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KEY TO PRONUNCIATION.

ã	far, father
ā	fate, hate
a or ă	at, fat
ã	air, care
ạ	ado, sofa
â	all, fall
ch	choose, church
ē	eel, we
e or ĕ	bed, end
ė	her, over: also Fr. *e*, as in *de; eu*, as in *neuf;* and *oeu*, as in *boeuf, coeur;* Ger. *ö* (or *oe*), as in *ökonomie.*
ẹ	befall, elope
ë	agent, trident
ff	off, trough
g	gas, get
gw	anguish, guava
h	hat, hot
h or H	Ger. *ch*, as in *nicht, wacht*
hw	what
ī	file, ice
i or ĭ	him, it
î	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din
j	gem, genius
kw	quaint, quite
ṅ	Fr. nasal *m* or *n*, as in *embonpoint, Jean, temps*
ñ	Span. *ñ*, as in *cañon* (căn'yŏn), *piñon* (pēn'yŏn)
ng	mingle, singing
nk	bank, ink
ō	no, open
o or ŏ	not, on
ô	corn, nor
ȯ	atom, symbol
ọ	book, look
oi	oil, soil; also Ger. *eu*, as in *beutel*
ö or oo	fool, rule
ou or ow	allow, bowsprit
s	satisfy, sauce
sh	show, sure
th	thick, thin
ṫh	father, thither
ū	mute, use
u or ŭ	but, us
ů	pull, put
ü	between u and e, as in Fr. *sur*, Ger. *Müller*
v	of, very
y	(consonantal) yes, young
z	pleasant, rose
zh	azure, pleasure
' (prime), " (secondary)	accents, to indicate syllabic stress

THE ENCYCLOPEDIA AMERICANA

Atahualpa, ä'ṭa-wäl'pa (*atahu,* Latin *virtus* and *allpa,* sweet), a Peruvian inca, the son of Huayna Capac, eleventh inca. His brother Huascar succeeded Huayna Capac; but Atahualpa obtained the kingdom of Quito, and a civil war broke out between the brothers; though the details are not accurately known, it appears that when Pizarro was beginning to move inland Huascar had been defeated and thrown into prison, and Atahualpa had become inca. Pizarro set out in September 1532, and made for Cassamarca, where the inca was. On 15 Nov. Pizarro entered Cassamarca, and sent to request an interview with the inca. On the evening of the next day, Atahualpa entered the great square of Cassamarca, accompanied by some five or six thousand men, while Pizarro's artillery and soldiers were planted in readiness in the streets opening off the square. The interview was carried on by the priest Vicente de Valverde, through an interpreter. He stated briefly and dogmatically the principal points of the Christian faith and the Roman Catholic policy, and concluded by calling upon Atahualpa to become a Christian, obey the commands of the Pope, give up the administration of his kingdom, and pay tribute to Charles V., to whom had been granted the conquest of these lands. To this the inca at first returned a very temperate answer. The priest retired, and Pizarro at once gave the signal for attack. The Spaniards rushed out suddenly, and the Peruvians, astonished and defenseless, were cut down in hundreds. Atahualpa, thus treacherously captured, offered an enormous sum of money as a ransom, and fulfilled his engagement; but Pizarro still detained him, until the Spaniards should have arrived in sufficient numbers to secure the country. While in captivity, Atahualpa gave secret orders for the assassination of his brother Huascar, and also endeavored to raise an army to expel the invaders. His plans were betrayed, and Pizzaro at once brought him to trial. He was condemned to death, and, as being an idolater, to death by fire. Atahualpa, however, professed himself a Christian, received baptism, and his sentence was then altered into death by strangulation. His body was afterward burned, and the ashes conveyed to Quito. Consult Prescott, 'Conquest of Peru.'

Atakapa, ä'ṭa-kä'pa, the designation of an extinct cannibal tribe who occupied the west gulf coast of Louisiana.

Atala, a'ṭa'la, a romance of the American wilderness, by Châteaubriand, published in 1801. It is the extravagant and artificial but beautiful story of two lovers — a young Indian brave, Chactas (that is, Choctaw), and an Indian maiden, Atala.

At'alan'ta, the name of two heroines in Greek mythology. One was a native of Arcadia, celebrated for her skill in archery. She slew with her arrows the Centaurs Rhœcus and Hylæus, sailed to Colchis with the Argonauts, and was present at the chase of the Caledonian boar, which she first wounded; hence Meleager awarded to her the prize. She was renowned for her beauty and swiftness in running. She stipulated that every candidate for her hand should run a race with her, and if he conquered her she was his own, but if he was conquered he was doomed to death at her hand. Many had fallen victims in the attempt, when Meilanion, by the aid of Aphrodite, overcame her. The goddess gave him three golden apples, which he threw behind him, one after another, as he ran. Atalanta stopped to pick them up, and Meilanion reached the goal before her. She accordingly became his wife. The other Atalanta, who cannot very well be distinguished from the preceding, the same stories being told about both, is connected with Bœotia and Bœotian localities. She is said to have been married to Hippomenes. See Morris, 'Atalanta's Race.'

At'alan'ta in Cal'ydon, a tragedy by Algernon Charles Swinburne, published in 1864. It deals with a Greek theme, and employs the Greek chorus and semichorus in its amplification. To this chorus are given several songs,

which exemplify the highest charms of Swinburne's verse — his inexhaustible wealth of imagery, and his flawless musical sense. The story is founded upon the hunting of the Caledonian boar.

At'aman, the title of the chief of the Cossack tribes. See HETMAN.

Ataulfus, Ataulf or **Adolf,** king of the Visigoths. The date of his birth is unknown. He was the brother-in-law of Alaric, whom he assisted in the sieges of Rome. After Alaric's death he went to Gaul and married Galla Placidia, sister of the emperor, June 414. In the same year he went to Spain and was assassinated at Barcelona in 415.

At'avism (Latin *atavus,* originally "ancestor," later specialized as "great-great-great-grandfather"): in biology, the reappearance in an organic being of specific ancestral peculiarities which have not appeared in intermediate generations, or of peculiarities of ancestral side branches not represented in the direct line. It is often loosely used as synonymous with reversion, but in scientific usage the latter is not the reappearance of single characteristics, and certainly not of abnormal ones, but the return in general type to the primitive type from which the special race was evolved. In this sense, it may be said that reversion is the extreme backward limit of atavism. For example, the birth of a six-fingered child with a six-fingered grandfather or uncle but normal parents would be atavism; but the approach of human beings left on a desert island to the prognathous and hairy type of the simians, were it conceivable, would be reversion. Sometimes the two are hardly to be discriminated; thus, the appearance of a tail-bone or pointed ears would be an atavism recalling the primitive type, as are horses with toes, yet not quite a reversion. A true reversion is the banded pigeon which is a frequent "sport" among fancy breeds; and the still commoner mongrel "yellow dog," a reversion to the jackal type. Atavisms are part of the perpetual family wonders, the reproduction of minute special features, habits, tricks of behavior, even tastes and fashions of speech, characteristic of distant relatives or far-back ancestors, but perhaps obliterated for long periods. In sociology, especially criminology, the word is used precisely in the sense of reversion to primitive instincts and passions, supposed to be overlaid or suppressed by civilization. The criminal on this theory is a being who has lost his evolved characteristics, and gone backward to the primitive savage. This, however, has too many flaws to be scientifically acceptable.

Atax'ia, an irregularity of function, but the term is usually applied to inco-ordination of muscular movements. It is a phenomenon seen in many disordered states of the body and not confined to the one disease, locomotor ataxia. Thus, ataxia is a common symptom of alcoholic intoxication. Two forms of ataxia may be distinguished, static and motor. In static ataxia there is an irregularity in the maintenance of attitudes and positions. This form of ataxia is common in chronic cocaine poisoning and is present in some severe cases of chorea, or St. Vitus' dance. The patients' limbs seem to give way beneath them and there is a restless irregularity in attitude and pose. Static ataxia is also a symptom in certain types of insanity, notably the disease termed catatonia. Motor ataxia is a much commoner form of this condition. In alcoholic intoxication it is well developed and the loss of control, largely due to diminution of the function of the sensory nerves, is too well known to need description. In a number of diseases of the nervous system ataxia of the muscles of the arms, lips, tongue, trunk, and lower limbs is a prominent symptom. Ataxia is to be distinguished from loss of the sense of equilibrium. See CEREBELLUM; CO-ORDINATION; EQUILIBRIUM; HEMIPLEGIA; LOCOMOTOR ATAXIA; SCLEROSIS.

Atbara, at-bä'ra (*Bahr-el-Agwad,* or Black River), an important tributary of the Nile. It rises in Abyssinia to the northwest of Lake Tzana, flows to the north, receiving several large tributaries, especially the Mareb and Tacazzé, and enters the Nile lat. 17° N.

Atchafalaya, ăch'ă-fa-lī'ya, a river in Louisiana, an outlet of the Red River. It flows southward through Grand Lake, and enters the Gulf of Mexico by Atchafalaya Bay. Its length is estimated at 250 miles and it is supposed to have been formerly the principal channel of the Red River.

Atcheen, a province of the Dutch Indies, until 1873 an independent state in the northwest part of Sumatra. Area 20,471 square miles, and containing a population of about 500,000. See ACHIN.

Atch'ison, David Rice, American legislator: b. Frogtown, Ky., 11 Aug. 1807; d. 26 June 1886. He was educated for the bar, and began practising in Missouri, in 1830. He was elected to the legislature in 1834 and 1838; was appointed judge of the Platte county circuit court; and, in 1843, while holding this office, was appointed United States senator to fill a vacancy. He was twice elected to the last office, and during several sessions was president *pro tem.* of the Senate. During Sunday 4 March 1849, he was the legal President of the United States, as Gen. Taylor, the President-elect, was not sworn into office until the following day. Senator Atchison became conspicuous in the slavery debates and in the Kansas-Nebraska struggle, because of his strong pro-slavery views. The city of Atchison, Kan., was named after him.

Atch'ison, Kan., a city and county-seat of Atchison County; on the Missouri River, 20 miles above Fort Leavenworth and on the Atchison, T. & S. F., the Chicago, R. I. & Pacific, the Burlington & Q. and other railroads. The city is beautifully situated on the "Great Bend" of the Missouri River, and because of its excellent river and extensive railroad facilities it is an important commercial centre, and one of the principal cities of the State. It exports large quantities of grain, flour, live-stock, coal, lumber, fruit, and general agricultural produce. The wholesale trade of the city in groceries, drugs, hardware, etc., is also very extensive, representing annually more than $50,000,000. The manufacturing interests of Atchison are important, there being over 50 large industrial establishments, including grain ele-

vators, flouring-mills, foundries, railroad shops, carriage works, brick yards, furniture, broom and harness factories, etc. The city contains many attractive buildings, notably the county court-house and government building, and the union depot erected at a cost of $140,000. The Missouri River is bridged by a noteworthy structure some 1,200 feet long. There are three parks in the city — Forest, City and Central; three banks with a combined capital of $300,000 and an annual business of $7,000,000; daily, weekly and monthly periodicals, and gas, electric-light, sewer, water and electric railway plants. Atchison is the seat of the State Soldiers' Orphans' Home; Wells' Insane Asylum; Allaman's Hospital; Midland College (Lutheran); Saint Benedict's College (Roman Catholic); Mount Saint Scholastica's Academy (Roman Catholic); has a fine public library and an excellent system of public education (8 public and 3 parish schools). The school board is chosen by popular vote. The city is governed by a mayor, elected every two years, and a municipal council of 10 members. The mayor appoints the administrative officials who are subject to confirmation by the city council. The city was first settled in 1854 and was named in honor of Senator D. R. Atchison. It was incorporated as a city in 1859. Pop. (1904) 16,925.

H. B. Horn,
Editor Atchison Champion.

Atchison, Topeka & Santa Fé Railway, The, one of the most important railways in the United States, and including a long list of auxiliary companies. The charter was granted 3 March 1863, the route prescribed being from Atchison on the Missouri River to the western boundary of the State of Kansas, in the direction of Santa Fé, New Mexico, a distance estimated at 500 miles. The time for completion was limited to 10 years, which expired 3 March 1873. Five years and six months were allowed to pass without commencing operations. In September 1868 the charter was transferred to new parties. In 1869 28 miles were built; in 1870 34 miles; in 1871 75 miles. The western boundary of Kansas not having been established, it was estimated that the remainder to be built, with only one year for the completion of the road and telegraph line which was to accompany it, was 345 miles. By great effort the means were provided, and the work completed with rapidity then unprecedented, and the cars were run over the entire line from the Missouri River to Colorado, about 470 miles, on the 28th day of December 1872, thereby saving the land grant, which would have been forfeited had the road not been completed before 3 March 1873. The road was remarkably well built, much better than the majority of western railways at that time, and in general construction bore comparison with the best roads either east or west. It ran for the greater part in the valley of the Arkansas River, with easy grades and curves, and almost immediately developed an amount of business that surprised the ownership and the public. The part which this railway has had in the building up of Kansas, Colorado and other sections through which it runs cannot be overestimated. It opened vast tracts of productive land to settlement, and drew a large emigration from the East to that region, where thriving towns and fertile farms took the place of what had been a desert. The road acquired a large share of through business in 1876 by leasing the Pueblo & Arkansas Valley and the Kansas City, Topeka & Western. Steel rails were adopted in place of iron, and neither effort nor expense were spared to bring the road up to the highest standard.

The growth of the Atchison, Topeka & Santa Fé in 30 years is shown by recent statistics. In 1875 the gross earnings of the system were $1,500,000, operating expenses $700,000; and net earnings $800,000; in 1902 the gross earnings were $59,100,000; operating expenses $33,000,000; and net earnings $25,200,000. The growth of mileage has been equally rapid. In 1875 the road only extended from Kansas City and Atchison to Wichita and Pueblo, 711 miles. On 30 June 1902 the main track mileage operated was about 7,900, which has since been added to considerably by the acquisition of new lines. The rolling stock, about 28 years ago, consisted of 38 locomotives and 1,028 cars, including two Pullmans. By recent figures it was 1,312 locomotives and 36,370 cars. Locomotive repairs were $60,000 in the early period, and $3,700,000 in the present. Grain shipments in 1875 were 28,400 tons, and were by late figures 1,550,000 tons. Live stock jumped from 87,500 head to 870,000 head. Passenger and freight traffic showed proportionate increase. These figures give an idea not only of the growth of the Atchison, Topeka & Santa Fé system, but also of the strides made by the Western United States in the past 30 years.

In the annual report of the Atchison, Topeka & Santa Fé for 1904 President Edward P. Ripley says:

"The large increase in the system earnings reflects the rapid growth of the territory served by your lines in population and wealth, and this growth is likely to continue. Many miles of your main lines are fed by but few branches, and extensive territory that should furnish profitable traffic to the system still remains, in a great measure, undeveloped for want of adequate railroad facilities. The construction of additional branches and feeders will be desirable in the near future, in order to increase the earnings of the system and strengthen its position, and in order to furnish additional transportation facilities to the growing territory through which the system extends. Furthermore, the traffic on your main lines has become so dense that the construction of second tracks and provision for additional equipment will soon be imperative. Since the year 1896 more than $30,000,000 of surplus net income has been applied to the development and enlargement of your properties, and it is expected that a considerable amount of surplus net income will be applied in like manner hereafter; but it is the opinion of your directors that additional capital should be obtained during the next few years for the purposes above referred to, and it is believed that the expenditure of this capital will result in a substantial increase of the surplus net income of the company."

The gross earnings for the year amounted to $68,171,200, an increase of $5,820,802 as compared with 1903. The operating expenses show an increase of $3,784,922. The mileage of the railroad increased 214.46. Of this increase, 134

miles was due to the completion of the Eastern Oklahoma Railway. It also includes the Gulf, Beaumont & Kansas City Railroad, which was leased during the year.

Ate, ā'te, among the Greeks the goddess of hate, injustice, crime, and retribution. According to Homer she was the daughter of Zeus, but according to Hesiod, the daughter of Eris (Strife). She was a vengeful goddess and was banished from Olympus by Zeus, whom she had induced to take an oath of which he subsequently repented. Her influence was always pernicious, and in her journeyings over the earth she afflicted mankind, but she was followed by other goddesses, the benevolent daughters of Zeus, who restored those who had come under Ate's evil influence.

At'eles, a genus of South American monkeys of the division with long prehensile tails, to which the name Sapajou is sometimes collectively applied. The head is round, and the facial angle about 60 degrees; the limbs are remarkably long and slender, upon which account the English name of spider monkey is sometimes used as a generic designation; the forelimbs are either destitute of a thumb or have a rudimentary one.

Ateles'tite, a native basic arsenate of bismuth, having the formula $3Bi_2O_3.As_2O_5.2H_2O$. It is yellow in color, and translucent with an adamantine lustre. It occurs in small monoclinic crystals, at Schneeberg, Saxony.

Ateliers Nationaux, ạ-tĕ-lĭā' na'syō'nō', national workshops established by the provisional government of France in 1848. Previous to the outbreak of the revolution of Feb. 1848, there had been two years of scarcity, inundation, and commercial crisis. *Ateliers nationaux,* or national workshops, were opened at once. The workmen were organized under lieutenants and brigadiers of their election. The number of applicants, including arrivals from the provinces, at length exceeded 100,000, and the total expense reached nearly 16,000,000 francs. The men were employed on roads, railways, earthworks, etc., but it was impossible to find work for the whole, and a great part of the labor was unprofitable. There were besides 30,000 to 40,000 women employed in preparing articles of outfit for the army, whose work left only a trifling loss. In June the Constituent Assembly resolved upon the immediate closing of the ateliers. This rash step provoked the insurrection of the Red Republicans (23d–26th June), suppressed by Gen. Cavaignac with fearful slaughter. In Lyons the ateliers were closed without disturbance, but in some other towns trouble was occasioned.

At'ella'næ Fab'ulæ (called also *Oscan plays*), a kind of light interlude between tragedy and comedy, performed by freeborn young Romans. This kind of a play is said to have originated in *Atella,* a city of the Oscans, between Capua and Naples, and a few disconnected fragments are all that remain of a national Italian comedy, consisting of farce seasoned by satire.

Atesh'ga (the place of fire), a place much revered by Persian fire-worshippers. It is on the peninsula of Apsheron, on the west coast of the Caspian, and is visited by large numbers of pilgrims, who bow before the sacred flames issuing from the bituminous soil.

Ath, ät, a town of Belgium, 14 miles from Mons. It has a hospital and college and important manufactures of linen, lace, cutlery, soap, and large hammers. It was formerly a fortress. Pop. (1900) 11,100.

Ath'a, a false prophet in the reign of the Caliph Mehedy, or his predecessor, Al-mansur. He taught the doctrine of metempsychosis, and claimed to be an incarnation of divinity. He had lost one of his eyes, on account of which he always wore a veil, whence he received the epithet of Mokanna. He is the hero of Moore's «Veiled Prophet of Khorassan» in 'Lalla Rookh.'

Athabasca, ăth'a-băs'ka, a district in northwestern Canada formed in 1882 and enlarged in 1895. It contains 251,965 square miles, including 8,805 square miles of water area, and is bounded on the north by the district of Mackenzie, on the east by the district of Keewatin, on the south by the districts of Saskatchewan and Alberta, and on the west by British Columbia. The district is watered by the Athabasca and Peace rivers. There are numerous lakes in the district, chief of which are Athabasca in the north and Reindeer in the east. The climate varies greatly but is not so severe as the high latitudes would seem to imply, and the air is very clear and bracing. The snow and rainfall is not great, but during the growing months of summer the rains are abundant, which add much to the productiveness of the district. The soil in the western part of the district is very fertile, and wheat, potatoes, and other cereals are readily grown. In the eastern section the soil is less fertile, being rocky and sandy. The fur trade is still a considerable industry. The country is well wooded with spruce, pine, and poplar. In the west the aspen trees predominate, growing to considerable size. The population of the district is small, consisting mostly of Indians (1,239) and half-breeds, who support themselves by hunting, but the immigration to the Northwest will soon seek this productive territory. The principal settlement is Dunvegan, in the southwest. On 1 Sept. 1905 the province was divided, the westerly portion being united to Alberta, and the easterly portion combined with Saskatchewan and Assiniboia to form the province of Saskatchewan.

Athabasca, (1) the name of a river in northwestern Canada which has its source in the eastern slopes of the Rocky Mountains, near Mount Brown, pursues a tortuous course to the north till it falls into Lake Athabasca. (2) The name of a Canadian lake, in the northwest territories, also called Lake of the Hills, 230 miles in length and averaging 14 miles in width. Near its southwestern extremity it receives the Athabasca River and discharges its waters northward by the Great Slave River. The north shore is high and rocky and thickly wooded with firs and poplars, etc., the south shore is level.

Athabasca Pass, a narrow passage in the Canadian Rocky Mountains, between Mount Brown and Mount Hooker. It crosses the boundary between the district of Alberta and British Columbia.

Ath'ali'ah, the daughter of Ahab, king of Israel, and wife of Joram, king of Judah. She was a woman of abandoned character, and fond of power, who, after the death of her son Ahaziah, opened her way to the throne by the murder of 42 princes of the royal blood. She reigned six years; in the seventh the high priest Jehoiada placed Joash, the young son of Ahaziah, on the throne of his father. Athaliah, attracted by the noise of the people who were crowding to the coronation of Joash, entered with them into the temple, where the ceremony was going on. At the sight of the new king, surrounded by priests, Levites, great officers of the kingdom, and the joyful people, she was beside herself; she tore her hair, and cried out, "Treason!" Jehoiada ordered her to be immediately led from the temple by the officers, and commanded that all who should offer to defend her should be slain; but she was put to death at the gate of the palace without opposition. The altars of Baal, which she had erected, were thrown down, and the worship of God restored (about 877 B.C.) (2 Kings viii. ix.). This story is the theme of Racine's 'Athalie,' written at the request of Madame de Maintenon.

Athalie, a'ta-lę, a famous tragedy by Racine, based on the Bible story of Athaliah. It was first performed in 1600. Rachel won her greatest triumphs in this play.

Ath'amas, the son of Æolus, and husband of Nephelē, the cloud goddess. Their children were Hellē and Phryxus. Being afterward separated from Nephelē, he had by Ino, his second wife, Learchus, Melicertes, and Eurycleia. Athamas, having lost his reason through the anger of Hera, and taking Ino and her children for a lioness and her whelps, seized Learchus and dashed him against a stone; while Ino, with Melicertes in her arms, plunged into the sea, and became the sea goddess Leucothea, Melicertes being transformed into Palænon, a divinity worshipped by sailors. Athamas now abandoned Bœotia and fled to Phthiotis, where he built Alos, and united himself with Themisto.

Athan'agild, the 14th king of the Spanish Visigoths, who succeeded Agila in 554, and died in 566. Being threatened by Agila, he applied for aid to Justinian, emperor of the East, who sent troops, and Athanagild defeated his adversary, who was obliged to retire to Merida. Athanagild was re-established at Toledo, which he made his capital.

Athan'aric, a king of the Visigoths in Thrace about the middle of the 4th century: d. Constantinople, 25 Jan. 381. The emperor Valens made war upon him and compelled him to sue for peace, but Athanaric would not come upon the Roman territory to sign the treaty, while Valens thought it beneath his dignity to visit the barbarian at home. Accordingly a bridge of boats was constructed across the Danube, and the two potentates met in the middle. In 380 he was compelled to flee to Constantinople, where Theodosius received him hospitably, and gave him a small pension until his death. See Hodgkin, 'Italy and Her Invaders,' Vol. I. (1880).

Athanasian (ăth'a-nā'zhăn) **Creed.** See CREED.

Athanasius (ăth'a-nā'zhĭ-ŭs) **Saint,** Bishop of Alexandria, a celebrated Greek theologian: b. Alexandria about 296; d. 373. He had a Christian education, and came into the family of Alexander, afterward archbishop of Alexandria. Alexander took him to the council at Nice, where he gained the highest esteem of the fathers by the talents he displayed in the Arian controversy. About 326 he became bishop of Alexandria. The complaints and accusations of his enemies at length induced the emperor Constantine to summon him in 334 before the councils of Tyre and Jerusalem, but his judges could do nothing, however, further than suspend him from his office. He still continued in the discharge of his duties until the emperor, deceived by new falsehoods, banished him to Treves. The death of Constantine put an end to this banishment at the end of a year and some months. Constantius, emperor of the East, recalled the holy patriarch. His return to Alexandria resembled a triŭmph. The Arians made new complaints against him, and he was condemned by 90 Arian bishops assembled at Antioch, while 100 orthodox bishops, assembled at Alexandria, declared him innocent. Pope Julius confirmed this sentence, in conjunction with more than 300 bishops assembled at Sardis from the east and west, and in consequence of this he returned a second time to his diocese. But when Constans, emperor of the West, died, and Constantius became master of the whole empire, the Arians ventured to rise up against Athanasius. Athanasius, displaced for a third time, fled into the deserts of Egypt. His enemies pursued him even here, and set a price on his head. To relieve the hermits who dwelt in these solitary places, and who would not betray his retreat, from suffering on his account, he went into those parts of the desert which were entirely uninhabited. He was followed by a faithful servant, who, at the risk of his life, supplied him with the means of subsistence. In this undisturbed spot Athanasius composed many writings, full of eloquence, to strengthen the faith of the believers, or expose the falsehood of his enemies. When Julian the Apostate ascended the throne he allowed the orthodox bishops to return to their churches. Athanasius therefore returned after an absence of six years. The mildness which he exercised toward his enemies was imitated in Gaul, Spain, Italy, and Greece, and restored peace to the Church. But this peace was interrupted by the complaints of the heathen, whose temples the zeal of Athanasius kept always empty. They excited the emperor against him, and he was obliged to flee to Thebais to save his life. The death of the emperor and the accession of Jovian again brought him back; but Valens becoming emperor eight months after, and the Arians recovering the superiority, he was once more compelled to flee. He concealed himself four months, until Valens, moved by the pressing entreaties and threats of the Alexandrians, allowed him to return. From this period he remained undisturbed in his office until he died, 373. Of the 46 years of his official life he spent 20 in banishment, and the greater part of the remainder in defending the Nicene Creed. Athanasius is one of the greatest men of whom the Church can boast. His deep mind, his noble heart, his invincible courage, his living faith,

his unbounded benevolence, sincere humility, lofty eloquence, and strictly virtuous life, gained the honor and love of all. His voluminous writings, which are chiefly controversial and dogmatical, treat of the mysterious doctrines of the Trinity, the incarnation of Christ, and the divinity of the Holy Spirit. His 'Apology Against the Arians,' addressed to the emperor Constantine, is a masterpiece. The creed which goes under his name was not written by him, but belongs to a later time. (See CREED.) The most complete edition of of his works is that published at Padua in 1777 (4 vols. folio).

Bibliography.— Bright, 'Lessons from the Lives of Three Great Fathers' (1890); Farrar, 'Lives of the Fathers' (1889); Fisher, 'History of Christian Doctrine' (1896); Harnack, 'History of Dogma,' Vol. IV. (1898); Möhler, 'Athanasius and the Church of His Time'; Hergenröther, 'Athanasius the Great, Görres Gessellschaft.'

Athapascan Stock (also *Tinneh*), of American Indians, and one of their most numerous and widely distributed linguistic and ethnological groups. The type-name is taken from a northwest Canadian group, the western Montagnais; but the tribes are scattered from Alaska to Mexico. The original stock were semi-arctic, along the Yukon and Mackenzie, fierce and energetic, but of a low type of culture; and spread southward by conquest on both sides of the Rocky Mountains. They are divided into three chief groups, the northern, the Pacific, and the southern. The first are those in the original home,— northwest Canada and interior Alaska,— Montagnais, Montagnards, Chippewayan, Kutchin, etc. These number about 8,500. The second are those of Washington, Oregon, and California, except the Thlinkeet coast tribes, which extend along the Alaskan coast also. These are few and scattered tribes, about 900 souls in all. The southern, and far the most important, comprises some 23,500 mostly of the great Apache and Navajo confederacies, also the Jicarillas and Mescaleros, and the Lipan, of Mexico.

Atharvana, at'här'vănạ, the fourth of the Indian Vedas. Its language is more modern than that of the other three. The theological treatises, regarded as 52 in number, called Upanishads, are appended to the Atharvan Veda.

A'theism, the denial of the existence of a God. Among the Greeks atheism consisted in a denial or non-recognition of the gods of the State. Socrates was put to death for asserting the superiority of the divine wisdom to the other gods, as the ruler and disposer of the universe, thus contradicting Greek mythology, which assigned that office to Zeus. In Latin times atheism still continued to be a negation, with no pretension to rank as a system. It was closely akin to that cultured unbelief which extensively prevailed among the Humanists during the early part of the Renaissance. The atheism of the 18th century was a protest against current religious hypocrisy; and, like its predecessors, put forward little or nothing to replace the system it attempted to destroy. The atheism of the 19th century may be taken to include every philosophic system which rejects the notion of a personal Creator; in this sense it ranks as a genus, of which Atomism, Pantheism, Positivism, etc., are species. Strictly, it is the doctrine that sees in matter the sole principle of the universe. Popularly, atheism consists in the denial of a God; this view is probably founded on the mistranslation of Psalms xiv. 1, and liii. 1, which should be, "The fool hath said in his heart, No God for me," that is, he wilfully rejects God, at the same time knowing that he is.

Ath'el, or **Æthel,** an Old English word signifying noble, eminent, not only in blood or by descent, but in mind. It is frequently a part of Anglo-Saxon proper names.

Ath'eling, a title of honor among the Anglo-Saxons, meaning one who is of noble blood. The title was gradually confined to princes of the blood royal, and in the 9th and 10th centuries applied exclusively to the sons or brothers of the reigning king. It was first conferred on Edgar by Edward the Confessor, his grand-uncle, who bestowed it when he designed to make him successor to himself.

Athelney, ăth'ĕl-nĭ, a marshy island in Somersetshire, England, about seven miles southeast of Bridgewater. It is formed by the junction of the rivers Parret and Tone. Alfred the Great established a fortified post here during a Danish invasion, and afterward founded an abbey which has entirely vanished.

Ath'elstan, a Saxon monarch, the first to assume the title of king of England. He succeeded his father, Edward the Elder, in 925, and died in Gloucester, 27 Oct. 940. He was victorious in his wars with the Danes of Northumberland, and the Scots, by whom they were assisted. After the overthrow of his enemies at Brunanburh (937), which became famous in Saxon song, he governed in peace and with great ability.

Ath'enæ'um, the general name of temples to Athena, but more especially applied to the temple at Athens, frequented by poets, learned men, and orators. Instruction was also given there to the youth, and in later times the name was applied to all places of education for the young. The same name was given at Rome to the celebrated school which Hadrian established on the Capitoline Mount about 135 A.D. Many learned men received ample salaries for giving instruction in this institution, and that they might be enabled to study at leisure. Here also learned men assembled to exchange ideas.

Ath'enæus, a Greek rhetorician and grammarian, who lived at Naucratis, in Egypt, then at Alexandria, and afterward at Rome, at the end of the 2d and beginning of the 3d century after Christ. He has left an encyclopedic work in the form of conversation, called the 'Feast of the Learned' (Deipnosophistæ), a rich but ill-arranged treasury of historical, antiquarian, philosophical, grammatical, and other knowledge. The principal editions are those of Schweighäuser (1801–7); Dindorf (1827); Meineke (1859–67).

Ath'enag'oras, a Christian philosopher of Athens, who wrote in Greek an 'Apology for the Christians,' addressed to the emperor Marcus Aurelius, in 177. This work defends the Christians from the accusations brought against them by the heathens (of atheism, of incest, of

eating murdered children, and the like), with a philosophical spirit and in a lively and forcible style.

Ath'ena'is, or **Eudocia,** empress of the East, daughter of the Athenian philosopher Leontius: b. Athens about 393–4 A.D.; d. Jerusalem about 465. Athenais gaining the favor of Pulcheria, sister of the emperor Theodosius, a youth of 20 years of age, presently became the wife of Theodosius and was persuaded to receive baptism by the name of Eudocia. By Theodosius she had a daughter, Eudoxia, who was married to Valentian III., emperor of the West. She was indisposed to submit to the authority of Pulcheria, who virtually ruled the empire of the East, and a quarrel ensued, in which Eudocia had for a time the ascendency; but the jealousy of her husband being aroused, the authority of Pulcheria was restored, and Eudocia was permitted to retire to Jerusalem. When her daughter and granddaughters were taken prisoners by Genseric she became reconciled to the orthodox Church.

Athene, ạ-thē'nẹ. See MINERVA.

Athe'ne, Temple of. See ÆGINA.

Athen'odo'rus, a Greek sculptor of the Rhodian school, who, with his father, Agesander, and Polydorus, executed the celebrated group of the «Laocoon.»

Ath'ens, Ala., county-seat of Limestone County, situated on the Louisville & N. railroad, 107 miles south of Nashville, Tenn., 85 miles north of Birmingham. Athens has a cotton factory, knitting mill, sash, door and blind factory, two large lumber mills, State Agricultural School; Athens Female College, under ownership and direction of North Alabama Conference, Methodist Episcopal Church south. Has five churches for whites and several churches for colored population, and two newspapers. Surrounded by a splendid agricultural country and has many advantages. City owns and operates water and light plant and the town has an excellent sewer system. City also owns and operates a dispensary.

ROBERT M. RAWLS,
Editor 'Alabama Courier.'

Ath'ens, Ga., a city and county-seat of Clarke County, on the Oconee River, and the Central of G., the Georgia, the Northeastern of G., and the Seaboard A. L. R.R.'s, 67 miles east of Atlanta, the State capital. It is in a cotton-growing region; has a large trade in that staple; and contains cotton and woolen, cotton-seed oil, bobbin, and hosiery mills, iron works, furniture factories, and other industrial plants. It is the seat of the University of Georgia, the State College of Agriculture and Mechanic Arts, Lucy Cobb Institute, Knox Institute, Jeruel Academy, and a State Normal School. There are electric light and street railway plants, two national banks, several hotels, and daily, weekly, and monthly periodicals. The assessed property valuation exceeds $6,000,000. Athens was first settled in 1801. Pop. (1904) 14,000.

Ath'ens (ancient Greek, *Athēnai*), the capital of the kingdom of Greece, anciently the capital of the State of Attica and the centre of Greek culture. Its origin and early history are shrouded in darkness. It is situated in the central plain of Attica, about four miles from the Saronic Gulf or Gulf of Athens, an arm of the Ægean Sea, running in between the mainland of Greece and the Peloponnesus. The site is irregular, the city having been built on and around several hills rising from the plain, Mount Lycabettus, on the northeast, overlooking the whole. The principal eminence within the city boundary was the Acropolis, the site first built on; west from the Acropolis was a lower hill, called the Areopagus; southwest from the Areopagus was the Pnyx and south from the Pnyx the Museum; toward the sea on the south the view was unimpeded. On the east of the city was the stream known as the Ilissus, and on the west the Cephissus. The Acropolis was often called Polis or the city, from its having formed the original nucleus of the town, while the whole city, or sometimes only the lower city, as distinct from the Acropolis, was called Asty. In the Areopagus and the line of hills that run north and south to the west of it traces of numerous dwellings cut in the rocks have recently been found. At its most flourishing period, in the 5th century B.C., Athens was connected with its port-town Piræeus and the harbors of Piræeus and Munychia by two massive walls 550 feet apart, while a third wall ran to the less important harbor of Phalerum. The first was considered the most convenient, and was one of the emporiums of Grecian commerce. The surrounding coast was covered with magnificent buildings, whose splendor vied with those of the city. The walls of rough stone which connected the harbors with the city were so broad that carriages could go on their top. The Acropolis contained the most splendid works of art of which Athens could boast. Its chief ornament was the Parthenon or Temple of Athena Parthenos (the Virgin). This magnificent building was 228 feet long, 101 broad, and 66 high. It was built under the administration of Pericles, and finished in 438 B.C. It was of the Doric order of architecture, and was built of marble, resting upon a basement of limestone. It had columns on all sides, 8 at either front and 17 at the sides, counting the corner columns twice. These columns were fully six feet in diameter at the base, and 34 feet high. The structure was adorned both within and without with statues, reliefs, and other sculptures. Inside the temple stood the statue of Athena by Phidias, a masterpiece of art, nearly 40 feet high, the unclothed portions formed of ivory, the drapery of plates of gold, the weight of which was estimated at 44 talents. The Propylæa, a magnificent building, built of white marble, formed the entrance to the Acropolis, of which it covered the whole western end. A splendid marble stair, 70 feet broad, led up to the Propylæa. The chief building on the Acropolis, in addition to the Parthenon and the Propylæa, was the Erechtheum, a kind of double temple, especially sacred to Athena Polias (or Athena, guardian of the city), and Erechtheus, or Poseidon. On the Acropolis also were other temples, altars, statues, etc., including a colossal bronze statue of Athena Promachos, 50 or 60 feet high. On the south slope of the Acropolis were the theatre of Dionysus, the Odeum of Pericles, and the later Odeum of Herodes, the latter two buildings being intended for musical competitions. In

the lower city the greatest pieces of architecture were the temples of Theseus and Olympian Zeus, one of which stood on the northwest, the other on the southeast side of the Acropolis. The first was of Doric architecture, and resembled the Parthenon. On the metopes of this temple the famous deeds of Hercules and Theseus were excellently represented. The temple of Zeus Olympius was of Corinthian architecture, and was the largest temple in Athens, and the greatest ever erected to the supreme deity of the Greeks. It was begun by Pisistratus, and continued from time to time until at length, after 700 years, it was finished by Hadrian. The outside of this temple was adorned by 120 fluted columns, 60 feet high, and 6 feet in diameter. It was 354 feet long and 171 broad. Other structures deserving of notice were the Horologium of Andronicus Cyrrhestes or the "Temple of the Winds," the choragic monument of Lysicrates, and the Stoa Poikilē or gallery of paintings. Besides these wonderful works of art Athens contained many other places which must always be interesting from the recollections connected with them. Such a spot was the renowned Academy where Plato taught, lying about six stadia north of the city, and consisting of a gymnasium surrounded by walks, groves, and fountains. Such a place was the Lyceum, where Aristotle taught, and which, through him, became the seat of the Peripatetic School. It lay on the bank of the Ilissus, opposite the city, and was also used for gymnastic exercises. Not far from thence was the less renowned Cynosarges, where Antisthenes, the founder of the Cynic School, taught. The sects of Zeno and Epicurus held their meetings in the city. Zeno chose the well-known Poikilē, and Epicurus established himself in a garden within the walls, for he loved both society and rural quiet. Not only literary, but political assemblies gave a particular interest to different places in Athens. Here was the court of Areopagus, where that illustrious body gave their decisions; the Prytaneum or senate-house; the Pnyx, where the free people of Athens deliberated. After 23 centuries of war and devastation, of changes from civilized to savage masters, have passed over this great city, its ruins still excite astonishment. The northern wing of the Propylæa is still tolerably perfect, and the inner wall, with its five gateways leading into the Acropolis, still stands. The Parthenon remained almost entire till 1687, when it was much injured by an explosion of gunpowder during the siege of Athens by the Venetians. It is now a magnificent ruin. Its two pediments represented, respectively, the contest of Poseidon and Athena for Athens and the birth of the goddess, while the metopes represented a number of events in which the goddess or heroes connected with Athens took part. A great number of these sculptures are now in the British Museum. In the whole of this mutilated building we find an indescribable expression of grandeur and sublimity. Near the Propylæa is the small but elegant temple of Nikē Apteros (Wingless Victory), which having been destroyed in 1687, was re-erected in 1835 from its remains. There are well-preserved remains to be seen of the Erechtheum, especially the beautiful female figures called Caryatides, supporting the roof of the southern portico. The Temple of the Winds is still tolerably perfect. Its form is an octagon: on each side it is covered with reliefs, which represent one of the principal winds. The choragic monument of Lysicrates also remains. It consists of a pedestal surrounded by a colonnade, and is surmounted by a dome of Corinthian architecture. Outside of the city are the lofty ruins of the temple of the Olympian Zeus. Of 120 pillars 16 remain, but none of the statues are in existence. The pedestals and inscriptions are scattered here and there, and partly buried in the earth. The main body of the temple of Theseus has remained almost entire, and it now contains a collection of ancient sculpture. On the hill where the famous court of Areopagus held its sittings are to be seen steps hewn in the rock, places for the judges to sit, and over against these the stations of the accuser and the accused. The hill became a Turkish burial-ground, and is covered with monuments. The Pnyx, the place of assembly for the people, not far from the Areopagus, is very nearly in its primitive state. One may see the place from which the orators spoke hewn in the rock, the seats of the scribes, and at both ends the places of those officers whose duty it was to preserve silence, and to make known the events of public deliberations. The niches are still to be seen where those who had any favor to ask of the people deposited their petitions. The spot occupied by the Lyceum is only known by a quantity of fallen stones. The ground occupied by the gardens of the Academy is still well cultivated and fertile. The long walls are totally destroyed, though the foundations are yet to be found on the plain. The Piræus has scarcely anything of its ancient splendor, except a few ruined pillars scattered here and there, though it promises to become a handsome modern town, and has again a harbor filled with shipping, engaged in carrying on a considerable trade. The most thorough investigation of the places among the ruins of Athens worthy of attention is contained in Leake's 'Topography of Athens, with Some Remarks on its Antiquities' (1821, with an atlas in folio; 2d ed. 1841). Other valuable works on the same subject are such as Stuart and Revett's 'Antiquities of Athens' (1762–1816); Dodwell's 'Tour Through Greece'; Wordsworth's 'Athens and Attica'; Curtius' 'Attische Studien'; Dyer's 'Ancient Athens'; and Wachsmuth's 'Die Stadt Athen in Alterthum.' Ancient Athens is believed to have had a population of not more than 200,000.

Athens was at no time so splendid as under the Antonines, when the magnificent works of from eight to ten centuries stood in view, and the edifices of Pericles were in equal preservation with the new buildings. Plutarch himself wonders how the ancient structures could retain such a perpetual freshness. Pausanias, who traveled in Greece at this time, that is, in the 2d century after Christ, has left a valuable account of the state of Athens as he saw it. Many of the edifices of later times were due to foreign potentates, rulers of Pergamus, of Egypt, of Rome. But after a time the wholesale robberies of collectors, the removal of great quantities of the works of art, first to Rome and then to Constantinople, Christian zeal, and the attacks of barbarians, made sad

1. Acropolis from the Hill of the Museum. 2. Parthenon (west front) restored.

inroads among the monuments. When Justinian closed the schools of the philosophers in 529, Athens soon ceased to be a centre of intellectual activity. The Parthenon was turned into a church of the Virgin Mary, and Saint George stepped into the place of Theseus. In 1456 Athens fell into the hands of the Turks, under whom the Parthenon became a mosque. When it was selected as the capital of the modern kingdom in 1833, it had only a scanty population inhabiting a scene of ruins.

Modern Athens lies mostly northward and eastward from the Acropolis, and consists of well-built streets, the most important being Piræus, Athens, Stadion, and University. Among the principal buildings are the royal palace, the university, the academy of science and art, the polytechnic, the national museum, the observatory, the chamber of deputies, exhibition buildings, new theatre, and new library. The palace (1838–43) is a conspicuous but unattractive building of limestone with marble portico. The National University, founded in 1837, is a handsome structure, with a large number of teachers and an attendance of over 2,000 students. The academy is a beautiful building faced with Pentelic marble; the new National Library is also a fine building, containing over 200,000 volumes, and so is the Polytechnic School, part of which is occupied as a museum, and contains the Schliemann and other collections. Saint Nicodemus, the largest and finest of the Byzantine churches (62 feet long by 45 wide), dates from the 11th century. Athens is well equipped with educational institutions, possessing besides the National University and Polytechnic School, a number of high schools, a gymnasium, a school for the higher education of girls and female teachers, orphanages for boys and girls, and four foreign archæological schools or institutes, the French, German, American, and British. The city is governed by a mayor elected every four years, with a council of 18 members. There is a municipal fire department and the city controls the gas, electric light and waterworks, but the water supply is so inefficient that the inhabitants are obliged to have recourse to water-carriers. Street cars cross the city in all directions and it is an important railroad centre. The bathing resort of Phaleron, adjoining the Fort of Piræus, is connected with Athens by a suburban railroad. The city has very little manufacturing, although the financial centre of the kingdom, and its trade is concerned chiefly with its own requirements. Pop. (1896) 111,486.

Ath'ens, Ohio, a town and county-seat of Athens County, situated on the Baltimore & O. S. W., the Toledo & O. C., the Hocking V. & T., and the Kanawha & M. R.R.'s. Athens was settled in 1797, and in 1811 was incorporated. The government is by a mayor, elected every two years, and a village council. The town owns and operates the waterworks. It is the seat of Ohio State University (q.v.) and of the Southeastern Ohio Insane Asylum, and manufactures lumber and brick. Pop. (1900) 3,066.

Ath'ens, Tenn., a town and county-seat of McMinn County, on the Southern R.R. half way between Knoxville and Chattanooga, 56 miles to either city. The town was incorporated in 1868. It has woolen mills, spinning mills, lumber factories and two newspapers. It is the seat of Grant Memorial University (q.v.). Pop. (1904) 2,600.

W. T. Lane,
Editor 'Athens Post.'

Ath'ens, Texas, city and county-seat of Henderson County; at the junction of the Saint Louis & S. and the Texas & N. O. R.R.'s., 75 miles from Dallas. It is an important manufacturing town and has pressed brick, fire brick and tile works, cotton oil mills, potteries, and other industries. There are excellent public schools, four churches, and two national banks. Athens was first settled in 1850 and was incorporated as a city in 1901. Pop. (1900) 3,200.

Ath'ens of America, a name frequently applied to Boston, Mass., on account of her intellectual and literary pre-eminence.

Ath'ens of the North, a name given to Edinburgh, Scotland, on account of the picturesqueness of the site and beauty of architecture, as well as intellectual distinction. Copenhagen also is often so called.

Ath'ens of the West, a name given to Cordova, Spain, the centre of Arab learning and culture in the Middle Ages.

Ath'ens, American School at, an institution for classical study, founded in Athens, Greece, in 1882. It is affiliated with the Archæological Institute of America, and is managed by a committee representing the colleges in the United States which contribute to its support. The building was erected by means of private subscriptions, on grounds donated by the Greek government, and the institution has an endowment of $50,000.

Ath'erine, a small fish, from five to six inches long, called also the sandsmelt.

Atheroma, a term sometimes applied to the process of arteriosclerosis as a whole, but best restricted to that type of chronic degeneration of the blood vessels associated with softening of the tissues and their infiltration with the necrotic products, fat cholesterin, etc. See Arteries, Diseases of.

Atherton, Charles Gordon, American politician: b. Amherst, N. H., 1804; d. Manchester, N. H., 15 Nov. 1853. He was graduated from Harvard in 1822, was a member of the New Hampshire legislature for five years and speaker of the lower house for four, and in 1837–43 was a Democratic representative from New Hampshire in Congress. In 1843–9 and 1852–3 he was a member of the Senate. On 11 Dec. 1838 he introduced in the house the so-called "Atherton gag" resolution, which provided that all bills or petitions on the subject of slavery should be "laid on the table without being debated, printed, or referred." The resolution was passed by a vote of 126 to 73, and remained in effect until 1844. It was resolutely opposed by J. Q. Adams, who advocated the "right of petition." Adams was ultimately victorious, and on 3 Dec. 1844 the 21st rule of the House, providing that no paper praying the abolition of slavery or the slave trade should be in any wise entertained, was abolished by a vote of 108 to 80. See Gag-rules.

Atherton, George William, American educator: b. Boxford, Mass., 20 June 1837; d. Bellefonte, Pa., 24 July 1906. He worked his way

through Phillips Exeter Academy and Yale College; was professor of political economy and constitutional law in Rutgers College, N. J., in 1869–82; was admitted to the bar of New Jersey in 1878; and from 1882–1906 was president of the Pennsylvania State College.

Ath'erton, Gertrude Franklin (Horn), American novelist: b. San Francisco in 1857. Since the death of her husband she has chiefly pursued a literary career. She has written 'The Doomswoman' (1892); 'Before the Gringo Came' (1894); 'A Whirl Asunder' (1895); 'Patience Sparhawk and Her Times' (1897); 'American Wives and English Husbands' (1898); 'The Californians' (1898); 'A Daughter of the Vine' (1899); 'The Valiant Runaways' (1899); 'Senator Worth' (1900); 'The Aristocrats' (1901); 'The Conqueror' (1902); 'The Splendid Idle Forties' (1902), a revision of 'Before the Gringo Came'; 'The Bell in the Fog' (1905).

Ath'erton, a manufacturing town of England, Lancashire, 13 miles northwest of Manchester, containing cotton-factories, collieries, iron-works. Pop. (1900) 16,200.

Ath'erton Res'olu'tions. See Gag Rules.

Athetosis, a peculiar movement, usually of the hands and fingers, occurring after some destructive process in the brain. It is seen in the young who have suffered severe injuries at birth and sometimes following an apoplectic stroke.

Ath'letes (Greek, *athlētai*), combatants who took part in the public games of Greece; also young men who went through the gymnastic exercises to harden themselves and to become fit to bear arms. In a narrower sense athletes were those who made the athletic or gymnastic exercises their principal business, particularly wrestlers and boxers. Their business was to contend at the public festivals, and they regulated their habits of life for this end. Not only the applause of the people, but also crowns and statues, were conferred upon the victor. He was led in triumph; his name was written in the public records; and poets sang his praise. He also received peculiar privileges, had a yearly pension, and the foremost seat at the sacred games.

Athlet'ics, or **Athletism,** is the exhibition of man's physical prowess in games of skill and endurance, and though in the passing centuries it has undergone many phases, it is practically the same to-day as when the Olympian games, which were resumed at the Pan-American Exhibition at Buffalo in 1901, were originally given 2,500 years ago, and Greece was in her prime. Then not only Greek met Greek, but the influence of the Olympian, Pythean, Nemean and Isthmian games was felt to the farthest extremities of Asia. After the fall of Rome, the mantle of physical prowess which that nation had inherited from the Greeks, fell upon the shoulders of the sturdy Norseman, whose chief glory was in his individual capacity to bear unflinchingly the stress and strain of contests and the elements. They bred into the bone, the hardihood, and love of personal achievement which in turn carried the current through the Dark Ages, even into those of the exaggerated chivalry, which Cervantes killed with ridicule in 'Don Quixote.' The spirit of the Greek, Roman, and Norseman planted its seeds in the hardy Anglo-Saxons, who in turn transplanted them into Virginian and New England soils on the northern continent of America, where its influence has been felt, even to the entire disappearance of the softer Latin races' supremacy. It is not surprising, therefore, that, with the disappearance of the earlier modes of life of the first settlers, calling for all the physical strain that the human frame was capable of, and the return of the comparative leisure which in early youth now surrounds the American universities and colleges, there has re-appeared a yearning after opportunities to supply, artificially, if so it must be, the stress and contest, physical effort, and the proof of supremacy of the earlier ages, when such conditions were compulsory. It was in the blood, and it came out, much to the nation's benefit. First in the form of isolated college and club contests, and subsequently in such a volume as to need a separation of contests into classes and the creation of an especial federation of the separate units, to regulate and control it. In the beginning, athletics developed in this or that college, or university, or club, acting separately and indiscriminately in its scope. Ultimately the lines of natural cleavage forced athletics into its two great branches: one out-doors, commonly known as track-events; the other, those carried on in a gymnasium. The out-door events are those which are now usually meant when the term athletics is used. The development of these came tentatively. First one college, or university, or club, then another, organized outdoor contests, until at length the net was spread over all the rising generation, and the Amateur Athletic Union was formed, whose fundamental rule is that "no person shall be eligible to compete in any athletic meeting, game or entertainment given or sanctioned by this Union who has (1) received or competed for compensation or reward, in any form, for the display, exercise or example of his skill in or knowledge of any athletic exercise, or for rendering personal service of any kind to any athletic organization, or for becoming or continuing a member of any athletic organization; or (2) has entered any competition under a name other than his own, or from a club of which he was not at that time a member in good standing; or (3) has knowingly entered any competition open to any professional or professionals, or has knowingly competed with any professional for any prize or token; or (4) has issued or allowed to be issued in his behalf any challenge to compete against any professional, or for money; or (5) has pawned, bartered or sold any prize won in athletic competition; or (6) is not a registered athlete. Nor shall any person residing within the territory of any active member of this Union be eligible to compete for or to enter any competition as a member of any club in the territory of any other active member of this Union, unless he shall have been elected to membership in such club prior to 1 April 1891; provided, however, that this restriction as to residence shall not apply to undergraduates connected with any allied college athletic organization.

"No one shall be eligible to compete in any athletic meeting, games or entertainment given or sanctioned by this Union, unless he shall be

a duly registered athlete, a member of the organization from which he enters, and shall not have competed from any club in this Union during a period of three months next preceding such entry; nor shall any member of any club in this Union, or any club in any district in this Union be allowed to compete in case he has within one year competed as a member of any other club then in this Union, except with the consent of such other club, which consent shall be filed with the registration committee of his district prior to such competition unless such other club shall have disbanded or practically ceased to exist; provided that the requirements of this section shall not apply to any athletic meeting, games, or entertainment, the entries for which are confined to the club or organization giving such meeting or entertainment.

"No athlete who has been released from a club which is a member of this Union, and who competes for another club directly thereafter, shall be allowed to compete again for the club he was released from for one year from the date of his release, except that the club has disbanded or ceased to exist.

"No person shall be eligible to compete for or enter any competition as a member of any club in the territory of any active member of this Union, unless he shall have resided within the territory of said active member at least four months previous to entering for competition; nor shall any person be eligible to enter or compete in any district championship meeting unless he shall have been a bona-fide resident of such district for at least six months prior to the holding of such championship meeting; and no person shall be eligible to compete in a championship meeting of more than one district in one year. The restrictions contained in this section shall not affect the eligibility of an undergraduate connected with any allied college athletic organization who shall have been elected to membership in any club of this Union prior to 20 Nov. 1899, to represent such club as long as he remains an undergraduate; nor shall these restrictions apply to an undergraduate competing for any college belonging to an allied body."

The Amateur Athletic Union (A.A.U.) of the United States has jurisdiction over the following out-door sports among amateurs: Baseball, bicycling, boating, bowling, cross-country running, football, hurdle-racing, jumping, lacrosse, lawn-tennis, pole-vaulting, putting the weight, quoits, racquets, running, skating, sculling, swimming, throwing the hammer, throwing weights, tug of war, and walking. The Union consists of the *Metropolitan Assoc.*, comprising the States of New York and New Jersey, north of Trenton; the *New England Assoc.*, comprising Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut; the *Atlantic Assoc.*, comprising New Jersey, south of and including Trenton, Delaware, Maryland, Pennsylvania, West Virginia, District of Columbia, Virginia, North Carolina, South Carolina, Florida, and Georgia; the *Central Assoc.*, comprising Ohio, Illinois, Indiana, Michigan, Wisconsin, Iowa, Minnesota; the *Pacific Assoc.*, comprising California, Arizona, Nevada, Utah, Idaho, Oregon, and Washington; the *Southern Assoc.*, comprising Alabama, Louisiana, Florida, Mississippi, Texas, Georgia, and Tennessee; the *Western Assoc.*, comprising Missouri, Wyoming, Arkansas, Oklahoma, South Dakota, North Dakota, Indian Territory, Kansas, Kentucky, New Mexico, and Colorado; and the *Pacific Northwest Assoc.*, comprising Idaho, Montana, Oregon, Washington, and Alaska. All its meetings are under the direction of "a games committee," one referee, two or more inspectors, three judges at finish, three or more timekeepers, a starter, a clerk of the course, a scorer, and a marshal; besides which all the conditions and restrictions for various events: the number of throws allowed, the size of the area of preliminary effort, as in shot-putting, etc., are subject to definitions from time to time promulgated, and imposed, by virtue of the authority of the A. A. U. in meeting assembled.

The athletic events at outdoor field meetings are for 100, 220, 440, and 880 yards run; 1 and 5 mile run; 1 and 3 mile walk; 2 mile bicycle ride; pole vault for height; running high and broad jumps; throwing 16-pound hammer; throwing 56-pound weight, for distance; putting 16-pound shot; 120 yards hurdle-race, 10 flights 3 feet 6 inches high; 220 yards hurdle-race, 10 flights 2 feet 6 inches high; and at indoor meetings, for runs of 75, 150, 300, 600, and 1,000 yards; 2 mile run; three quarter mile and 4 mile walk; standing, broad, and high jumps; three standing broad jumps; running hop, step, and jump; pole vault for distance; throwing 56-pound weight for height; putting 24-pound shot; 200 yards hurdle-race, 10 flights 3 feet 6 inches high; 300 yards hurdle-race, 10 flights 2 feet 6 inches high; and tug of war, 4 men, unlimited weight. The associations award in each year three prizes for all-round excellence to the three athletes making the highest three aggregate scores, and two prizes for individual excellence. The Intercollegiate Association of Amateur Athletes of America is the governing body of intercollege athletics. Its championships must be won at the annual meeting. See also GYMNASTICS; EDUCATIONAL ATHLETICS.

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Athlone, ăth-lōn', a town of Ireland, on the Shannon, about 67 miles west by north of Dublin. It is divided by the river into two nearly equal parts, which communicate by a handsome stone bridge of five arches. It is one of the chief depôts for troops and military stores; and the barracks, occupying a height above the river, can accommodate 1,500 men, and have attached an ordnance yard, magazines, and armory provided with 15,000 stand of arms. By means of a canal the Shannon has been rendered navigable for 71 miles above the town, which, being also terminus of four important railways, carries on a brisk trade. The chief industrial establishment is an extensive woolen factory, and there are also large saw-mills. Pop. (1891) 6,742.

Ath'ol, Mass., a town in Worcester County, on Miller's River, and the Boston & A., and Fitchburg R.R.'s; 26 miles northwest of Worcester. It contains several villages, has electric railways connecting with the suburbs, and is principally engaged in the manufacture of cotton warps, shoes, sewing-silk, fine mechanical tools, matches, organ-cases, pocket-

books, billiard-tables, and furniture. The town has two national banks, public library, high school, several weekly and monthly periodicals, and a property valuation exceeding $4,000,000. Pop. (1900) 7,061.

Athol, ăth'ŏl, or **Athole,** a mountainous and romantic district, situated in the north of Perthshire, Scotland. It gives the title of duke to a branch of the house of Murray, and the duke owns the greater part of the district.

Athor, a'thôr, Hathor, or **Hether,** an Egyptian goddess, identified with Aphrodite (Venus). Her symbol was the cow bearing between its horns the solar disk and hawk feather plumes. Her chief temple was at Denderah. From her the third month of the Egyptian year derived its name.

Athos, now *Hagion Oros* or *Monte Santo* (Holy Mountain), a high mountain in European Turkey, forming the extremity of a long chain of mountains which runs through a peninsula jutting into the Archipelago. The peninsula is about 30 miles long and 5 miles broad. It is covered with forests of various kinds of trees, and with vineyards and plantations of olive and other fruit-trees. The surface is very irregular, and the coast displays numerous creeks and inlets of the sea. In ancient history the peninsula is mentioned chiefly on account of the shipwreck which here befell the Persian fleet under Mardonius in 493 B.C., and on account of the canal which, in order to avoid a similar calamity, Xerxes caused to be cut through the isthmus that joins the peninsula to the mainland. The whole peninsula, as well as the mountain, which is about 6,700 feet above the level of the sea, receives the name of Athos. It contains some 20 monasteries, and a multitude of hermitages, inhabited by about 6,000 monks and hermits, of the Order of St. Basil. They are extremely industrious: they diligently cultivate the soil, grow vines and olives, vegetables, etc., and actively engage in fishing, and they also carve statues of the saints, *Agni Dei,* crucifixes, rosaries, etc., which they send to the small town of Karyes, on the mountain, where weekly markets are held, and to the rest of Europe, especially to Russia. They also collect alms to pay their heavy yearly tax to the Porte. There is an academy in which the younger monks receive instruction in various subjects. The libraries of the monasteries are rich in literary treasures, particularly in manuscripts, partly procured from Constantinople before its conquest by the Turks, partly presented to them from the same place, and partly written by the laborious monks. Many books have been brought thence to the great collections at Paris, Vienna, etc., and the rest are but little used among the monks themselves. Their monasteries and churches are the only ones in the Ottoman empire which have bells. Every nation belonging to the Greek Church has here one or more monasteries of its own, annually visited by pilgrims from Russia, Servia, Bulgaria, etc., as well as from Greece, Asia Minor, and Constantinople. The privileges which the members of the various establishments enjoy they owe to Murad II., who, on account of their voluntary submission, even before the capture of Constantinople, granted them his protection. Hermits were established on Athos in the middle of the 9th century, and the first monastery, that of St. Lavra, was founded by the monk Athanasius in 968.

Athos, a'tōs', a character who figures in Dumas' 'Musketeer' novels. He is one of the three guardsmen associated with d'Artagan.

Athy, ă-thī', a market-town in Ireland, 37 miles southwest of Dublin, with Protestant and Roman Catholic churches, extensive county jail, police barracks, etc. It has a large trade in corn, by canal and river, and is an important railway-station.

Atitlan, ä'te-tlän', a lake, mountain and town of Central America, in Guatemala. The lake is about 24 miles long and 10 broad; the mountain an active volcano, 12,160 feet high. The town, known also as Santiago de Atitlan, is located on the side of the mountain, and is chiefly known for its medicinal springs. Pop. (1903) about 10,000.

At'ka Mackerel. See GREENLING.

At'kinson, Edward, American economist: b. Brookline, Mass., 10 Feb. 1827; d. Boston, 11 Dec. 1905. He invented a cooking-stove called the «Aladdin Oven,» and was president of the Boston Manufacturers' Mutual Fire Insurance Co. since 1878. His wide reputation was due chiefly to the fact that for 40 years he was a prolific writer of pamphlets on economic, commercial, and political subjects, including banking, competition, railroads, fire-prevention, economic legislation, industrial education, the money and tariff questions, and colonial expansion. He vigorously opposed the war in the Philippines, and during 1899–1900 published the 'Anti-Imperialist' in support of his views. The following is a selected list of his more important publications: 'Cheap Cotton by Free Labor' (1861); 'Collection of Revenue' (1866); 'Reform of the Legal-Tender Act' (1874); 'The Fire-Engineer, the Architect, and the Underwriter' (1880); 'Distribution of Products' (1885); 'The Margin of Profit' (1887); 'Taxation and Work': 'Science of Nutrition'; 'Prevention of Loss by Fire.'

At'kinson, George Francis, American botanist: b. Raisinville, Mich., 26 Jan. 1854. He was educated at Olivet College, Michigan, and Cornell University, and taught general zoology, biology, and entomology in the universities of North Carolina, South Carolina, and the Alabama Agricultural and Mechanical College. He was assistant and professor of cryptogamic botany at Cornell, 1892–6, and professor of botany there since 1896. He has written: 'Biology of Ferns'; 'Stories of Plant Life'; Studies of American Fungi.'

At'kinson, John, American clergyman: b. Deerfield, N. J., 6 Sept. 1835; d. Haverstraw, N. Y., 8 Dec. 1897. He entered the Methodist ministry in 1853, and held pastorates in Newark, Jersey City, Chicago, Bay City, Adrian, and Haverstraw. He was the author of the hymn 'Shall We Meet Beyond the River.' He wrote: 'The Living Way' (1856); 'Memorials of Methodism in New Jersey' (2d ed. 1860); 'The Garden of Sorrows' (1868); 'Centennial History of American Methodism' (1884).

At'kinson, John Christopher, noted English clergyman and antiquary: b. Eddhangor, England, 1814; d. 1900. He was for half a century vicar of the parish of Danby in the North Riding of Yorkshire, which he has described in

his delightful 'Forty Years in a Moorland Parish' (1891). He wrote much on natural history, and his 'Walks, Talks, Travels and Exploits of Two School-Boys' (1859); 'Play Hours and Half Holidays' (1880); 'British Birds' Eggs and Nests' (1861), and 'The Last of the Giant Killers' (1891), have been widely read.

At'kinson, Thomas, American bishop: b. Mansfield, Va., 6 Aug. 1807; d. Wilmington, N. C., 4 Jan. 1881. He was graduated from Hampden-Sidney College, Virginia, in 1825, and practised law for nine years. Ordained priest in the Episcopal Church in 1837, he served as rector in Norfolk and Lynchburg, Va., and Baltimore, Md., whence he was elected third bishop of North Carolina, 26 May 1853. He was an able administrator and prominent in the councils of his Church. He published various sermons and Episcopal charges.

Atlanta, the capital of Georgia and the county-seat of Fulton County, is situated at the foot of the Appalachian chain of mountains on the ridge dividing the watershed of the Atlantic Ocean from that of the Gulf of Mexico. The altitude of 1,050 feet at the lowest point and 1,100 feet at the highest, makes the climate cooler than the latitude, 33° 44′ 58.8″, would indicate, and the air has a bracing effect conducive to mental and physical vigor. This commanding site was determined by the building of railroads in the first half of the 19th century. The village of Marthasville was first a terminus of the line from Savannah and Macon. As one road after another centred there, the place grew rapidly; its destiny as a business centre was foreseen, and the name changed to Atlanta. Here eastern and western traffic meet. Atlanta was an important strategic point in the Civil War. In 1861 it became a depot of Confederate military supplies, and this made it an objective point in Gen. Sherman's march to the sea. After a siege of several weeks he occupied the city (see Jonesboro, Battle of, and Fall of Atlanta), and by his order it was burned 17 Nov. 1864. In later years Gen. Sherman described the strategic position of Atlanta by comparing it to the wrist of a hand whose fingers reached the five principal ports of the gulf and south Atlantic coast. During the Spanish war the city was headquarters for the Department of the Gulf. Twice the test of war has approved the site, and twice a city has been built on the same spot. In 1865 the military government of Georgia was established there. The legislature removed from Milledgeville, and Atlanta became the capital of the state during the reconstruction era. It was made the permanent capital by vote of the people in 1877, and the capitol building was completed in 1889 at a cost of $1,000,000. The exterior is of oolitic limestone, and the interior is ornamented with Georgia marble. The Cotton Exposition of 1881, projected by citizens of Atlanta, was a rallying point for southern industry. Atlanta now became the business centre of the southeastern States and shared the general growth. From 39,000 in 1880, its population grew to 89,872 in 1900. At the beginning of 1903 the number of buildings indicated 100,000 population. A postal census then gave a population of 110,000 in the city and suburbs. The city assessment showed $57,000,000 of taxable wealth. A second exposition, held in 1895, greatly stimulated the growth of business. Bank clearings increased from $56,000,000 in 1894 to $131,000,000 in 1902. In same period bank deposits grew from less than $4,000,000 to $12,750,000. Business has recently increased four times as fast as population, although that has grown at the rate of 4 per cent a year. The increase of postal receipts in 1902 was 16 per cent, and that of bank clearings 18 per cent. Postal receipts for the year ending 30 June 1902, were $415,546.14. Congress has appropriated $200,000 for an entire block of ground upon which to erect a $1,000,000 post-office. The wholesale and retail trade of the year 1902 is estimated at $50,000,000. The mule market is one of the most important in the country. Sales for the year 1902–03 are estimated at 62,500 head, valued at $7,000,000. Total trade and manufactures, $80,000,000. As a manufacturing centre, Atlanta's strength is in variety. The census of 1900 reported 395 establishments with $16,085,114 of capital, 9,368 wage-earners, $3,106,039 total wages, and $16,721,899 of products. An investigation made by the Atlanta Chamber of Commerce in December 1902, showed that the products had increased to $20,400,000, the wage-earners to 11,000, and the total wages to $3,600,000. The most important products are cotton goods, fertilizers, gins, engines, car-wheels, machinery, lumber, sheet-metal work, terra-cotta, brick, wagons, carriages and buggies, furniture, confectionery, crackers, cigars, coffins, chemicals, printing, lithographing, electrotyping, engraving, paper-bags, flour and meal, paints, varnish, cotton-seed oil and cake, ice, harness, belting, hosiery, suspenders, underwear, neckwear, woolen goods, clothing, trunks, and condiments.

The factories of the city use 45,000 horse-power furnished by steam and electricity. A massive masonry dam is under construction at Bull Sluice Shoals on the Chattahoochee, and a plant costing $2,000,000, to be completed by the middle of 1904, will deliver 11,000 horse-power of electric current in the city. This has given a new impetus to manufacturing, much of the additional power having been taken in advance of completion. Atlanta's central position has made it southern headquarters for large business concerns. It is the third insurance centre of the United States, with premium collections estimated at $8,000,000 per annum, and is headquarters for the railways, telegraphs, telephones, and the large industrial corporations doing business in the southern or southeastern States. The concentration of these interests has created such a demand for quarters that Atlanta has more fire-proof office buildings than any other southern city. A fire-proof hotel with over 300 rooms was recently completed. With other excellent hotels, Atlanta has been famous for many years as "A Convention City." Atlanta is the most important centre of publication for newspapers and periodicals in the southern States. The postal receipts for second-class matter were $44,064.76 in the fiscal year ending with June 1902, exceeding that of Brooklyn, Baltimore, Buffalo, Washington city, Omaha, New Orleans, Louisville, and Indianapolis.

The public school system embraces grammar schools and high schools, with 14,000 pupils. Three business colleges have 700 students. Medical and dental colleges have 800. Two female colleges, a female seminary, and several select schools for boys have an attendance of 550

The Georgia Institute of Technology, with 481 students, is the most important institution for higher education. It has textile, mechanical engineering, and electrical engineering schools, and machine-shop practice, in addition to literary and scientific courses. The total number of students in these institutions for white youth is 2,500. A site has been given and funds are partially raised for a Presbyterian university, the total investment of which will be $1,000,000.

There are six institutions for the higher education of colored youth, with a total attendance of 2,265. They include literary and scientific schools, theology, industrial training, and a training school for nurses. Charities are numerous and include such educational features as free kindergartens, night schools, and three orphan asylums. Grady Hospital is supported by the city; St. Joseph's Infirmary by the Roman Catholics, and the Presbyterian Hospital by the Presbyterians. Private hospitals or sanatoriums are numerous and well equipped. There are two theatres with 2,500 and 2,000 seating capacity, and two lyceum or lecture associations. Carnegie Library is a white marble building in classic style, and contains 20,000 volumes. The book circulation is 11,000, one fourth among juveniles. There are 131 churches, including missions, and the attendance in fair weather averages 25 per cent of the population. The total membership exceeds a third of the population. Railway facilities include 10 radiating lines, five of which belong to the Southern Ry., and three controlled by the Louisville & N. system. A union depot to cost $900,000 is under construction. Belt lines complete the terminal system. Local transportation is unified in a system of well-equipped street railways, covering 142 miles of track, 100 miles within the city, the rest extending eight miles out. The area of the city is 11 square miles, and the boundary a circle of 3½ miles diameter, extended in two suburbs. Street improvements since 1880 cost $3,807,667, including 100 miles of sewers, 63 of paved streets, 227 of sidewalks. Six miles of streets are paved with asphalt, the remainder with granite blocks, macadam, and vitrified brick. The city waterworks takes its supply from the Chattahoochee River above Peachtree Creek, in a sparsely populated district. By settling and filtration water is purified. Two engines of 15,000,000 gallons daily capacity each pump it into the city. The consumption in 1902 was 8,966,000 gallons a day. For domestic use water is supplied at 10 cents per thousand gallons. At this rate, with some reduction to manufacturers, the city makes a profit. Fire, police, sanitary, and other city departments are well equipped and efficient. The city government is administered by a mayor and general council. Appropriation bills are voted separately by two legislative branches, and the mayor has a veto. Bonded debt is limited by State Constitution to 7 per cent of the taxable wealth. The charter requires a sinking fund to retire all bonds in 30 years from date of issue. Atlanta is one of ten cities designated by the secretary of the treasury whose bonds might be used as security for federal deposits. The tax rate is 1¼ per cent and the assessment averages 60 per cent of actual value.

The cool and invigorating climate makes Atlanta a desirable place of residence, the mean summer temperature being 77; winter 44. Streets are made attractive by grassy lawns and shade trees. Grant Park, Piedmont Park, Lakewood, East Lake, Ponce De Leon Spring, and the Chattahoochee River are outing resorts. A bill has been introduced in Congress to make a national military park on the battle ground north of the city. Public spirit is strong in Atlanta. The Chamber of Commerce, Clearing House Association, Credit Men's Association, Manufacturers' Association, and Freight Bureau are organs for concerted action among business men. The Greater Georgia Association, projected by the Atlanta Chamber of Commerce, unites the efforts of Georgia towns, cities, and counties to develop the resources of the State. Fraternal and social organizations are numerous and active. Religious denominations are well organized.

W. G. Cooper.

Atlan'ta University, a co-educational (non-sectarian) institution, in Atlanta, Ga., organized in 1869. In 1905 it had 18 professors, 340 students, 12,000 volumes in the library, grounds and buildings valued at $250,000; productive funds, $54,000; benefactions, $36,000, and an income of $54,000, graduates 508.

Atlantes, ăt'-lăn'tēz, in architecture, colossal statues of men used instead of pillars to support an entablature. Roman architects called them *telamones* (Greek).

Atlan'tic, Iowa, a city and county-seat of Cass County, situated on the Chicago, R. I. & P. R.R., 80 miles southwest of Des Moines. It has various manufacturing interests, including iron and bridge works, planing mills, canning factories, starch-works, soap-factory, and two machine shops. It was chartered as a city in 1869. Pop. (1900) 5,046.

Atlan'tic City, N. J., a city and seaside resort in Atlantic County; on the Atlantic Ocean and on the Reading and the Pennsylvania R.R.'s. It is built on a long, sandy island, known as Absecom Beach, 60 miles southeast of Philadelphia. The island stretches along the coast for 10 miles; has an average width of three fourths of a mile, and is from four to five miles from the mainland. At the north end is the Absecom Light, well known to coastwise sailors. The city has several miles of bathing beach, a magnificent promenade on the ocean front, nearly 100 hotels and boarding houses, electric lights, public schools, churches of the principal denominations, seven national banks, and daily, weekly, and monthly periodicals. It is probably the most important all-the-year-round resort in the United States, its splendid climate giving it a large popular patronage even in the dead of winter. The assessed property valuation exceeds $14,000,000. A fire in April 1902 destroyed many hotels and other buildings and led to a municipal enactment that all structures henceforth erected within the municipal limits must be fireproof. Atlantic City was first settled in 1854. It is governed by a mayor and a city council of 17 elected by popular vote. Pop. (1890) 13,055; (1900) 33,000; (in summer) 150,000.

Atlan'tic Ocean, the vast expanse of water lying between the western coasts of Europe and Africa, and the eastern coasts of North and South America, and extending from the Arctic to the Antarctic Seas. Its greatest breadth is between the western coast of North Africa and the eastern coast of Florida in North America,

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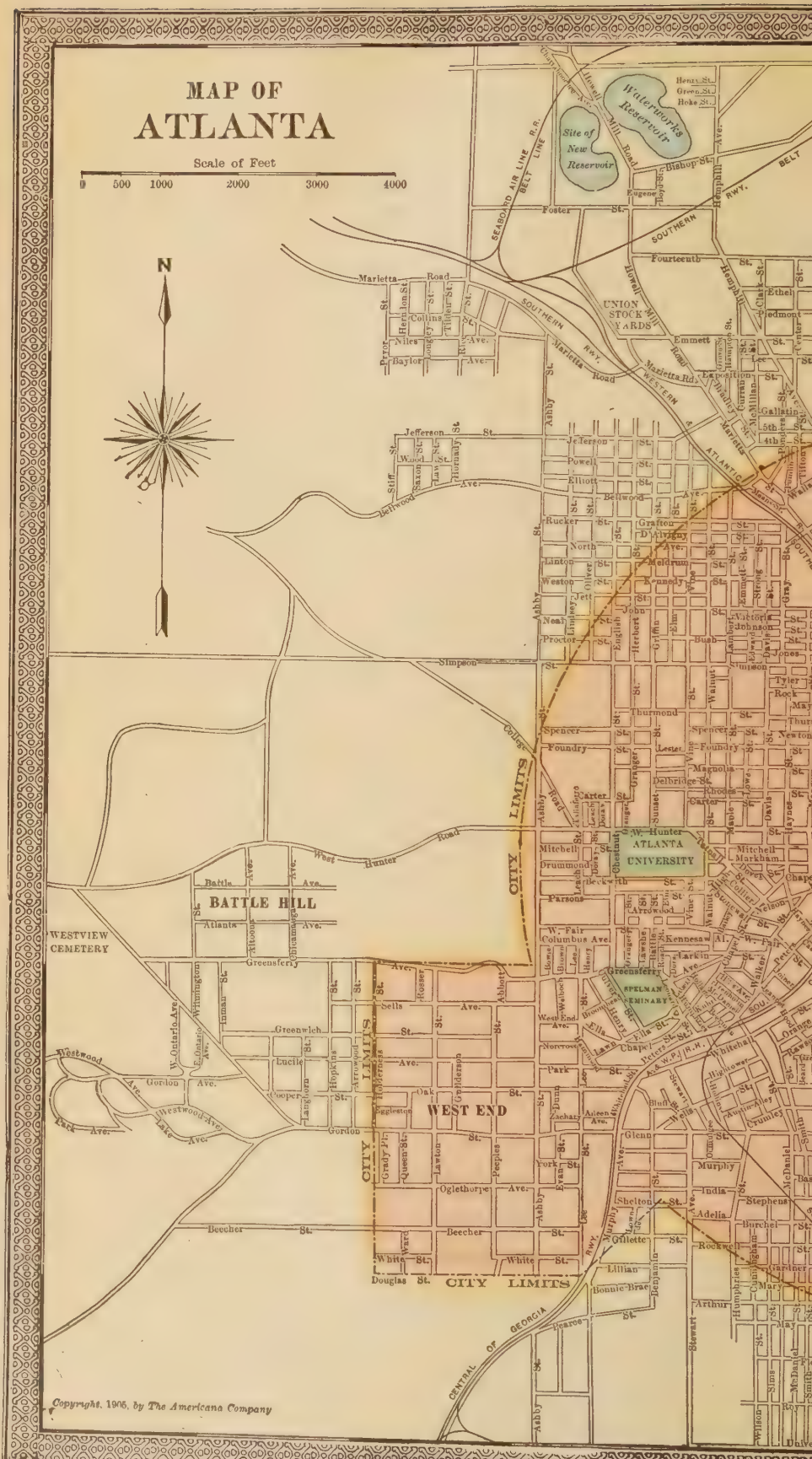

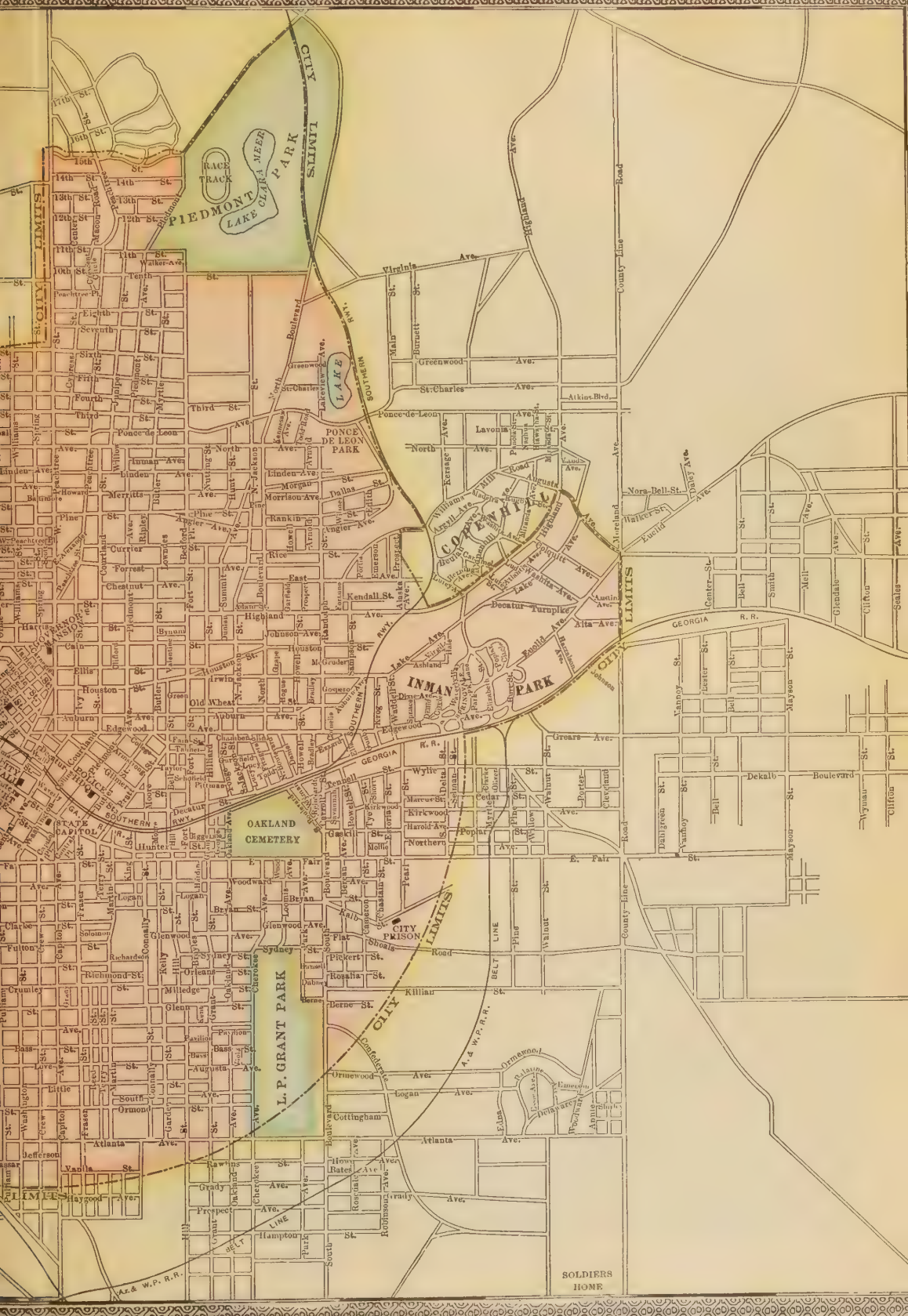
CITY LIMITS
PIEDMONT PARK
RACE TRACK
LAKE CLARA MEER
LAKE
PONCE DE LEON PARK
COLLEGE HILL
INMAN PARK
OAKLAND CEMETERY
L. P. GRANT PARK
CITY PRISON
STATE CAPITOL
SOUTHERN R.R.
GEORGIA R.R.
A. & W.P.R.R.
SOLDIERS HOME
Peachtree St.
Piedmont Ave.
Boulevard
Virginia Ave.
Highland Ave.
County Line Road
Ponce de Leon Ave.
North Ave.
Decatur Turnpike
Edgewood Ave.
Dekalb Boulevard
Memorial Drive
Confederate Ave.
Ormewood Ave.
Logan Ave.
Cottingham
Atlanta Ave.
Hampton
Grady Ave.
Hayswood Ave.
Jefferson
Capitol Ave.
Crew St.
Fraser St.
Glenn St.
Crumley St.
Richmond St.
Fulton St.
Clarke St.
Fair St.
Hunter St.
Auburn Ave.
Houston St.
Ellis St.
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Harris St.
Williams St.
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Howard Ave.
Baldwin St.
Pine St.
Currier St.
Forrest Ave.
Chestnut St.
Rice St.
Rankin St.
Morgan St.
Linden Ave.
Merritts Ave.
Nunnally St.
Jackson St.
Hunt St.
Butler St.
Pryor St.
Ivy St.
Piedmont Ave.
Peachtree Pl.
Seventh St.
Eighth St.
Tenth St.
Walker St.
Eleventh St.
Twelfth St.
Thirteenth St.
Fourteenth St.
Fifteenth St.
Sixteenth St.
Seventeenth St.
Spring St.
Third St.
Fourth St.
Fifth St.
Sixth St.
Greenwood Ave.
St. Charles Ave.
Lakeview Ave.
Linden Ave.
Morgan Ave.
Dallas St.
Rankin St.
Ingier Ave.
Rice St.
Kendall St.
Highland Ave.
Johnson Ave.
Houston St.
Ashland Ave.
Edgewood Ave.
Wyllie St.
Delta St.
Selman St.
Cedar St.
Marcus St.
Kirkwood Ave.
Harold Ave.
Poplar St.
Northern Ave.
Woodward Ave.
Bryan St.
Glenwood Ave.
Sydney St.
Pickert St.
Rosalia St.
Killian St.
Derne St.
Milledge Ave.
Orleans St.
Oakdale St.
Cherokee Ave.
Augusta Ave.
Bass St.
Payton St.
Love St.
Martin St.
Connally St.
Kelly St.
Hill St.
Butler St.
Capitol Ave.
Washington St.
Little St.
South Ormond
Garden St.
Vanira St.
Rawlins St.
Howell Rates Ave.
Rosedale Ave.
Robinson Ave.
Cherokee Ave.
Oakland Ave.
Prospect Ave.
Park St.
Grant St.
Hill St.
Pine St.
Walnut St.
Porter St.
Clarissa St.
Dahlgreen St.
Parkway St.
Bell St.
Mayson St.
Lester St.
Vannoy St.
Glenn St.
Ivy St.
Forsyth St.
Pryor St.
Central Ave.
Decatur St.
Alabama St.
Randolph St.
Washington St.
Gilmer St.
Gaskill St.
Mangum St.
Roswell St.
Carroll St.
Simmons St.
Fort St.
Whitehall St.
Peters St.
Chamberlain St.
Talmer St.
Scholfield St.
Pittman St.
Taylor St.
Bell St.
Hilliard St.
Moore St.
Collier St.
Courtland St.
Williams St.
Spring St.
Peachtree St.
Northside Drive
Virginia Ave.
Highland Ave.
Nora Bell St.
Euclid Ave.
Moreland Ave.
Austin Ave.
Alta Ave.
Center St.
Bell St.
Smith St.
Mell St.
Glendale Ave.
Clifton St.
Sealey St.
Vannoy St.
Lester St.
Mayson St.
Greare Ave.
Dekalb Boulevard
Clifton St.
Wynnar St.
Parkway St.
Dahlgreen St.
Bell St.
Mayson St.
Porter St.
Clarissa St.
Walnut St.
Pine St.
Myrtle St.
Willow St.
Elmira St.
Delta St.
Selman St.
Cedar St.
Marcus St.
Kirkwood Ave.
Harold Ave.
Poplar St.
Northern Ave.
E. Fair St.
Fair St.
Pearl St.
Boulevard Ave.
Bryan St.
Glenwood Ave.
Sydney St.
Flat Shoals Road

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a distance of 4,150 miles. If the Gulf of Mexico, in reality one of its bays, be included, it will extend to 5,000 miles. Its least breadth, between Norway and Greenland, is about 930 miles. Between Cape St. Roque, Brazil, and Sierra Leone, the breadth is 1,730 miles. Its superficial extent has been estimated at 25,000,000 square miles. From the number and extent of its inlets, gulfs, and bays, its coast lines are of great length, the eastern being upward of 32,000 miles, and the western upward of 55,000. Its principal inlets and bays are Baffin and Hudson bays, the Gulfs of Mexico, Honduras, and San Juan, the North Sea or German Ocean, the Bay of Biscay, and the Gulf of Guinea. The principal islands north of the equator are Iceland, the Faroe, and British islands, the Azores, Canaries, and Cape de Verd islands, Newfoundland, Cape Breton, and the West India islands; and south of the equator, Ascension, St. Helena, Trinidad, Columbus, and Tristan da Cunha, the last three being mere rocks.

Currents.— The great currents of the Atlantic are of two kinds, drift and stream. Drift currents are produced by the wind, either by the perpetual or trade winds, or by prevailing winds. Those having the former origin are constant, running always in the same direction, and generally with a nearly equal velocity; those having the latter are not so constant, neither do they always run in the same direction, nor at a similar rate. The drift currents produced by the trade winds are found between the tropics; those resulting from prevailing winds, north and south of the parallels of 30°. Stream currents are due indirectly to the influence of winds, being produced by drift currents, of which they are continuations. As these currents travel for great distances they meet with many obstacles in their course, which result in changes of direction. A stream current may thus be successively propelled by different currents, or consist in the combination of different stream currents. A third kind of currents is produced by the flow of the water to restore the level disturbed by other currents. This is called a current of indraught. The great currents of the Atlantic are the Gulf Stream, the equatorial current — which may be divided into the main equatorial current, the north equatorial current, and the south equatorial currents — the North African and Guinea current, the South connecting current, the Southern Atlantic current, Cape Horn current, Rennel current, and the Arctic current.

The Gulf Stream is a continuation of the main equatorial current, and partly of the north equatorial current, both western drift currents produced by the trade winds. The former passes across the Atlantic to the American coast, upon which it strikes from Cape St. Roque to the Antilles. On being turned by the coast it runs along it at a rate of 30 to 50 miles per day, and sometimes at a higher speed, till it enters the Gulf of Mexico, from which, having previously received part of the waters of the north equatorial current, it issues between Florida and Cuba under the name of the Gulf Stream. It afterward flows nearly parallel to the coast of the United States, separated from it by a belt of cold water. Off Cape Hatteras it spreads into an expanding channel, reaching a breadth of 167 miles, and consisting of three warm sections with two cold belts interposed. On passing Sandy Hook it turns east and continues to be recognizable, partly by the blue color derived from the silt of the Mississippi, till about lon. 30° W., where, with a greatly diminished temperature, it is found flowing nearly due east. The equatorial current, so called from its being under the line, commences on the western coast of Africa, about lat. 10° S., or nearly opposite St. Paul de Loando. From this point it pursues a northwest direction till it makes lon. 0°, when it proceeds due west on both sides of the equator, till it arrives at Cape St. Roque in South America, when it is divided into two branches, one running along the Guiana coast, and into the Gulf of Mexico, as already mentioned, the other along the coast of Brazil, and so called the Brazil current. The latter is reinforced by the south equatorial current, which, however, is not distinctly separable from the main equatorial current. The length of the equatorial current, from the coast of Africa to Cape St. Roque, is 2,500 miles. Its breadth near the commencement is 185 miles; opposite Cape Palmas, 420; and before dividing, about lon. 31° or 32° W., it is 510. Its average velocity, which is greater in summer than in winter, is from 25 to 30 miles a day. The North African and Guinea current originates between the Azores and Cape Finisterre in Spain. It flows in a southeasterly direction, and after sending a mass of water into the Mediterranean it pursues a southerly course to Cape Mesurada, south of Sierra Leone, keeping at a considerable distance from the land. It then flows rapidly for 1,000 miles due east to the Bight of Biafra, where it seems to mingle with the equatorial current. It is led from the west by the Guinea counter current, a back flow of water between the main and the north equatorial currents. The south connecting current strikes across the South Atlantic from the Brazil current, then turns north, and finally joins the great equatorial current. The South Atlantic or South African current originates north of the Cape of Good Hope, from which it flows in a northwesterly direction, at a rate of from 15 to 30 miles a day, and eventually merges into the equatorial current. Cape Horn current flows constantly from the Antarctic and South Seas into the Atlantic Ocean, its general direction being east-northeast and northeast. Rennel current, which is possibly a continuation of the Gulf Stream, enters the Bay of Biscay from the west, curves round its coast, and then turns northwest toward Cape Clear in Ireland. The Greenland or Arctic current runs along the east coast of Greenland to Cape Farewell; having doubled this cape, it flows up toward Davis Strait, from which it receives an inflow of water, and then turns to the south along the coast of Labrador, and continues along the coast of the United States, from which it separates the Gulf Stream by a cold band of water. Immense masses of ice are borne south by this current from the Polar seas, and carried into warmer regions, where they gradually dissolve and disappear. In the interior of the North Atlantic there is a large area comparatively free from currents, lying between 20° and 30° N. and 30° to 60° W. It is called the Sargasso Sea, from the large quantity of sea weed which drifts into it. A similar area exists in the South Atlantic, to which the same name is occasionally applied by

analogy, though it is destitute of sea weed. It extends between 20° and 30° S. and 0° and 25° W. Besides the surface currents, recent investigation has established the existence of a general oceanic circulation, consisting of an under current of cold water flowing from the Poles to the equator, and an upper current of warm water from the equator to the Poles.

The winds of the Atlantic are not peculiar to that ocean, but identical with those that prevail in the same latitudes in the other seas around the globe. The most remarkable of these are the perennial or trade winds, which blow constantly in one direction, namely, from east to west, or nearly so. The tract of the trade winds to the north of a zone, which is almost always found on the north side of the equator, is called the region of the northeast trade wind, from blowing one or two points north of east; that to the south, the region of the southeast trade wind, from blowing south of east. The northeast trade wind blows with less steadiness than the southeast, but toward the West India islands it keeps generally steady between east and northeast. The trade winds are constant only at a considerable distance from land, and become more steady the greater the expanse of water over which they blow.

Depths.— The greatest depth yet discovered in the Atlantic is to the north of the island of Porto Rico, in the West Indies, namely, 27,366 feet. Formerly depths of 40,000 or 50,000 feet were reported, but this was owing to defective sounding apparatus. The geography of the ocean bed is now pretty well known, especially in the North Atlantic. Cross-sections of the North Atlantic between Europe and America show that its bed may be represented as exhibiting two great valleys lying in a northerly and southerly direction, and separated by an intervening ridge. Each of these valleys is about 500 miles in width. The mean depth of the east valley is about 14,000 or 15,000 feet, and it can be traced from the equator to the latitude of the Faroes, where it terminates, or over an extent of 3,700 miles. The west valley has a maximum depth of 16,800 feet, and can be traced from the latitude of the Azores as far north as Greenland, where it bifurcates, the deeper portion pointing north up Baffin Bay. The submarine ridge dividing these two valleys appears to be very uniform in depth below the surface, having 1,600 fathoms of water above it from the Azores to the latitude of the Hebrides. It then rises gradually till at last it culminates in Iceland. On this plateau the Atlantic telegraph cables have been laid, and from it the first specimens of deep-sea mud were brought up. This was found on examination by the microscope to consist to a large extent of calcareous shells (*Foraminifera*), not water-worn, but quite perfect, showing that the water at such depths can have little or no motion. No sandy particles were found in the mud. The South Atlantic is not so well known as the North, but so far as soundings yet prove it has not a greater depth than the latter, the greatest depth found being 2,900 fathoms, in lat. 28° S. It would appear to be separated from the North Atlantic by a rocky ridge, on which rest the islands of Ascension, Fernando de Noronha, and St. Paul. The saltness and specific gravity of the Atlantic differ in various parts, and gradually diminish from the tropics to the poles, and also from within a short distance of the tropics to the equator. In the neighborhood of the British Isles the salt is given as one thirty eighth of the weight of the water. See Ocean Current.

Atlan'tic Telegraph. See Telegraph.

Atlan'tides, a name given to the Pleiades, the seven daughters of Atlas or of his brother Hesperus.

Atlan'tis, or **Atlan'tica,** a large island traditionally asserted to have once existed in the ocean immediately beyond the Strait of Gades; that is, in what is now called the Atlantic Ocean, a short distance west of the Strait of Gibraltar. Homer, Horace, and some others made two Atlanticas, distinguished as the Hesperides and the Elysian Fields, and believed to be the abodes of the blessed. Plato states that an easy passage existed from the one Atlantis into other islands, which lay near a continent exceeding in size all Europe and Asia. Some have thought this America. Atlantis is represented as having ultimately sunk beneath the waves, leaving only isolated rocks and shoals in its place. Geologists have discovered that the coast line of western Europe did once run farther in the direction of America than now; but its submergence seems to have taken place long before historic times. 'The New Atlantis' is the title which Lord Bacon gives to a literary fragment, in which he sketched out an ideal commonwealth.

Atlan'tis, a romance of the antediluvian world, by Ignatius Donnelly (1882).

Atlan'tosau'rus. See Camarasaurus.

Atlas, an extensive mountain system in North Africa, starting near Cape Nun, on the Atlantic Ocean, traversing Morocco, Algiers, and Tunis, and terminating on the coast of the Mediterranean. It is divided into the great and little Atlas. The little Atlas is the range nearest the sea-coast; the great is more inland, and borders on the desert. In fact, however, the two ranges are one and the same system, though sometimes connected only by separate mountains, or ranges of low hills. On the coast, the range skirts the Mediterranean, from Cape Spartel, and the straits of Gibraltar, to Cape Bon, on the northeast of Tunis. The Atlantic shore is sometimes sandy and low, at other times formed by cliffs, which do not attain any great height, except at Cape Ghir. The Mediterranean shore, between Capes Spartel and Bon, is generally rugged, and in places attains a considerable height. Between Cape Bon and the gulf of Gabes it is rocky, but without reaching any great elevation. The southern slope of the Atlas reaches the great desert, from which it is separated by a region of sand hills, shifting with every strong wind, and gradually making encroachments on the fertile lands at the foot of the mountains. On the west of the gulf of Gabes, Mount Nofusa, the last eastern spur of the Atlas, joins Mount Garian, which extends into the regency of Tripoli. The French geographers include within the limits of the Atlas their own province of Algeria, together with the empire of Morocco, and a part of Tunis. The whole area is 500,000 square miles, including a great variety of surface, mountains, valleys, and extensive plains.

PHYSICAL CHART
OF THE
ATLANTIC OCEAN
Shewing
THE FORM & DIRECTION OF THE CURRENTS,
Distribution of Heat at the Surface,
NAVIGATION AND TRADE ROUTES &c.
AMERICA
NORTH
SOUTH
EUROPE
AFRICA
ASIA
PACIFIC OCEAN
GULF OF MEXICO
CARIBBEAN SEA
MEDITERRANEAN SEA
BRITISH ISLES
Iceland
Greenland
Tropic of Cancer
Tropic of Capricorn
EQUATOR
Cape Horn
Cape Roona
Falkland Is.
So Georgia
Sandwich Land
South Shetland
Chiloe
Patagonia
Rio de Janeiro
Buenos Ayres
Trinidad
Ascension
St Helena
Tristan da Cunha
Cape of Good Hope
Cape Colony
Congo
Benguela
Madagascar
Abyssinia
Lake Tchad
Sierra Leone
Benin
Canaries
Madeira
Azores
Barbary
Guinea
Guiana
Venezuela
Mexico
Guatemala
Jamaica
Bermudas
Florida
Texas
Louisiana
Virginia
Carolina
Ohio
Missisippi
Canada
Labrador
Hudson's Bay
Davis Strait
Baffin's Bay
Behring's Strait
Spitzbergen
Nova Zembla
Lapland
Russia
Siberia
Persia
Arabia
Egypt
Syria
Barbary
Greenland
Iceland
Ireland
Scotland
Norway
Sweden
Denmark
Prussia
Poland
Germany
France
Spain
Portugal
Italy
Turkey
Greece
Black Sea
Caspian Sea
Aral Sea
Red Sea
Persian Gulf
Indian Ocean
Madagascar
Cape Colony
Southern Atlantic Current
Southern Connecting Current
Brazil Current
Gulf Stream
Canaries Current
Guinea Current
Equatorial Current
Agulhas Current
Mozambique Current
Cape Horn Current
Falkland Current
Tristan da Cunha Current
Cape of Good Hope Current
Benguela Current
Trade Winds
Monsoons
Variable Winds
Calms
Westerly Winds
Easterly Winds
NOTE
The Arrows shew the course & direction of the Currents & the figures placed beside them shew Velocity in Nautical miles p. hour
80 West Greenwich 80
80 East Greenwich 80

The loftiest peaks form a diagonal line, striking across the general course of the mountains from southwest to northeast. This line begins at Cape Ghir, on the Atlantic, which rises almost perpendicularly from the sea to a great elevation. It then stretches away, east of the meridian of Morocco, then turns abruptly northeast, and from this quarter four important rivers take their rise, the Wady Oum Erbegh (Morbeya), the Muluia, the Tafilet, and the Draa. At this precise spot, the loftiest peaks of the whole mass seem to be brought together, and the most elevated chain runs away north. The principal chain traverses a region called the desert of Ansad, the boundary line between Morocco and Algiers. Here the name great Atlas is first applied. The principal chain recurs in Algeria, where its highest part is called Wanashrees, or Warensenis, and terminates on the banks of the Shelliff, whose valley makes a gap in its course. It reappears southwest of Algiers, in the lofty summits of the Jurjura. From this point, the chain follows a direction parallel to the coast, then it dips again to the southeast, and takes the name of the mountains of Wannooga. Further on to the east, we meet it as the Djebel Aures, and approaching the coast again, it penetrates into the territory of Tunis, under the name of Mount Tipara, terminating at Cape Blanco and Cape Zibeb, on the north of the city of Tunis. The highest summits, the Miltsin (11,400 feet), southeast of the city of Morocco, and other mountains near the Wady Oum Erbegh, and the Muluia, are rarely free from snow. The greatest heights of the entire system are the Jebel Ayashi (14,600 feet), and Tamjurt (14,500 feet). The little Atlas is by no means so lofty, its highest peak, Shelia, having an altitude of only 7,611 feet. The great Atlas is the water-shed of the province. The rivers flowing north from this line force their way through the lesser Atlas to the Mediterranean, while those that take their rise on the southern slope are lost in the marshes of the desert. There are several defiles through the Atlas, the best known of which are those of the Beboonan, leading to Terodant in Morocco, and the Biban, or Iron gate on the east, leading from Algiers to Constantine. The geological constitution of these mountains presents old limestone alternating with a schist, oftentimes passing to a well-characterized micaceous schist, or gneiss. The stratification of the gneiss is also very irregular, only presenting organic débris; then come schistose clays, alternating with secondary limestones; then come limestone with white clays, and iron sands resting on blue clay. This formation is particularly developed near Oran, and the plains in which the soil is formed from it are of great fertility. Volcanic rocks have been found in small quantities. There are veins of iron, copper, and lead. Saltpetre is found near Terodant. About 50 miles from the same town, excellent malleable iron is found. At Elala there are copper and silver mines. The vegetation embraces all the varieties of both temperate and tropical climates. The Atlas was known to the ancients, and the Romans formed several colonies in the district.

At'las, an anatomical term applied to the first vertebra of the neck, which supports the head. It is connected with the occipital bone in such a way as to permit of the nodding movement of the head, and rests on the second vertebra or *axis,* their union allowing the head to turn from side to side.

At'las, in Greek mythology, the Titan whom Zeus condemned to bear the vault of heaven. The same name is given to a collection of maps and charts, and was first used by Gerard Mercator in the 16th century, the figure of Atlas bearing the globe being represented on the title-pages of such works.

At'lee, Washington Lemuel, American surgeon: b. Lancaster, Pa., 22 Feb. 1808; d. 6 Sept. 1878. He became noted as a pioneer in ovariotomy and the removal of uterine fibroid tumors, and published 'Ovarian Tumors' (1873) 'Struggles and Triumphs of Ovariotomy' (1875), and a prize essay on 'Fibroid Tumors of the Uterus' (1876).

At'midom'eter, an instrument for measuring the evaporation from water, ice, snow, etc. It consists of two glass or metal bulbs, one of them placed above the other, with which it communicates by a narrow neck. The instrument having been immersed in a vessel of water through a circular hole in which the steam rises, distilled water is gradually poured into the pan above, causing it to sink to the point at which the zero of the stem is on a level with the cover of the vessel. As then the water in the pan gradually evaporates, the steam slowly ascends, the amount of evaporation being indicated in grains on the graduated scale.

Atmol'ysis, the separation of the components of a gaseous mixture by means of diffusion. See DIFFUSION.

Atmom'eter, an instrument invented by Sir John Leslie for measuring the quantity of moisture exhaled in the open air in a given time from any humid surface. It consists of a very thin ball of porous earthenware, from one to three inches in diameter, having a small neck firmly cemented to a long and rather wide tube of glass, to which is adapted a brass cap with a narrow collar of leather to fit closely. It is filled with distilled or pure water, and its cap screwed tightly. It is then suspended out of doors where it is exposed freely to the action of the wind, but sheltered from rain. As the water evaporates from the external surface of the ball, it transudes through its porous substance, and the waste is measured by the corresponding descent of the liquid in the stem. To test the amount of this descent, there is a finely-graduated scale. When the water has sunk to the bottom of the stem, the latter requires to be filled anew.

At'mosphere (Greek, «vaporous sphere»), in ordinary usage, the gaseous envelope that surrounds the earth. The atmosphere consists chiefly of the gases oxygen and nitrogen, not chemically combined, but mechanically mixed in the proportion of about 21 volumes of oxygen to 79 of nitrogen. It also contains small quantities of carbon dioxid, organic matter, water vapor, argon, and other substances. (For a more precise statement of its composition, see AIR.) At the surface of the earth it has a density of about 1/800th of that of water, though this varies somewhat with the height above the sea level at which the determination is made, and with the temperature and barometric pressure prevailing at the time. The presence of

free nitrogen in the atmosphere may be attributed, probably, to the comparative inertness of that gas, so far as any tendency to form chemical compounds is concerned. The presence of free oxygen cannot be explained in this manner, however, because oxygen is one of the most active chemical substances known. It appears more probable that oxygen is present in the free state simply on account of the immense quantity of that element that the earth contains. In past geological times, it combined with practically all of the oxidizable minerals that were near enough to the surface of the earth to be accessible to it, and the present supply of free oxygen in the atmosphere must be regarded as merely the excess of that element that remained unused, after all the possible oxidations had been effected. According to this view, the earth (at least in its more superficial parts) is a gigantic, burned-out cinder; and this accords with the estimates that chemists and geologists make, that nearly one half of the weight of the earth's crust consists of oxygen. It is likely that in past ages, and particularly in the carboniferous period when the vegetation that gave rise to our modern coal fields was flourishing, the quantity of carbon dioxid present in the atmosphere was considerably greater than at the present time. Part of this gas was absorbed by plants, its carbon being stored in the coal beds and its oxygen returned to the air; but it is likely that by far the greater portion combined with lime and other similar earths to produce the present vast deposits of limestone and other carbonated minerals and rocks. At the present day, carbon dioxid is being absorbed from the atmosphere by plants, and returned to it again by animals, and by factories in which coal is burned. We have no means of knowing whether the balance is being preserved, so far as this constituent of the atmosphere is concerned, or not; because the mass of the entire atmosphere is too vast for the composition to be sensibly changed by these causes, since the time when exact analyses became possible.

Galileo observed that water cannot be drawn up by a suction pump or other equivalent device, to a greater distance than about 34 feet. He did not succeed in explaining the existence of this limiting height, but his friend and amanuensis Torricelli, who succeeded him as professor at Florence, afterward made the shrewd guess that water rises in such a pump for the reason that the atmosphere exerts a certain pressure upon all terrestrial objects, and that when a portion of this pressure is removed from the water in the suction tube of the pump, it is the pressure of the atmosphere upon the water *external* to the pump that causes the water in the pump-tube to rise; and he saw that if that were the case, it would follow that a pump could only "draw" water up to the particular height at which the pressure due to the water-column so "drawn up" would precisely balance that of the atmosphere. The limit of 34 feet corresponds (as is easily shown by a simple calculation) to a pressure of about 15 pounds to the square inch; and hence Torricelli inferred that the atmosphere exerts a pressure of that amount upon all objects. Meditating upon this hypothesis, it occurred to him that if his explanation were indeed correct, the atmosphere would be able to raise mercury (which is about 14 times as heavy as water) to only about one fourteenth of the height to which it can raise water. He accordingly (in 1643) procured a glass tube some 35 inches long, and closed at one end. Placing it with the open end upward, he filled it with mercury. He then covered the open end to prevent the escape of the mercury, and inverted the tube so that its mouth dipped into a basin also filled with mercury. Upon uncovering the open end of the tube, he was gratified to see that the mercury in the tube at once sank until its upper surface stood at about 30 inches above that in the basin. This experiment proved that the atmosphere exerts a pressure equal to that due to a column of mercury 30 inches high; or, in other words, equal to about 14.7 pounds per square inch. Additional proofs were soon given, also. Thus Pascal suggested that if the explanation were true, the pressure ought to be less at the top of a mountain, than in a lower place; because the mountain projects up into the atmosphere so far that there is a sensibly smaller height of air above it then there is above a point in a valley. The experiment was actually carried out by M. Perrier, who carried an apparatus like Torricelli's (now known as a "barometer") to the summit of a mountain in Auvergne called the Puy de Dôme, and found at the top of this mountain (which is 4,800 feet high) the atmosphere could sustain only about 27 inches of mercury, although after returning to the plains below, the full height of 30 inches was again observed. Shortly afterward (in 1650) the air-pump was invented by Guericke, and the pressure of the atmosphere was demonstrated beyond any doubt whatever, by numerous direct experiments.

The pressure of the atmosphere varies somewhat from day to day, and even from hour to hour, as well as with the latitude and with the height above the sea. For scientific purposes the normal atmospheric pressure is now generally taken to be equal to the pressure due to a column of pure mercury 760 millimeters (29.9212 inches) high, at the level of the sea, in latitude 45°; the mercury being at the temperature 32° F. The pressure so defined is called an "atmosphere"; or, more briefly and conveniently, an "atmo." The "atmosphere" of pressure, as so defined, is nearly equal to a pressure of one million dynes per square centimeter, and it has therefore been proposed to take one million dynes per square centimeter as the standard atmosphere of pressure, calling it an "absolute atmosphere," because the dyne is a unit in the "absolute system" of units. This proposal has not yet been adopted by physicists to any great extent. See UNITS.

Knowing the pressure exerted by the atmosphere upon each square inch of the earth's surface to be about 14.7 pounds, and knowing the dimensions of the earth, it is not difficult to calculate the total weight of the entire atmosphere. The calculation, when performed, shows that the mass of the atmosphere is about 1/1,000,000th of that of the whole earth.

If the atmosphere were of uniform density, it would be easy to calculate the height to which it extends. We should only have to divide the pressure upon one square inch of the earth's surface by the weight of a cubic inch of the air, and the quotient would be the height of the

atmosphere, in inches. Thus a cubic inch of air, at a pressure of 30 inches of mercury and at the temperature of freezing water weighs about 0.000749 of an ounce; and as a column of mercury 30 inches high exerts a static pressure of about 235.8 ounces, it follows that if the atmosphere were homogeneous (that is, of uniform density throughout), its height would be about 253.8 ÷ 0.000749 = 314,000 inches, or 4.97 miles, when the air has a temperature of 32° F., and the barometric pressure is 30 inches. The height so calculated is convenient for use in certain physical computations, and is called the "height of the homogeneous atmosphere." If we turn from this problem to the more difficult one of determining the *actual* height of the atmosphere, we find that no satisfactory results can be given. As we go up, the strata become rarer and rarer, for the reason that the lower layers are weighed down and compressed by those above, and at increasing heights there is less and less air above, to exert this compression. At great heights the atmosphere becomes more and more attenuated, and thins out by insensible gradations into a perfect vacuum. There is no definite boundary, immediately below which there is an atmosphere, and immediately above which there is none. Glaisher and Coxwell, in their famous balloon ascension of 5 Sept. 1862, attained an actual elevation of over 29,000 feet, and observed a barometric height of 9.5 inches (corrected); but it is certain that the atmosphere extends far higher than this. Some estimates, based on the calculated heights of shooting stars when they first become luminous, place the limit at which the atmosphere has a density sufficient to produce any observable effects, at about 200 miles; but, as has been pointed out above, all estimates of this kind are necessarily indefinite and unsatisfying. (For some of the questions raised in connection with the limits of the atmosphere, see GASES, KINETIC THEORY OF.)

The atmosphere, as might be expected from its relatively great depth, exhibits an absorption spectrum (see SPECTROSCOPE), and this varies to a certain extent from time to time. A portion of this absorption spectrum is due to the presence of water vapor, and the "rain bands" in the spectrum have been utilized to a limited extent (though not very generally) in connection with weather predictions. It is also known that the atmosphere is less transparent to the rays at the blue end of the spectrum than to those in the middle and toward the red end. The experiments of Professor S. P. Langley, on the expedition of the United States Signal Service to Mount Whitney, demonstrated that this selective absorption is so great that the sun would appear distinctly bluish, instead of white or yellowish as it does under actual conditions, if we could see it from a point outside of our own atmosphere. (See Langley, 'Researches on Solar Heat,' 1884.)

Little is yet known concerning the electrical phenomena of the atmosphere. In clear, calm weather, the atmosphere appears to be always positively electrified, with respect to the earth, and the difference in potential increases greatly during snow storms and high winds. In thunder storms it is subject to sudden and violent oscillations, as might be expected. Many theories have been proposed to account for the electrification so observed, particularly for the enormously high potentials that are in evidence during thunder storms; but none has yet met with general acceptance. It was formerly thought that the evaporation and condensation of water had much to do with it, but no experimental evidence has been adduced to justify this hypothesis, although physicists have given it the most careful attention. Bartoli and Pettinelli made exhaustive experiments in connection with it, both with water and with organic compounds; but always without obtaining any favorable results. Kelvin, MacLean, and Gall observed electrification when dry air bubbled through a liquid, the air being electrified negatively in the case of pure water, and positively in the case of sulphuric acid or salt water. Apparently these are all friction phenomena, and it is not certain that they have any bearing on the electrical phenomena of the atmosphere. We know, from numerous experiments, that dust facilitates the condensation of aqueous vapor, and numerous authorities have endeavored to trace a similar connection between dust and the development of high electric potentials in the atmosphere. No certain results have been attained, however, as may be judged from the fact that in the 12 years immediately preceding 1902, no less than 25 new thunder-storm theories were proposed, 6 of these being published during the year 1895. See also METEOROLOGY; WIND.

Atmospheric Engine, an early form of pumping engine, invented by Papin in 1695 and subsequently improved by Newcomen and Watt. The steam cylinder is vertical and single acting, the piston being alternately forced upward by steam, and downward by the pressure of the atmosphere. See STEAM AND STEAM ENGINE.

Atmospheric Line. See INDICATOR.

Atmospheric Railway, a railway in which the propulsive force designed to move the carriages along is that of the atmosphere. The notion of such a method of locomotion seems first to have suggested itself, in the latter part of the 17th century, to the French physician Papin, whose name is forever associated with the celebrated digester. In 1810, Mr. Medhurst published a work entitled 'A New Method of Conveying Letters and Goods by Air.' His proposal was to construct a close tunnel, in which the carriages,— the last of them provided with a piston fitting the tunnel,— should be propelled by air forced in behind them. Vallance, of Brighton, in 1825, recommended, as an improvement on this plan, the exhaustion of the air in front. About 1835, Henry Pinkus, an American, residing in England, patented a scheme for placing the carriages in the open air, but connecting them below with a small tunnel, having a narrow slit above, with ingeniously constructed apparatus to render the tunnel temporarily air-tight, notwithstanding the slit. Not much was done to carry out the patent; and Pinkus' scheme of what he called a pneumatic railway was considered as having failed, when, in 1840, Messrs. Clegg and Samuda brought forward a somewhat similar project under the name of the "Atmospheric Railway." An experimental fragment of line laid down near Wormwood Scrubs, just outside of London, on the Great Western line, was successful, as was

one designed for actual use from Kingstown to Dalkey, in Ireland, another between London and Croydon, and a third in South Devon; but these have been since abandoned, and all that now remains to represent this mode of propulsion is the pneumatic dispatch tube, used for transmitting parcels to short distances. See WIRE-ROPE.

Atoll, a-tŏl', the Polynesian name for coral islands of the ringed type enclosing a lagoon in the centre. They are found chiefly in the Pacific in archipelagos, and occasionally are of large size. Suadiva Atoll is 44 miles by 34, and Rimsky 54 by 20. See CORAL ISLANDS.

Atomic'ity. See VALENCY.

Atomic Theory, in chemistry, the theory whose fundamental doctrine is that all matter is composed of ultramicroscopic particles, separated by spaces either entirely destitute of matter, or at least containing it in a very attenuated state. Such a theory was taught by Lucretius and other ancient philosophers, but the views of these early writers were necessarily vague and indefinite, and the atomic theory, as held by chemists of to-day, is generally attributed to the English scientist, John Dalton. In the early part of the 19th century Dalton called attention to the fact that when substances combine chemically they do so in certain definite proportions. His reasoning was something like this: In 100 pounds of carbon monoxid there are 42.9 pounds of carbon, and 57.1 pounds of oxygen. In the same weight of carbon dioxid there are 27.3 pounds of carbon, and 72.7 pounds of oxygen. These are merely experimental facts, obtainable by direct analysis, and they involve no hypothesis whatever. No particular relations are discernible among the numbers stated above; but Dalton discovered that if the same facts are stated in a different way, a very remarkable relation appears. Thus, suppose we calculate what weight of oxygen is combined *with each pound of carbon* in the two gases. In carbon monoxid we find that there are $57.1 \div 42.9 = 1.33$ pounds of oxygen to each pound of carbon, and in carbon dioxid we find that there are $72.7 \div 27.3 = 2.66$ pounds to each pound of carbon. One of these numbers being exactly twice the other, we conclude that carbon can unite with oxygen in two proportions, the quantity of oxygen, per unit weight of carbon, being twice as great in one case as in the other. Dalton observed similar relations among other compounds,—in fact, his theory first occurred to him while he was studying the simpler compounds of carbon and hydrogen; and after turning the matter over in his mind he came to the conclusion that the facts can best be explained by assuming that matter consists of exceedingly minute, indivisible particles or atoms, each of which has a definite weight. When two bodies combine chemically, he conceived their atoms to come together in pairs, or in threes, or fours, according to the compound formed; and he devised symbols to represent the various elementary bodies and their compounds. Thus oxygen was represented by a circle with a white centre, hydrogen by a circle with a dot in the centre, nitrogen by a circle crossed by a vertical straight line, and carbon by a solid black circle. His notation has no advantages over the one now in common use, and hence, in what follows, we shall adopt the modern symbols. As water was the only compound of oxygen and hydrogen that Dalton knew, he naturally represented it by the symbol OH, considering that in it the particles of oxygen and hydrogen are united in *pairs*. Taking the hydrogen atom as the unit, it follows that the weight of the oxygen atom must be 8, if Dalton's view of the composition of water is correct; for experiment shows that in a given mass of water there is eight times as much oxygen, by weight, as there is hydrogen. Carbon monoxid was represented by the symbol OC, and since for each unit of its oxygen (by weight) this gas contains ¾ of a unit of carbon, it follows that the atomic weight of carbon is ¾ of that of oxygen. Hence the weight of the carbon atom is 6, the weight of the hydrogen atom being arbitrarily taken, as before, as 1. Carbon dioxid was represented by the symbol OCO. Ammonia gas, being the only compound of hydrogen and nitrogen known to Dalton, was represented by the simple symbol NH; and since experiment shows that ammonia gas contains (by weight) 4⅔ times as much nitrogen as hydrogen, the atomic weight of nitrogen must be 4⅔, or 4.67. In presenting the foregoing sketch of Dalton's views, use has been made of better experimental data than were available in his time, in order that the relation of his system of atomic weights to the modern system may be more clearly seen. A few of his actual determinations of atomic weights, from the imperfect data that he had, are given in the accompanying table. These were published in

Element	Atomic Weight
Hydrogen	1.0
Nitrogen	4.2
Carbon	4.3
Phosphorus	7.2
Oxygen	5.5

1805, and his general theory of chemical compounds was given in the first volume of his 'New System of Chemical Philosophy,' published in 1808. All subsequent researches have tended to confirm Dalton's fundamental conception, that matter is discontinuous in its ultimate nature, and consists of discrete atoms which come together in definite groups when chemical combination occurs. And we agree with him, to-day, in the belief that the so-called "atomic weights" of substances are really the *true relative weights of their atoms;* the weight of the hydrogen atom being taken as unity. Soon after Dalton's theory had been announced, it was observed that there are simple *volumetric* relations among *gases* when they combine. Thus it was noticed that 2 volumes of hydrogen combine with 1 volume of oxygen to form water; that 1 volume of hydrogen combines with 1 volume of chlorine to form 2 volumes of hydrochloric acid gas; and so on. This being the fact, it was suggested by Avogadro in 1811, and independently by Ampère in 1813, that all gases, when under the same conditions of temperature and pressure, contain the same number of constituent particles per unit of volume. This principle, known as "Avogadro's Law," has been of the greatest service to chemistry. Its truth was long questioned, but as it has led to results of great value, and has been found to be in conformity with all other known facts of

chemistry, it is now accepted without reserve as a fundamental principle of nature. Moreover, the kinetic theory of gases has shown that it is a mathematical necessity, if gases are admitted to consist of elastic particles, flying about through space, and colliding with one another, and with the walls of their containing vessels. (See GASES, KINETIC THEORY OF.) But if Avogadro's law be admitted to be a fact of nature, it becomes necessary, at once, to make an important modification in Dalton's theory. For it is plain that if 1 cubic inch of hydrogen, containing (say) n atoms, combines with 1 cubic inch of chlorine, also containing n atoms, to produce 2 cubic inches of hydrochloric acid gas, containing n constituent particles altogether, then the number of such particles *in each cubic inch* of the hydrochloric acid gas is only $n \div 2$; whereas Avogadro's law requires us to admit the existence of n particles *per cubic inch*, in the compound gas as well as in each of its constituents. It follows, therefore, that when the H and the Cl combine, their ultimate particles do not simply unite in pairs. There is no way to explain the observed facts, consistently with Avogadro's law, unless we assume that the ultimate particles of H and Cl are both compound, and that when these gases combine, their particles split in two, half a particle of the one combining with half a particle of the other, to produce a whole particle of HCl. In other words, Avogadro's law compels us to admit that the little corpuscles of which matter is composed, and which we have heretofore called atoms, are really (in some cases, at least) systems composed of still smaller bodies. To distinguish between the two kinds of particles — namely, between the systems and their component bodies — it therefore becomes necessary to introduce a new term. The systems are called «molecules» (literally, «tiny masses»), and their constituent parts are still called «atoms.» To put the case in another way, the smallest parts into which a given substance can be conceived to be divided, without changing its chemical character, are called «molecules»; while the word «atom» is reserved for the smallest portion of a substance that can enter into a chemical combination. A molecule is a system of atoms capable of independent existence; and an atom is one of the parts into which the molecule of a substance divides, as a preliminary to entering into a chemical combination.

We have but little information, up to the present time, concerning the number of atoms entering into the molecules of the different elements. The molecules of cadmium, mercury, zinc, and indium are believed to be monatomic, at least when those bodies are in the gaseous state; so that in these cases there is no difference between a molecule and an atom. The same is apparently true of the newly discovered gases, argon, helium, neon, krypton, and xenon. Hydrogen, nitrogen, oxygen, selenium, and tellurium are believed to be diatomic; that is, their molecules are believed to contain two atoms each. Phosphorus and arsenic are believed to be tetratomic, their molecules containing four atoms each. Chlorine, bromine, and iodine are diatomic at temperatures below 1100° F., but above 1100° their molecules are believed (by some authorities) to break up into single atoms, so that at about 2200° F. two thirds of the little particles present in these substances are free atoms, while the remaining one third continue to exist as diatomic molecules. Sulphur is hexatomic at 900° F., but its molecules break up somewhat at higher temperatures, and are practically all diatomic above 1500°. According to this view of the case, if H stands for the atom of hydrogen and Cl for the atom of chlorine, what happens when a molecule of one of these gases combines with a molecule of the other is not simply $H + Cl = HCl$, because the molecule of hydrogen must be represented by H_2 and that of chlorine by Cl_2. Hence the process of combination consists of two parts, the first of which is

H_2	+	Cl_2	=	$H + H$	+	$Cl + Cl$
Molecule of hydrogen		Molecule of chlorine		Atoms of hydrogen		Atoms of chlorine

The atoms of hydrogen and chlorine, thus set free, then combine to form hydrochloric acid, in the following manner:

$$H + H + Cl + Cl = HCl + HCl;$$

or we may write the whole operation in the following simple manner:

$$H_2 + Cl_2 = 2HCl.$$

Dalton, assuming that the formula of ammonia is NH, and knowing by experiment that the weight of the nitrogen present is 4.67 times as great as the weight of the hydrogen, would conclude that the atomic weight of nitrogen is 4.67; but since experiment shows that when ammonia gas is separated into its constituent elements, 2 volumes of the ammonia yield 1 volume of nitrogen and 3 volumes of hydrogen, Avogadro's law requires us to conclude that the true formula for ammonia is NH_3; and hence we must take $3 \times 4.67 = 14$ as the atomic weight of nitrogen. This example will suffice to show how Avogadro's law obliged chemists to modify the atomic weights that would be obtained by the methods known to Dalton. Direct analysis of compounds of an element whose atomic weight is desired will give either that atomic weight itself, or some simple multiple or submultiple of it; but to decide between these several multiples (as for example between 4.67 and 14, in the case cited above), it is necessary to have recourse to Avogadro's law, or to some other equally general principle. Unfortunately Avogadro's law cannot always be applied to the determination of atomic weights, because it frequently happens that no compound of the element under examination can be obtained in the gaseous condition, or that the gaseous compounds that can be obtained are unsatisfactory, for one reason or another, and not adapted to the determination of the particular multiple that should be selected as the atomic weight of the element. In such cases recourse may be had to the law of Dulong and Petit, or to the «periodic law» of Meyer and Mendeléeff. In 1819 two distinguished French physicists, MM. Dulong and Petit, announced that the specific heats of 13 elements upon which they had made careful experiments are inversely proportional to the respective atomic weights of those elements. In other words, that the product of the specific heat and the atomic weight (which product is called the «atomic heat») is the same for all of them. This remarkable generalization did not meet with universal and immediate acceptance, because it failed in numerous cases unless the

atomic weights of the corresponding elements were changed somewhat from the values that had been previously assigned to them from purely chemical considerations. Thus in the case of bismuth, platinum, silver, and cobalt, Dulong and Petit substituted multiples or submultiples of the atomic weights then in use; and other changes were also made. Moreover, the law could not possibly be exact, because the specific heats of bodies are not constant, but vary with the temperature, and sometimes to a considerable extent. Subsequent experimenters have paid great attention to Dulong and Petit's law, however, and now that the atomic weights of the more familiar elements have been pretty well determined in one way and another, the law is found to be surprisingly near to the truth, and most of the changes for which they contended, in connection with previously accepted atomic weights, have since been made. A list of ten elements whose specific heats have been well determined are presented in the table, to illustrate the degree of accuracy with which

Element	Atomic Weight	Specific Heat	("Atomic Product Heat")
Lithium.....	7.	0.941	6.6
Aluminum....	27.	0.214	5.8
Potassium....	39.	0.166	6.5
Copper.....	63.	0.0952	6.0
Silver.....	107.	0.0570	6.1
Antimony....	119.	0.0508	6.1
Tungsten.....	183.	0.0334	6.1
Gold.....	196.	0.0324	6.4
Bismuth.....	207.	0.0308	6.4
Uranium.....	238.	0.0277	6.6

a proposed element may be expected to conform to it. The atomic weights in the table range from 7 to 238, and yet when we multiply each one by the corresponding specific heat, we find that the product (or "atomic heat") remains constant, or nearly so. In some cases (notably for boron, silicon, and carbon), a large deviation from the law is observed; but these exceptions cannot be considered in the present place. As an example of the use of Dulong and Petit's law, the case of silver may be cited. Previous to the publication of that law, the atomic weight of silver had been taken at 215. Dulong and Petit pointed out that if this value were retained, the product of the atomic weight and the specific heat greatly exceeded the value 6, to which many of the other elements approximated. They therefore proposed to halve the then accepted atomic weight of this element, and to make (of course) a corresponding change in the formulas of all compounds of silver. Regnault confirmed their experiments, and repeated their demand that the atomic weight be halved. But Berzelius, then the greatest living authority on such matters, refused to consent to the change, on the ground that silver and sodium compounds are isomorphous (see ISOMORPHISM), and that the analogy between the formulas of their corresponding compounds would be destroyed, if the atomic weight of silver were halved, while that of sodium was left unchanged. Regnault then determined the specific heat of metallic sodium, and showed that the atomic weight of that element should also be halved, in order for it to conform to Dulong and Petit's law. Berzelius' objection thus lost its force, and the atomic weights of both silver and sodium were ultimately halved, by universal consent. The "periodic law," already referred to, cannot be adequately treated in this place (see PERIODIC LAW); but it may be said that when the known elements are arranged in the order of their atomic weights, it is found that certain attributes recur in a remarkable "periodic" manner, as we pass from one end of the array to the other. This fact is of great assistance in the determination of atomic weights, because any great error in the assignment of the atomic weight of an element would throw that element, among others with which it would have relations, entirely out of harmony with those that prevail in other parts of the array. This "periodic" classification is so powerful and far-reaching, that the existence of new and previously unsuspected elements has been predicted by it, and afterward verified (in some cases) by the actual discovery of the elements themselves. The newly discovered gas "argon" (q.v.) affords an interesting case of the determination of an atomic weight by indirect means. Argon has resisted all attempts to make it combine with other substances, and hence it has been impossible, thus far, to analyze any of its compounds. Its density was found, by direct experiment, to be about 20 times as great as that of hydrogen. Now if, as Avogadro's law states, a cubic inch of argon contains just as many molecules as a cubic inch of hydrogen (under the same conditions of temperature and pressure), then it follows that a molecule of argon weighs 20 times as much as a molecule of hydrogen, or 40 times as much as an *atom* of hydrogen. To find the weight of an atom of argon we therefore merely have to divide 40 by the number of atoms that there are in its molecule. For an explanation of the method by which the number of atoms in the molecule of such a gas is obtained, we must refer to the article GASES, KINETIC THEORY OF; it will suffice, in the present place, to state that it was found that argon is monatomic, its molecule containing but a single atom. Therefore the conclusion was, that the atomic weight of argon is about 40. The "periodic law" was not of any great service in this case, because the properties of the new gas proved to be so unlike those of any previously known substance that its proper place in the general scheme could not be even guessed until its atomic weight had been determined. The subsequent discovery of helium and the other inert gases of the same group showed, however, that the atomic weight already assigned to argon is in reasonably good accordance with the periodic law.

Chemists educated in recent years can hardly conceive the confusion that prevailed half a century ago, while the principles that have been outlined above were struggling for recognition and universal adoption. There was no agreement as to what atomic weights nor what formulas should be used. Mendeléeff says: "Some took O=8 and others O=16. Water in the first case would be HO and hydrogen peroxid HO_2, and in the second case (as is now generally accepted) water would be H_2O and hydrogen peroxid H_2O_2 or HO. Discussion and confusion were reigning. In 1860 the chemists of the whole world met at Carlsrühe for the purpose of arriving at some agreement on the subject. There was great difference of opinion,

and a conditional agreement (or compromise) was proposed and defended with the greatest acumen by the ranks of science. A conditional agreement was not arrived at, and ought not to have been; but instead of it, truth, in the form of the law of Avogadro-Gerhardt, received by means of the Congress a wider development, and soon afterward conquered all minds. Then the new so-called Gerhardt atomic weights established themselves, and in the seventies they had already become generally used. As soon as a few of the atomic weights had been determined with some little degree of precision, it became evident that they came nearer to exact integers than one would naturally expect them to, judging from the theory of probability. As early as 1815, Prout made the assumption (since known as "Prout's Hypothesis") that the true values of these atomic weights are really integral numbers; and he drew the inference that all elements are composed of hydrogen. Thus nitrogen, whose atomic weight is almost exactly 14, he believed to contain 14 times as many atoms to the molecule as hydrogen contains, and he believed the fundamental atom to be the same in each case. There is nothing about this assumption which conflicts with what has been said above about nitrogen being a *diatomic* gas; for all that Avogadro's law positively shows is that when a molecule of that gas divides, it splits into *halves,* and therefore contains an even number of atoms. In the absence of any evidence to the contrary we assume it to be simply diatomic, although we must always remember that future research may require us to admit it to be tetratomic, hexatomic, or even more complex. Prout's hypothesis has provoked a great deal of discussion, and since it was first proposed it has been attacked and defended by many distinguished chemists; and although rather in disfavor at present, we can hardly yet say that it has been finally laid to rest. One can scarcely glance at a table of atomic weights (such as that here presented) without being impressed by the manifest tendency shown by these atomic weights to approach integral values. Of course there are conspicuous exceptions — chlorine, for example — but the fact that many of the atomic weights are nearly integral demands some sort of an explanation. What that explanation may ultimately prove to be, we cannot now guess; but it is possible that it will be found in the development of the remarkable corpuscular hypothesis of Prof. J. J. Thomson. (See ELECTRON.) The atomic weight of oxygen was long thought to be precisely 16; very careful experiments then indicated that 15.96 is a closer approximation to the real fact; and it has recently been ascertained that 15.88 is a still better approximation. It is a matter of choice what element is taken as having the atomic weight unity, hydrogen having been chosen for this purpose merely because it is the lightest element known. For many purposes it would be convenient if the atomic weight of oxygen were precisely 16; but this value is now known to be incompatible with the assumption that the atomic weight of hydrogen is 1. Chemists have therefore been in the habit, in recent years, of multiplying all the atomic weights, as deduced on the hypothesis that H = 1, by a constant number, so determined as to make the atomic weight of oxygen come precisely 16. It happens that this number is 1.008, and this is therefore the atomic weight that must be assigned to hydrogen, if we are to adopt a scale on which the atomic weight of oxygen is to be precisely 16. A majority of the chemists of the world now use this modified scale, on which the atomic weight of hydrogen is taken as 1.008; and the scale so established is known as the "International" scale of atomic weights. A table of the atomic weights of the elements, both for H = 1, and for O = 16, is presented herewith.

TABLE OF ATOMIC WEIGHTS.

Element	Symbol	Atomic Weight	
		H=1.	O=16.
Aluminum	Al	26.9	27.1
Antimony	Sb	119.1	120.
Argon	A	39.6	39.9
Arsenic	As	74.4	75.
Barium	Ba	136.4	137.4
Bismuth	Bi	206.9	208.5
Boron	B	10.9	11.
Bromine	Br	79.36	79.96
Cadmium	Cd	111.6	112.4
Cæsium	Cs	132.	133.
Calcium	Ca	39.7	40.
Carbon	C	11.91	12.
Cerium	Ce	139.	140.
Chlorine	Cl	35.18	35.45
Chromium	Cr	51.7	52.1
Cobalt	Co	58.56	59.
Columbium	Cb	93.3	94.
Copper	Cu	63.1	63.6
Erbium	E	164.8	166.
Fluorin	F	18.9	19.
Gadolinium	Gd	155.	156.
Gallium	Ga	69.5	70.
Germanium	Ge	71.5	72.
Glucinum	Gl	9.03	9.1
Gold	Au	195.7	197.2
Helium	He	4.	4.
Hydrogen	H	1.	1.008
Indium	In	113.1	114.
Iodine	I	125.9	126.85
Iridium	Ir	191.5	193.
Iron	Fe	55.6	56.
Krypton	Kr	81.2	81.8
Lanthanum	La	137.	138.
Lead	Pb	205.35	206.9
Lithium	Li	6.98	7.03
Magnesium	Mg	24.18	24.36
Manganese	Mn	54.6	55.
Mercury	Hg	198.8	200.3
Molybdenum	Mo	95.3	96.
Neodymium	Nd	142.5	143.6
Neon	Ne	19.9	20.
Nickel	Ni	58.3	58.7
Nitrogen	N	13.93	14.01
Osmium	Os	189.6	191.
Oxygen	O	15.88	16.
Palladium	Pd	105.2	106.
Phosphorus	P	30.77	31.
Platinum	Pt	193.3	194.8
Potassium	K	38.86	39.15
Praseodymium	Pr	139.4	140.5
Rhodium	Rh	102.2	103.
Rubidium	Rb	84.76	85.4
Ruthenium	Ru	100.9	101.7
Samarium	Sa	148.9	150.
Scandium	Sc	43.8	44.1
Selenium	Se	78.5	79.1
Silicon	Si	28.2	28.4
Silver	Ag	107.12	107.93
Sodium	Na	22.88	23.05
Strontium	Sr	86.94	87.6
Sulphur	S	31.83	32.06
Tantalum	Ta	181.6	183.
Tellurium	Te	126.	127.
Thallium	Tl	202.6	204.1
Thorium	Th	230.8	232.5
Thulium	Tu	170.	171.
Tin	Sn	117.6	118.5
Titanium	Ti	47.7	48.1
Tungsten	W	182.6	184.
Uranium	U	237.7	239.5
Vanadium	V	50.8	51.2
Xenon	X	127.	128.
Ytterbium	Yt	172.	173.
Yttrium	Y	88.3	89.
Zinc	Zn	64.9	65.4
Zirconium	Zr	90.	90.7

The many questions that suggest themselves as to the size and physical nature of atoms belong properly to the domain of physics, and are discussed under the heading MOLECULAR THEORY. The day will doubtless come when the physicist and the chemist will find some common ground for the discussion of the nature of atoms and molecules; but at present these two sciences deal with such widely different classes of phenomena that no such common ground can be discerned. The atom and the molecule of the physicist appear to be hardly capable of possessing the properties that the chemist demands; but this difficulty may one day be overcome. See CHEMISTRY; ELECTRON; MOLECULAR THEORY; GASES, KINETIC THEORY OF; VALENCY; SPECTROSCOPE; PERIODIC LAW.

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Editorial Staff 'Encyclopedia Americana.'

Atonement. The Atonement is the caption under which Christian theology introduces the discussion of the application of the merits of the life and death of Christ to the reconciliation of fallen man to his Creator, as well as of the acceptance thereof by the Divinity. It expresses the crowning effect of the incarnation. It is, in this sense, an attempt at an explanation of the coming of the Redeemer. In a general way it means compensation, restoration, expiation, satisfaction, ransom. It is a word made up etymologically of *at* and *one*, and suggests that two who were divided have become one again. It embraces all that the Saviour accomplished to nullify the effects of sin. The atonement is considered to have repaired the consequences of the primal transgression, all the moral consequences, say some, say most of the authorities. As to the physical outcome of the rebellion in Eden, it claims no change save, that through it, man has been enabled to bear patiently and meritoriously all the ills of existence and to wrest from what is evil a good that worketh unto satisfaction. The atonement idea is co-existent with what, in order to avoid conflict with those who think otherwise, may be called Biblical humanity; that is, the race whose chronicle is found in the pages of Scripture. It has no meaning for those who reject the inspiration of Holy Writ or for those whose beliefs are antagonistic to Christianity. With these, if there be any atonement at all, it lies in an evolution, by virtue of which man develops from worse to better and in the "process of the suns" reaches, unaided, to a deliverance and a perfection far surpassing even the dreams of Christianity. The subject is a vast one. It has many and far-reaching ramifications which are constantly in contact with every issue of soteriological study. To confine it within the limits of an encyclopedic article necessarily cramps it and scarcely makes for completeness. All that can be done is to present its general features, the basis on which it rests, and some of the opinions which deserve attention in the different stages of development incidental to its growth. The fact upon which the doctrine reposes is that narrated in Genesis iii., wherein the prevarication of the first couple is said to draw on them and posterity the curse of the Almighty, which He tempers with the promise of a Redeemer to come. This violation of God's command, while it rendered Adam and Eve criminal and placed them under a ban, was at the same time an insult outraging, as much as anything finite could, the infinite perfections. Thus a condition was brought about which consigned man to punishment and left an affront against the Creator to be, in some way or other, atoned for. In this plight the whole race was involved and became ostracized from God. All humanity was confronted by a God whose infinite justice called for an indemnity of some kind as a reparation for the indignity offered to His perfections, by a penal sentence to be endured, by the loss of innocence, by the unbridling of concupiscence and by a slavery which reduced it to the thrall of the prince of the powers of darkness. Immediately is perceived the gaping breach which the atonement had to bridge over. Could the restoration be achieved by man himself and alone, or by entire humanity? The general answer is a negative. It is clear from the attitude into which man was forced by his sin what the questions are which in this discussion call for a reply. The views entertained by theologians are not marked by very harmonious notes. There is a very great discrepancy of opinion. Like other doctrines, that of the atonement did not come into existence full grown. It was not formulated in the beginning. Hints of its nature are found in the New Testament. By Christians up to the time of the Reformation it was received from individual teachers, by whom, as by the laity, it was instinctively grasped, though scarcely expressed, and thus in many forms traversed the duration of nearly 15 centuries. Whenever, during all that period, it was treated by the fathers and doctors and other writers, there was unanimity on this one point: that the atonement was effected by the incarnate Son of God and that the satisfaction was complete and answered all the exactions of a just Deity, while it simply deluged man with a sea of spiritual blessings. Their contention, summed up, was that it was in the absolute power of God to pardon man without any atonement, without sending His Christ. In His wisdom, however, consulting not only the great wrong perpetrated against Him, but the welfare of His creatures, He decreed the incarnation of His divine Son, the second person of the Blessed Trinity. That Son incarnated was both God and man, possessing two natures in one person. This person was divine. As all acts are attributable to the personality of the individual, it followed that the acts of the God-man were divine, and so, whether proceeding from the human nature or not, they were infinite in value. It was necessary for an atonement act to have infinity, because sin, though committed by a finite agent, was in a measure infinite, since its malice was directed towards a being infinite in nature. Theologians made the distinction that sin was finite subjectively, but objectively infinite. The divinity of the person made the atonement secure on the side of the Father. Man was doubly privileged. The Redemption of Christ obtained for him, through grace which had its efficacy in the blood of the Saviour, the remission of sin, and strengthened him against his own weakness, his own passion and the wiles of the enemy from whose thraldom he had been rescued. In a word, the insult to the Father was wiped

out; man was restored to the old friendship, was endowed with the means of justification and sanctification and his feet put on a path to the vision of God, in the enjoyment of which sin becomes an impossibility and happiness is supreme. With very few exceptions this, more or less completely, was the form the atonement took in the thoughts of the large majority of teachers of the Church for a decade and half of centuries. They labored to hold up the dignity and liberality of the atonement. The Atoner was Christ, and He atoned through His sacrifice on the cross in a manner ample beyond all human reckoning. But the atonement was not a thing of Christianity only; its effects reached back to the whole past of man, for the Lamb who atoned was «slain from the foundation of the world.» They argued that the redemption was universal as to time and place and for all the generations of man. All the peoples before Christ came within its pale. No man, however incult, fell outside of the plan of redemption. Everyone everywhere could find its blessings within his reach. It wrought from alpha to omega on the race. Not the chosen people only, but the Gentiles as well participated in its benefits. It was taught in the period under reflexion that just as soon as the Redeemer was foretold to Adam and Eve the atonement began to energize in some inexplicable manner, but always with a view to the merits of Christ, who was to come in the fulness of time and pay the ransom. The concession of the Creator in granting a Redeemer who was to make plenary atonement for every man until the passing away of the race was, before the incarnation, a promissory note — if it may be allowed to use the term — a promissory note of salvation accepted and honored by the Maker, who knew that at the appointed time a priceless amount would be stored up for its redemption. The atonement idea, that is, the necessity of making amends to a Ruler whose mandates had been and were being violated, prevailed everywhere in the ancient world and was not confined to the descendants of Abraham. Sacrifices, propitiatory and expiatory, so common among the ancient idolators, are evidence sufficient. Among them was an uppermost thought that reconciliation with God or with the gods could not be brought about by individual efforts alone. The sacrifices of Israel emphasize the essence of all atonement. A victim was always called for. Something outside of the transgressor had to be offered to effect the lifting of the ban. That blood offerings, or others, were ineffective, save indirectly and by a mysterious connection with the oblation of Christ, is admitted throughout the extent of ante-Reform tradition. In the Jewish mind the concept of sacrifice in a multitude of cases connoted effusion of blood. The Hebrews were instructed that transgressions placed on the back of the victim died with the victim. This only in a measure, for it does not appear that they professed that after the death of the victim the guilt of the sacrificers was cancelled without any further act or cooperation on their part. Repentance was necessary and each had to do his utmost to share by individual action in the redeeming work of the sacrificial object. The vexed subject of imputation (q. v.) recurs frequently but cannot be touched here. The religion of the Jews was distinguished by the number and variety of its sacrifices. But atonement was ever before their eyes. Yom hakkippurim, or Day of Atonement, is another proof. It was a penitential occasion. Its austerity was rigorous. From the evening of the 9th to the evening of the 10th of the seventh month no bodily labor could be done, no food taken under penalty of death. All the ritual was carried out by the high priest, who offered sacrifices for the sins of himself, of the priesthood and of the people. For the typical meaning of these ceremonies see Heb. viii–x, and for a description of the solemnity cf. Lev. xvi. These types ceased with the advent of Christ. Mention has already been made of the gradual development of the doctrine of atonement. From the death of the Saviour it was admitted that «Jesus died, the just for the unjust, to redeem mankind from the bondage of corruption and to restore the broken connection between heaven and earth.» Different ways of looking at this fundamental axiom of Christianity in general, have suggested various explanations. The conditions of the dispute led to many questions which relate to the incarnation. The one thing the teaching Church held to was that Christ as man is the first and supreme mediator between God and man (1 Tim. ii. 5). Because as man He was a created being He is below God, but is above all creatures by reason of the plenitude of His grace and glory. As man He offered to God a satisfaction so singularly adequate that by it was destroyed «the handwriting of the decree» so adverse to us, and by it also man was endowed with all that is requisite to be in friendly association with God, by grace in the present and by glory in the future. Others, ministerially or otherwise, may co-operate in uniting God and man, but Christ is the chief and first and literally the only mediator (Billot).

The doctrine of the incarnation in its entirety illumines this subject, but of it and of other cognate subjects, such as justification and original sin, notice cannot be taken here. The atonement, as such, has not been treated specifically by early writers, and it would be difficult to put one's finger on any dogmatic decree in which it is definitely formulated. Just as from definitions here and there spread over the volume of authoritative teaching the nature of the atonement is elicited, so from the utterances of ecclesiastical writers one is able to reach a conclusion in harmony with the affirmation of tradition. The view still claiming attention bases itself on Scripture. Texts therefrom are not necessary for the present writing; they embrace the prophetic language of the Old and the literal language of the New Testament. The Apostolic Fathers, from Clement to Polycarp, are satisfied with stating the fundamental idea that «Christ died for us» and for our sakes. Irenaeus and Origen insist that a price had to be paid to Satan because Satan had gained a rightful mastery over and ownership of men, for which the only equivalent was the blood of Jesus. This view was never universal, but now and again it is brought forward, even up to the time of Peter Lombard. The Fathers and writers from Origen to Anselm wrote more systematically on nearly every

topic, but were unanimous in maintaining that the death of Christ was the sacrifice unique and par excellence and amply satisfactory. Some do, others do not, endeavor to explain whether and why this sacrifice was imperative. This is true of the Church East and West, Greek and Latin. Two ideas are prominent: the infinite value of the human acts of Christ, and the need of grace for human weakness. More stress is placed on the incarnation than on its concomitant effecting of the atonement. "The work of mediation was summed up but not exhausted in the dying. He was a priest and a sacrifice from the beginning, and is and always will be. The imitability of Christ's career was not confined to the death on the cross, but as well to the whole existence" (Newman).

Occasionally a peculiar view would startle the world, but without changing the generally accepted opinion. Anselm (1033) in his 'Cur Deus homo' vigorously opposes the view of Origen and others concerning the so-called bargain by which the Almighty, through Christ, purchased back the souls of men from the grasp of Satan. Then came the age of the Schoolmen. It has been the custom to look upon these men as triflers and hair splitters, but what Huxley says of Saint Thomas is, with modification, applicable to many of these very imperfectly known and much abused investigators: "His marvelous grasp and subtlety of intellect seem to me to be almost without a parallel" (Science and Morals). They all united in declaring that Christ by His sacrifice was the Atoner. They differ in their explanation of some points connected with the incarnation which are irrelevant here. They are broad and moderate in their views. Christ not only freed us from sin, says Aquinas, but won for us grace and glory, and it was fitting that by death He should overcome the power of death, but His death need not have been a violent one. Over the question whether the incarnation was an absolute necessity or only something congruous, they run through every note of the gamut of argument. Duns Scotus is one of the principal figures in the discussion. Among other views he maintains that a mere man conceived without sin, or a good angel, could have made satisfaction for the entire race had it pleased God to accept it. Express treatises on the atonement cannot be found. It is always treated as an adjunct of the incarnation. There have been many pious and devotional essays on this topic. Since the days of the scholastics all Catholic analysis of the atonement can be traced back to them or to the Fathers and doctors. The Reform opens with the 15th century of modern times, and those leaders only who have left an indelible impress upon their followers will receive attention. Arians, and those who reject the divinity of Christ directly or by implication, fall outside this inquiry.

An insistent tenet of the Reformers is, that Christ reconciled God to us, whereas the Tridentine Council teaches that He reconciled us to God. The Divinity by the very force of the divine perfections, Catholics hold, remained in itself unchanged. The fall affected man, that is, man by his transgression placed himself voluntarily under the ban of infinite justice and willingly subjected himself to all the consequences of his disobedience. Man alone changed. God's attitude was always the same. In one of his bulls Leo X. (1520) condemned 41 propositions of Luther, some of which in one way or another refer to the doctrine of the atonement. In the sixth session of the Council of Trent the decrees on justification, on the advent of Christ, on justification, etc., set forth a basis for views on the Atonement which are in opposition to those of Luther and others. Luther denies the supernatural character of man's original sanctity. God, according to Luther, planted in the very essence of human nature the capabilities and the acts of virtue. Hence no freedom of will. Sin is of the essence of man. Man is wholly evil. Calvin asserts that everything coming from man's corrupt nature is damnable and so can in no way co-operate in the atonement. It must all occur outside of himself. He contributes nothing. He is justified; he is reconciled to God, or God is reconciled to him through faith in the merits of Christ, whose obedience becomes man's obedience and whose righteousness becomes man's justification. In this way the Creator remits sin, reputes man just and rewards him with eternal life. Christ made satisfaction for sinners in two ways: by fulfilling the law in their place and by enduring the curse and penalty of the law. Everything in the atonement becomes vicarious. Another person is substituted for the debtor and the criminal. These doctrines are gathered from the Epistles of Saint Paul. Only the bare statement has been here presented of the doctrine of the Reformers. A review of the reasons advanced to sustain this teaching would repay the student. Those who came after Luther and Calvin and Melancthon modified in a lesser or greater degree this teaching and modified the idea of transference as atonement and demanded at least some co-operation, on the part of the sinner. Imputation soon became the great battleground of controversy. Investigation will reveal that in the Protestant churches there has been a recoil from the positive utterances of the Reformers. The disparity existing between the above and what can be gleaned from the early and modern history of the Catholic Church is undoubtedly marked. So much so that Pusey in his introductory essay to 'Essays on the Reunion of Christendom' observes: "The Lutheran and the Catholic belief are as like two different religions as any can be, wherein the belief as to the adorable Trinity and the incarnation is the same. The *whole* doctrine of the application of the merits of Christ to fallen man and the condition of man in consequence of the fall is radically different." In fact, the difference is so radical that there is no possibility of confounding one with the other. All Protestant theology from the rise of that religion is a literature which is within the reach of any one to consult, and further quotations or references are unnecessary. "Just as the justice of man binds the judge to punish the criminal, so is some penalty exacted from man by virtue of the same attribute, which, of course, is more perfect in the divinity. It is not the spirit of vengeance which animates God. In spite of the transgression God's love remains as it was in the beginning, without diminution or alteration of any kind. The Son

of man died for all men sufficiently, for the elect efficiently. Satisfaction is required of man. But that satisfaction is amply made by man by believing, who thus becomes one with the Redeemer and shares with Him in the redemption He wrought as the Head of the Redeemed. This is enough to excite love and repentance and the striving after holiness."

Everything bracketed above, though taken from different writers, expresses the view of the Atonement as held by Protestant expounders.

In later years, both in Germany and elsewhere, the theology outside of the Catholic Church, while apparently concordant with the opinion of the necessity of man's co-operation, harks back, consciously or unconsciously, to the belief of Luther and his immediate disciples that Christ atoned fully, and so fully that the sinner need only by some interior act appropriate to himself the work already done by the Saviour. Where there is any insistence that man must of himself do something positive, in so much is that insistence at variance with the thought that in the beginning of the Reformation was spread broadcast among the adherents of the New Religion. Might there not be drawn a distinction between atonement and salvation? The atonement would mean that Christ had done all that was necessary to reconcile man with God, but there could be no salvation unless man turned to God through the path of the atonement and by individual repentance and satisfaction so comported himself as to bring by voluntary acts his life into entire harmony with the will of his Creator. No solution of the evidently complicated nature of the atonement will compel conviction which does not answer adequately the following questions: What is the relation of the Atonement to an offended God? What was His acceptance of the sacrifice? How far did that sacrifice in itself go towards bringing God and man together? Was it alone enough to liberate man so absolutely that after the death of the victim no more was expected on his part? How were the outraged excellences of the Godhead — His justice, His mercy, His love — compensated for the injury done them by sin? Did that injury really affect the divine nature? It may be advanced here that in every theory which possesses any serious claim to assent the Supreme Being remained unimpaired in the beauty of His perfection, and it was due to the infinite justice of God to demand a congruous if not a condign reparation. What part does Satan play in the plan of redemption? Has a solution been presented? Is it and will it always be an impenetrable mystery? It is a matter so significant for Christians that they have the right to expect from some form of Christianity a clear exposition based on Scripture and authoritative teaching. For Christians it means salvation, regarding which certainty is security and doubt a calamity.

Thus much for Christianity, which emphasizes the necessity of an atonement. All Christians admit Christ as the fountain head of all reconciliation of man with God. But the world is far from being entirely or even largely Christian. In the world to-day there are about 1,500,000,000 human souls, of which number only a little over 400,000,000 have received the religion of Christ. Half of these, it is computed are Catholics, the remainder are Protestants or Catholics of some kind or other, but divided from the See of Rome. The rest of the race is either Jewish or Mohammedan or belongs to some Oriental form of worship or is out and out heathen. Will Christianity assume the responsibility of stating that beyond its pale the atonement does not reach and that therefore for the pagan there is hope neither here nor hereafter? Some mention has already been made of the Jews and their manner of atonement. Their views have crystallized into the shape which their orthodox members adopt to-day and which they base upon certain books of the Old Testament, upon their Talmud and their Targum. It differs in no way materially from the teachings of Moses and the Law and the Prophets. They lived in the past as they are living now in the hope of a great Deliverer to whom every act of worship bore and bears reference. In some way or other these typical ceremonies, it is said, influenced Jehovah to make them the promise: "I will be merciful to their iniquities, and their sins I will remember no more." (Hebrews viii, 12.) The space of this article is inadequate to include even the most summary account of the atonement idea as it was understood by the nations outside of the chosen people. Research has made it admissible that everywhere there have been religious beliefs, opinions and practices pointing to the acknowledgment of a Supreme Being and judgment to come and a reward or punishment in a life beyond this. With this are apparently connected sacrifices which no matter how accompanied by fanaticism and superstition are an attestation of an homage paid to a deity, a homage of praise, or petition, or thanksgiving or of supplication for pardon — an homage which was inspired by an underlying sentiment of the need of appeasing some offended divinity. Yet it is not easy to trace this need in those religions which are so widespread in the Levant and furthest East and proclaim as fundamental Fatalism, Metempsychosis and Pantheism. The investigation of the subject of atonement as advanced by the followers of Christ, by those followers who profess that Jesus was the Son of God, that is, was Divine, among other questions inevitably suggests the question of the possibility of salvation for all individuals of the race whose creed negatives Christianity altogether. Some reply, adequate or otherwise, may be found in the dogma that "Christ died for *all* men," whence the inference is deducible that even those who never heard of the Redeemer, or the atonement, cannot but be affected by that death. How? is a large thesis. That the problem has been approached by honest and able thinkers is plain to the readers of history. In the Christian world there is no small number who deny the primal fall and hence see nothing urgent in the discussion of the atonement. The Messiah has not yet reached this earth say the Jews, Christ was not God, say the Arians, there is no God, say the Atheists, if there be He is unknowable, say the Agnostics. For all these the atonement has very slight, if any, significance. Teachers of note advance the theory, basing it on Scripture, that the first tradition of a redeemer to

come and who was to atone, was carried by the earlier peoples as they grew and scattered and populated the earth. The Jewish idea brought by the Israelites in their wanderings and captivities and assimilated by the tribes and nations among whom they dwelt, was in the lapse of time weakened or metamorphosed, or adapted to pagan beliefs and so corrupted. "The only theory which accounts for all these facts," says Rawlinson, "is that of a primeval revelation variously corrupted through the manifold and multiform deterioration of human nature, in different races and places."

Bibliography.— Various commentaries on the Fourth Gospel and the Epistles of Saint Paul; Canones Concil Trident; Luther's 'de Servo Arbitrio,' 'Two Catechisms,' etc.; Augsburg Confession; Melancthon's 'Loci Theologici'; Möhler's 'Symbolism'; Oxenham's 'The Catholic Doctrine of the Atonement'; Calvin's 'Christianæ Religionis Institutio,' etc.; various theological tracts on the incarnation; Campbell, 'Nature of the Atonement'; Hallam, 'Literature of Europe'; writings of the Fathers and Doctors; Grotius on 'Satisfaction'; Prof. Jowett, 'Essay on Atonement and Satisfaction'; Coleridge, 'Aids to Reflection'; Bishop Forbes, 'Thirty-nine Articles.'

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Atos'sa, the daughter of Cyrus, 530 B.C. She was successively married to Cambyses, Smerdis, one of the Magi, and Darius, son of Hydaspes, the last of whom she incited to invade Greece. The word served as a poetical name given by Pope, in his 'Moral Essays,' to Sarah, Duchess of Marlborough.

Atrato, ạ-trä'tō, a river of Colombia, of note, because it has repeatedly been made to bear a part in schemes for a ship-canal across the Isthmus of Panama. Rising on the Western Cordillera at an altitude of 10,560 feet, above sea-level, it runs 305 miles northwest through low, swampy country and falls by several mouths, interrupted by bars, into the Gulf of Darien. It is navigable by steamers for fully 250 miles, being 750 to 1,000 feet wide, and 8 to 70 feet deep. A route, surveyed by the United States government in 1871, proposed to connect the Atrato and the Jurador, flowing into the Pacific, by a canal 48 miles long. At the Paris International Congress (1879), that route was, with various others, discussed and rejected in favor of De Lesseps' line from Limon to Panama. Gold-dust is found in and about the Atrato.

Atrau'li, a town of India, in the northwest provinces. It is clean, well built, and has a good trade. Pop. 14,374.

Atrebates, ạ-trĕb'ạ-tēz, or ăt're-bā'tēz, the ancient inhabitants of that part of Gallia Belgica afterward called *Artois.* A colony of them settled in Britain, in a part of Berkshire and Oxfordshire.

Atrek, ạ-trĕk', a river of Asia, forming the boundary between Persia and the Russian Transcaspian territory, and flowing into the Caspian. Its length is over 300 miles.

Atreus, ā'troos, in fabulous history, the son of Pelops and Hippodamia. He and his brother, Thyestes, murdered their half-brother, Chrysippus, from jealousy of the affection entertained for him by their father. Thereupon they fled to Eurystheus, with whose daughter, Aërope, Atreus united himself, and after the death of his father-in-law became king of Mycene. Thyestes had two sons by the wife of his brother, and was banished by Atreus. Thirsting for revenge, Thyestes conveyed away secretly a son of his brother, and instigated him to murder his own father. This design was discovered, and the youth, whom Atreus thought to be the son of his brother, was put to death. Too late did the unhappy father perceive his mistake. A horrible revenge was necessary to give him consolation. He pretended to be reconciled to Thyestes, and invited him with his two sons to a feast, and after he had caused the latter to be secretly slain he placed a dish made of their flesh before Thyestes. When the father had finished eating Atreus brought the bones of his sons and showed him the dreadful revenge which he had taken. Atreus (or his son Pleisthenes) was the father of Agamemnon and Menelaus, who are hence called the Atridæ, Atridēs (the singular) being often distinctively applied to Agamemnon.

A'treus, Treasury of, a subterranean building at Mycenæ, so styled by Pausanias and frequently referred to as "the tomb of Agamemnon." It is a vaulted tomb resembling a bee-hive in construction, its arch being composed of projecting horizontal courses of stone narrowing as the top is approached. It contains a circular chamber 50 feet wide with a smaller square one adjoining.

Atri, ä'trę, Italy, the ancient *Adria;* a town of the province of Teramo, in Italy; 14 miles southeast of the city of Teramo, on the Brindiri R.R. There are some ruins of ancient walls and buildings. The cathedral is interesting for its frescoes, and a 15th-century painting of the Madonna worshipping the child. It manufactures silk, soap, and licorice. Pop. (1901) 13,448.

At'riplex, a large genus of succulent plants of the natural order *Chenopodiaceæ,* widely distributed in tropical and temperate climates. Many of the species are weeds, but some, known as saltbush (for example, *A. leptocarpa* and *A. semibaccata*) are used as forage plants in Australia, where they are native upon the alkali soils. They have also proved promising in the alkali soils of the western United States. (Consult Circular 3, Division of Agrostology, United States Department of Agriculture, Washington.) *A. hortensis,* orach (q.v.) or sea-purslane, an erect annual herb with yellowish-green or red leaves, was formerly very popular as a substitute for spinach and is still so used to some extent. A few species are also cultivated for ornament.

A'trium, the entrance hall and most important apartment in ancient Roman houses. It was usually ornamented with statues and various family relics, and in the roof there was an opening called the *compluvium,* toward which the roof sloped so as to throw the rain-water into a cistern in the floor known as the *impluvium.* In this room the nuptial couch was placed, and here the matron with the women of the household sat and spun. It was also used as a reception room for visitors and clients. In mediæval times, till the 12th century, the name was given to a cov-

ered court, somewhat on the model of the ancient atrium, constructed in front of the principal doors of an edifice. Later the cloister at the side of the church, for the use of the monks, took the place of the atrium.

At'ropa, a genus of plants of the natural order *Solanaceæ*. Its best known species is probably *A. belladonna*. See BELLADONNA.

Atrophy, a term denoting a diminution in the size of the organs, or tissues that make up the body. It is part of the physiological process in its simpler forms, as many parts of the body atrophy and become of secondary service in adult life; the thymus gland and umbilical vessels being examples. It may also be a symptom of disease, particularly in affections of the nervous system in which the trophic fibres of an organ are involved. It may also indicate a perverted state of nutrition. See NUTRITION.

At'ropine, a crystalline alkaloid obtained from the deadly nightshade. It is extremely poisonous. Large doses cause delirium, convulsions, and finally stupor and death. It is employed for several purposes in medicine, to relieve pain or spasm, and to arrest excessive sweats. The physiological action of atropine is chiefly exerted on the nervous system. It is a strong stimulant, particularly of the motor and respiratory centres, and paralyzes the end filaments of many nerves, particularly those that supply the secretory glands, the involuntary muscles, and the heart. Its chief poisonous symptoms are, in the stage of excitement, dryness of the mouth and pharynx, with anesthesia, a hot dry skin, dilatation of the pupil with blurred vision, due to paralysis, extreme restlessness, due to the motor excitation, a noisy, busy, and incoherent brain action, perhaps a delirium, quickened pulse, quickened respiration. This stage may pass into one of depression in which the patient becomes comatose, the pulse and respiration become slowed and death results from asphyxia. Treatment of the poisoning should include prompt washing of the stomach, emetics being of no service because of the anesthesia, artificial respiration, infusions of hot coffee, and general supportive measures. See BELLADONNA; SOLANACEÆ.

Atropos, ăt'rō-pŏs, the eldest of the Fates, who cuts the thread of human life with her shears.

Atsuta, ạt-soo'tạ, Japan, a town in the southern part of Honishu, practically a suburb of Nagoya, with which it is connected by rail. It contains a number of Shintoese temples, in one of which the sword forming part of the Japanese imperial regalia, is kept. Pop. (1898) 24,291.

Attaché, ạ'tạ'shạ', a military, naval or subordinate member of the diplomatic service attached to an embassy or legation. Modern usage in effect restricts the term to subordinate officers of an embassy or legation.

Attach'ment, in law, a taking of a person, goods, or estate by virtue of a writ or precept. It is distinguished from an *arrest* by proceeding out of a higher court by precept or writ, whereas the latter proceeds out of an inferior court by precept only. An arrest lies only against the body of a person, whereas an attachment lies often against the goods only, and sometimes against the body and goods. It differs from a *distress* in that an attachment does not extend to lands, while a distress cannot touch the body. In the United States attachment may be defined as the taking into the custody of the law the person or property of one already before the court, or whom it is sought to bring before the court; also a writ for this purpose. To some extent it is of the nature of a criminal process. In some States a plaintiff can at the beginning of an action to recover money attach the property of the defendant as a security for the payment of the judgment expected to be recovered; and in case of recovery the property is applied in satisfaction of the judgment. But the more usual rule is that there can be no seizure of property, except in specified cases, till the rights of the parties have been settled by judgment of the court. The exceptions are chiefly in cases where the defendant is a non-resident or a fraudulent debtor, or is attempting to conceal or remove his property. In some States, attachments are distinguished as foreign and domestic — the former issued against a non-resident having property with the jurisdiction of the State, the latter against a resident in the State; jurisdiction over the person or property being necessary for an attachment. An attachment issued under a State law not adopted by Congress, or by a rule of court, cannot be sustained in a United States court.

Attack', a term denoting the opening act of hostility by a force seeking to dislodge an enemy from its position. It is considered more advantageous to offer than to await attack, even in a defensive war. The historic forms of attack are: (1) The parallel; (2) The form in which both the wings attack and the centre is kept back; (3) The form in which the centre is pushed forward and the wings kept back; (4) The famous oblique mode, dating at least from Epaminondas, and employed by Frederick the Great, where one wing advances to engage, while the other is kept back, and occupies the attention of the enemy by pretending an attack. Napoleon preferred to mass heavy columns against an enemy's centre. The forms of attack have changed with the weapons used. In the days of the pike, heavy masses were the rule, but the use of the musket led to an extended battle front to give effect to the fire. The advent of magazine rifles, machine and rapid-fire guns, breech-loading field and horse artillery guns, smokeless powder, etc., has reduced the methods of attack to a practical science. See TACTICS.

Attain'der, the legal consequence of a sentence of death or outlawry pronounced against a person for treason or felony, the person being said to be attainted. It resulted in forfeiture of estate and "corruption of blood," rendering the party incapable of inheriting property or transmitting it to heirs; but these results now no longer follow. Formerly persons were often subjected to attainder by a special bill or act passed in Parliament. In the United States, the Federal Constitution declares that "No bill of attainder shall be passed, and no attainder of treason, in consequence of a judicial sentence, shall work corruption of blood or forfeiture except during the life of the person attainted."

Attaint', a writ at common law against a jury for a false verdict. It was abolished in England in 1825 except as to jurors guilty of embracery. See ATTAINDER.

At'tal'ea, a genus of about 20 species of mostly tall, smooth-stemmed tropical American palms with large pinnate leaves sometimes used for thatch, mats, hats, etc., and with nut fruits enclosed in a fibrous husk. *A. funifera*, the piassaba palm of the coast provinces of southern Brazil, yields a cordage of great strength and durability in sea water. Its fruits (coquilla nuts) are as large as ostrich eggs and are used like vegetable ivory (see VEGETABLE IVORY). The piassaba palm of northern Brazil is a different species. It furnishes a fibre which is exported. *A. excelsa* and *A. speciosa* furnish nuts which are burned in rubber-making to dry and color the rubber obtained from *Siphonia elastica*. *A. compta*, the pindóva or indājá palm, a handsome species with a wide-spreading crown, yields edible fruits as large as goose eggs. *A. Cohune*, indigenous to Honduras, supplies a fruit from which the oil is extracted for soap-making at home and abroad. Several species are cultivated in greenhouses, but are generally considered too slow of growth from seed to be satisfactory.

At'talus, the names of three kings of ancient Pergamus, 241–133 B.C., the last of whom bequeathed his kingdom to the Romans. All were munificent patrons of art and literature.

At'talus, Flavius Priscus, the emperor of the East for one year, 409–10. He was proclaimed by Alaric and his Goths, but soon deposed. Honorius later cut off his thumb and forefinger and banished him to the island of Lipari.

Attâr, ät-tär', **Ferid eddin**, celebrated Persian poet: b. near Nishapur, 1119; d. about 1229 (?). The son of a spicer, he followed his father's trade (whence his surname of Attâr), but afterward became a dervish and one of the greatest mystics of Persia. He is said to have been killed by a Mongol soldier during the invasion by Jenghiz Khan. Of his extant political works the most famous are: 'The Book of Council,' a series of didactic poems on ethics; 'The Parliament of Birds' (1184–7). His principal work in prose is 'Biographies of the Saints.'

At'tar, or **Otto of Roses**, a perfume extracted from rose petals. It is a volatile oil, of soft consistency, nearly colorless, and deposits a crystallizable substance partially soluble in alcohol. The best article is prepared at Ghazipoor in Hindustan; but is apt to be much adulterated with sandal wood and other oils. The whole country, for many miles around Ghazipoor, is a garden of roses, and in the spring of the year presents a most beautiful picture of red and green. The roses are used both for rose water and the oil of roses. The latter is obtained from the rose water by setting it out during the night in large open vessels, and early in the morning skimming off the essential oil, which floats at the top. The rose water after the removal of the oil is not so highly valued as before. It is estimated that 200,000 well-grown roses are required to produce half an ounce of the oil; and the value of this when it is manufactured is about $40, and even then it is likely to be adulterated. If warranted genuine, it sells for about $50 or $100 per ounce. Attar is also imported from Smyrna and Constantinople; but it rarely, if ever, arrives in this country pure. It is commonly adulterated with spermaceti and a volatile oil, which appears to be derived from one or more species of *Andropogon*, and which is called oil of ginger-grass, or oil of geranium. Pure attar of rose, carefully distilled, is at first colorless, but speedily becomes yellowish. It congeals below 80°; melts at 84°. At 57°, 1,000 alcohol dissolve 7½ oil, and at 72°, 33 oil. Specific gravity 872. Formula, $C_{22}H_{22}O_2$. Many attempts have been made to discover some chemical reaction which would reveal the falsification of attar with geranium oil, but hitherto mostly in vain.

Attempt', in criminal law an endeavor to accomplish a crime carried beyond mere preparation, but falling short of the execution of the ultimate design in any part of it. 5 Cush. Mass. 367. To constitute an attempt, there must be an intent to commit some act which would be indictable, if done, either from its own character or that of its natural and probable consequences. In some States an attempt to commit a crime is defined by statute. The statute in New York is substantially similar to that of other States. The Penal Code of New York, § 34, provides that «An act, done with intent to commit a crime, and tending but failing to effect its commission, is an attempt to commit that crime.»

Attention. See CONSCIOUSNESS.

Atterbom, ät'tèr-bōm, **Peter Daniel Amadeus**, Swedish poet: b. Asbo, East Gothland, 19 Jan. 1790; d. Upsala, 21 July 1855. Having visited Germany and Italy in 1817–19, he formed ties of friendship with Schelling and Thorwaldsen; became instructor to Crown Prince Oscar, in 1820, and professor at the university in Upsala in 1828. He was unquestionably the foremost among the lyric poets of the romantic school in Sweden. His most celebrated work is 'The Isle of Blessedness' (1823), a romantic drama in the manner of Tieck; but he also wrote 'The Flowers,' a cycle of lyrics; 'The Blue Bird,' a play; and 'Swedish Seers and Poets,' a volume of criticism.

At'terbury, Francis, celebrated English prelate: b. Middleton Keynes, England, 6 March 1662; d. Paris, 15 Feb. 1732. He distinguished himself at the university as a classical scholar, and gave proofs of an elegant taste for poetry. In 1687 he took his degree of M.A.; is thought to have assisted his pupil, Boyle, in his famous controversy with Bentley on the Epistles of Phalaris. Taking orders in 1691 he settled in London, where he became chaplain to William and Mary, preacher of Bridewell, and lecturer of St. Bride's, and soon became distinguished by the spirit and elegance of his pulpit compositions, but not without incurring opposition, on the score of their tendency and doctrine, from Hoadly and others. Soon after the accession of Queen Anne he was made dean of Carlisle, and besides his dispute with Hoadly on the subject of passive obedience, he aided in the defense of the famous Sacheverell, and wrote 'A Representation of the Present State

of Religion,' deemed too violent to be presented to the queen, although privately circulated. In 1712 he was made dean of Christ Church, and in 1713 Bishop of Rochester and dean of Westminster. The death of the queen, in 1714, put an end to his hopes of further advancement; for the new king treated him with great coolness. Atterbury not only refused to sign the loyal declaration of the bishops in the rebellion of 1715, but suspended a clergyman for lending his church for the performance of divine service to the Dutch troops brought over to act against the rebels. Not content with a constitutional opposition, he entered into a correspondence with the Pretender's party, was apprehended in August 1772, and committed to the Tower; and in the March following a bill was brought into the House of Commons for the infliction of pains and penalties. This measure met with considerable opposition in the House of Lords, and was resisted by the bishop, who maintained his innocence with his usual acuteness and dexterity. His guilt, however, has been tolerably well proved by documents since published. He was deprived of his dignities, and outlawed, and went to Paris, where he chiefly occupied himself in study, and in correspondence with men of letters. But even here, in 1725, he was actively engaged in fomenting discontent in the Highlands of Scotland. As a composer of sermons he still retains a great portion of his original reputation. His letters, also, are extremely easy and elegant; but, as a critic and a controversialist, he is deemed rather dexterous and popular than accurate and profound.

At'tic, pertaining to Attica or to Athens. Elegant; classical; poignant; characterized by keen intellect, delicate wit, sound judgment and expressive brevity; as, the Attic Muse. Attic dialect was the most refined and polished of all the dialects of ancient Greece; and in it wrote Solon, the lawgiver; Thucydides and Xenophon, the historians; Aristophanes, the comic poet; Plato and Aristotle, the philosophers, and Demosthenes, the orator. When, after the Macedonian conquest, Greek became the language of literature and diplomacy in most parts of the civilized world, the Attic came to be that dialect of the Greek tongue which was generally adopted.

Attic Order, in architecture, a low order, commonly used over a principal order, never with columns, but usually with antæ or small pilasters. It is employed to decorate the façade of a story of little height, terminating the upper part of a building; and it doubtless derives its name from its resemblance in proportional height and concealed roof to some of the buildings of Greece. In all the best examples, and especially in the remains of antiquity at Rome, the attic is decorated with a molded base and cornice; often with pilasters and figures, as in the Arch of Constantine. In modern architecture, the proportions of the attic order have never been subject to fixed rules, and their good effect is entirely dependent on the taste and feeling of the architect. Attic base: The base of a column consisting of an upper and lower torus, a scotia and fillets between them. Attic story: A term frequently applied to the upper story of a house, when the ceiling is square with the sides, to distinguish it from a garret.

At'tica, a State of ancient Greece, whose capital, Athens, was once the first city in the world. It is a peninsula, united, toward the north, with Bœotia, toward the west, in some degree, with Megaris, and extends far into the Ægean Sea at Cape Sunium (now Cape Colonna). The unfruitfulness of its soil protected it against foreign invaders, and the Athenians boasted of their ancient and unmingled race. The earliest inhabitants of Attica lived in a savage manner until the time of Cecrops, who came 1550 B.C. with a colony from Sais, at the mouth of the Nile, to Attica, and is acknowledged as their first real king. One of Cecrops' descendants founded 11 other cities, which in after-times made war upon each other. Theseus compelled these cities to unite, and to give to Cecropia, now called Athens, as the capital city of the whole country, the supreme power over the confederacy. He founded the great feast called the *panathenæa,* watched over the administration of the laws, commanded the army, divided the whole people into three classes — noblemen, husbandmen, and mechanics. He embellished and enlarged Athens, and invited foreigners to people the country. After the death of Codrus, 1068 B.C., the monarchical form of government, which had continued 487 years from the time of Cecrops, was abolished. An archon, chosen for life, possessed the regal power. After 316 years the term of office of the archons was limited to 10 years, and 70 years later to 1 year, and their number was increased to 9. A regular code of laws was now needed. The archon Draco was commissioned to draw one up; but his severity disgusted the minds of the people, and 594 B.C. Solon introduced a milder code and a better constitution. He provided that the form of government should continue democratic, and that a senate of 400 members, chosen from the people, should administer the government. Pisistratus, a man of talents, boldness, and ambition, put himself at the head of the poorer classes, and made himself master of the supreme power in Athens. His government was splendid and beneficent, but his two sons could not maintain it. Clisthenes, a friend of the people, exerted himself to prevent future abuses by some changes in the laws of Solon. He divided the people into 10 classes, and made the senate consist of 500 persons. Attica was already highly cultivated; the vintage and harvest, like all the labors of this gay people, were celebrated with dance and song, with feasts and sacrifices. Then came the splendid era of the Persian war, which elevated Athens to the summit of fame. Miltiades at Marathon, and Themistocles at Salamis, conquered the Persians by land and by sea. The freedom of Greece escaped the dangers which had threatened it; the rights of the people were enlarged; the archons and other magistrates were chosen from all classes without distinction. The period from the Persian war to the time of Alexander (500 B.C. to 336) was most remarkable for the development of the Athenian constitution. According to Böckh's 'The Public Economy of Athens,' Attica contained, together with the islands of Salamis and Helena, a territory of 847 square miles, with 500,000 inhabitants,

365,000 of whom were slaves. Cimon and Pericles (444 B.C.) introduced the highest elegance into Athens, but the latter laid the foundation for the future corruption of manners, and for the gradual overthrow of the state. Under him began the Peloponnesian war, which ended with the conquest of Athens by the Lacedæmonians. A more dangerous enemy rose in the north — Philip of Macedon. Athens, together with the other states of Greece, became dependent on the Macedonians. When they suffered themselves to be misled to support Mithridates against the Romans, they drew upon themselves the vengeance of Rome. Sulla captured the city, and left it only an appearance of liberty, which it retained until the time of Vespasian. This emperor formally changed it into a Roman province. After the division of the Roman empire, Attica belonged to the empire of the East. 396 A.D., it was conquered by Alaric the Goth, and the country devastated. Attica, along with the ancient Bœotia, now forms a nome or province (Attike and Viotia) of the kingdom. See ATHENS.

Attica, Ind., city in Fountain County, on the Wabash River and Wabash Railroad; 21 miles southwest of Lafayette. It has numerous manufactories, churches, schools, two banks, and a public library. Pop. (1900) 3,005.

At'ticus, Titus Pomponius, a noble Roman, the intimate friend of Cicero: b. 109 B.C.; d. 32 B.C. The Pomponian family, from which he originated, was one of the most distinguished of the *equites,* and derived its origin from Numa Pompilius. When he attained maturity, the republic was disturbed by the factions of Cinna and Sulla. His brother, Sulpicius, the tribune of the people, being killed, he thought himself not safe in Rome, for which reason he removed, with his fortune, to Athens, where he devoted himself to science. His benefits to the city were so great, that he gained the affections of the people in the highest degree, and acquired so thorough a knowledge of Greek, that he could not be distinguished from a native Athenian. When quiet was restored in Rome he returned and inherited from his uncle 10,000,000 sesterces ($500,000). His sister married the brother of Cicero. Cæsar treated him with the greatest regard, though he was known as a friend of Pompey. After the death of Cæsar, he lived in friendship with Brutus, without, however, offending Antony.

At'ticus Herod'es, Tiberius Claudius, a wealthy Athenian; b. about 104 A.D.; d. about 180. He received a careful education under the most distinguished masters of the time, and specially devoted himself to the study of oratory, to excel in which seems to have been the ruling motive of his life, ultimately attaining to great celebrity as a speaker and as a teacher of rhetoric. Among his pupils were Marcus Aurelius and Lucius Verus. He was highly esteemed by the Antonines, particularly by Aurelius, and received many marks of favor, among others the archonship at Athens and the consulate at Rome. Atticus is principally celebrated, however, for the vast sums he expended on public purposes. He withdrew from Athens, and resided at his villa near Marathon, where he died about 180 A.D. None of his writings are extant.

Attila, ăt'tĭ-la (in German, *Etzel*), the son of Mundzuk, a Hun of royal descent, who followed his uncle, Roas, in 434, and shared the supreme authority with his brother, Bleda. These two leaders of the barbarians, who had settled in Scythia and Hungary, threatened the Eastern Empire, and twice compelled Theodosius II. to purchase an inglorious peace. The Huns themselves esteemed Attila, their bravest warrior and most skilful general. Their regard for his person soon amounted to superstitious reverence, and being now sole master of a warlike people, his unbounded ambition made him the terror of all nations; and he became, as he called himself, the *scourge* which God had chosen to chastise the human race. In a short time he extended his dominion over all the people of Germany and Scythia, and the eastern and western emperors paid him tribute. The Vandals, the Ostrogoths, the Gepidæ, and a part of the Franks united under his banners. Hearing a rumor of the riches and power of Persia, he directed his march thither, but was defeated on the plains of Armenia, and drew back to satisfy his desire of plunder in the dominions of the emperor of the East. He easily found a pretext for war, for all states which promised him a rich booty were his natural enemies, and all princes whom he hoped to conquer had broken alliances. The Emperor Theodosius collected an army to oppose his progress; but in three bloody battles fortune declared herself for the barbarians. Constantinople was indebted to the strength of its walls, and to the ignorance of the enemy in the art of besieging, for its preservation. Thrace, Macedonia, and Greece, all submitted to the savage robber, who destroyed 70 flourishing cities. Theodosius was at the mercy of the victor, and was obliged to purchase a peace. Attila now directed his eyes to Gaul. With an immense army he passed the Rhine, the Moselle, and the Seine, came to the Loire, and sat down under the walls of Orleans. The inhabitants of this city, encouraged by their Bishop, Agnan (Anianus), repelled the first attack of the barbarians, and the united forces of the Romans, under their general, Aetius, and of the Visigoths, under their king, Theodoric, compelled Attila to raise the siege. He retreated to Champagne, and waited for the enemy in the plains of Chalons. The two armies soon approached each other. Attila, anxious for the event of the battle, consulted the soothsayers, who assured him of a defeat. He concealed his alarm, rode through the ranks of his warriors, reminded them of their deeds, spoke of his joy at the prospect of a battle, and at the thought that their valor was to be rewarded. Inflamed by his speech, and by the presence of their leader, the Huns were impatient for battle. At length the ranks of the Romans and Goths were broken through, and Attila was already sure of the victory, when the Gothic prince, Thorismond, the son of Theodoric, poured down from the neighboring height upon the Huns. Attila, pressed on all sides, escaped with difficulty to his camp. This was perhaps the bloodiest battle which has ever been fought in Europe; for, according to contemporary historians, 106,000 dead bodies covered the field of battle. Attila caused all his camp equipage and treasures to be brought together into a heap, in

order to burn himself with them, in case he should be reduced to extremities. But the enemy were contented with collecting their forces during the night, and having paid the last honors to the dead body of King Theodoric (Dietrich), which they discovered with difficulty, they saluted his son, Thorismond, king upon the field of battle. Thus Attila escaped, but the Franks pursued him till he had passed the Rhine. He now demanded Honoria, the sister of Valentinian III., in marriage, and conquered and destroyed Aquileia, Padua, Vicenza, Verona, Bergamo, and laid waste the plains of Lombardy. The inhabitants fled to the Alps, to the Apennines, and to the small islands in the shallows (lagoons) of the Adriatic Sea, where they built Venice. The emperor had no army to oppose him; the Roman people and senate had recourse to tears and supplications. Pope Leo I. went with the Roman ambassadors to the enemy's camp and succeeded in obtaining a peace. Attila went back to Hungary. The Romans looked upon their preservation as a miracle, and the old chronicles relate that the threats of St. Peter and St. Paul had terrified Attila — a legend which the art of Raphael and Alghardi has immortalized. Not having obtained Honoria for a wife, Attila would a second time have demanded her, sword in hand, if the beautiful Ildico had not been added to his numerous wives, with whom he solemnly united himself (453). On this occasion he gave himself up to all the extravagance of debauchery; but on the other day after the marriage, the servants and warriors, impatient to salute their master, thronged into the tent; they found Ildico veiled, sitting by the cold corpse of her husband. During the night he had died of a hemorrhage. The news of his death spread sorrow and terror in the army. His body was enclosed in three coffins — the first was of gold, the second of silver, and the third of iron. The captives who had made the grave were strangled. The description that Jornandes has left us of this barbarian king reminds us of his Kalmuck-Tartar origin. He had a large head, a flat nose, broad shoulders, and a short and ill-formed body. See Thierry, 'Histoire d'Attila' (1814).

Attis. See Atys.

At'titude, an art term signifying an artistic pose or position assumed by living figures. Attitudes require a regular study, a part of which is a knowledge of anatomy. The art of exhibiting attitudes, at least in modern times, is of recent invention. At the end of the 18th century the celebrated Lady Hamilton began the practice, and imitated, with great talent, the attitudes of antique statues in many large towns of Europe, so that Sir William Hamilton could say that he possessed, in his wife, a whole collection of antiques. Her dress was a simple tunic, fastened with a ribbon tight under the breast, and a shawl. With these she imitated all the different draperies. On the continent of Europe this art was carried to much perfection by Mrs. Hendel Schutz, who exhibited attitudes, copied from the Greek, Egyptian, Italian, and German styles of art.

At'tleboro, Mass., a town of Bristol County, 30 miles southwest of Boston, and 12 miles from Providence. It has good railroad connections, contains national banks, newspaper offices, several churches, and a system of graded schools. The town is the seat of several important industries, the chief of which is the manufacture of jewelry and electro-plate. There are also manufactories of cotton, woolen, and knit goods, and of boots and shoes. Pop. (1900) 11,335. Consult Daggett, 'A Sketch of the Town of Attleborough' (1894).

Attock, ăt-tŏk', a town and fort of the Punjab, on the east bank of the Indus. Attock stands below the fort, established by the Emperor Akbar in 1581, to defend the passage of the river. The great railway bridge across the Indus here was opened in 1883. It has five arches 130 feet high, and renders continuous the railway connection between Calcutta and Peshawur (1,600 miles). The situation of Attock is important, whether in a commercial or in a military view. It is at the head of the steamboat navigation of the Indus, being 940 miles from its mouth. Taxila, where the Macedonians crossed the Indus, has been identified with Attock.

Attorney, ăt-tûr'nĭ (*attornatus,* in Latin), a person appointed to do something for and in the stead and name of another. A public attorney or attorney at law is a person qualified to appear for another before a court of law to prosecute or defend any action on behalf of his client. The term was formerly applied especially to those practising before the supreme courts of common law at Westminster, and corresponded to the term solicitor used in regard to the courts of chancery. As an attorney was almost invariably a solicitor, the two terms came to be generally regarded as synonymous. By the Judicature Act of 1873 all persons practising before the supreme courts at Westminster are now called solicitors. Attorneys or solicitors do not plead or argue in court on behalf of their clients, this being the part of the barristers or counsel: their special functions may be defined to be, to institute actions on behalf of their clients and take necessary steps for defending them, to furnish counsel with necessary materials to enable them to get up their pleadings, to practice conveyancing, to prepare legal deeds and instruments of all kinds, and generally to advise with and act for their clients in all matters connected with law. An attorney, whether private or public, may have general powers to act for another; or his power may be special, and limited to a particular act or acts. In Scotland there is no class of practitioners of the law who take the name of attorneys. A special attorney is appointed by a deed called a power or letter of attorney, and the deed by which he is appointed specifies the acts he is authorized to perform. It is a commission, to the extent of which only he can bind his principal. As far as the acts of the attorney, in the name of the principal, are authorized by his power, his acts are those of his principal. But if he goes beyond his authority, his acts will bind himself only; and he must indemnify any one to whom, without authority, he represents himself as an attorney of another, and who contracts with him, or otherwise puts confidence in him, as being such attorney.

Attorney-General, in English law, an important officer under the king, made by letters patent. His most important duties are to

exhibit informations and prosecute for the crown in matters criminal, and to file bills in the exchequer in any matter concerning the king's revenue. The attorney-general of the United States is an officer appointed by the President. He is required by statute to give his advice and opinion upon questions of law whenever required by the president; to pass upon the validity of the title to public lands purchased for the erection of public buildings by the United States; when requested, to give his opinion to the head of any executive department on any questions of law arising in his department; to conduct and argue all cases in which the United States is interested, whenever he deems it best for the interests of the United States for him to do so; to exercise general superintendence and direction over the attorneys and marshals of all the districts in the United States and the Territories as to the manner of discharging their respective duties. The attorney-general is also a member of the Cabinet, and according to the provisions of the act of Congress of 19 Jan. 1886, is the fourth in succession, after the Vice-President, to the office of President in case of a vacancy in that office. In each of the United States there is an attorney-general, or similar officer, who appears for the people, as in England he appears for the Crown. Only a few of the duties of the attorney-generals in the various States are defined by statute, consequently, so far as applicable to our altered situation, jurisprudence, and system of government, attorney-generals of the various states are clothed with the common law powers of the attorney-generals of England. The attorney-general of England had the power (1) to prosecute all actions necessary for the protection and defense of the property and revenues of the Crown; (2) by information to bring certain classes of persons accused of crimes and misdemeanors to trial; (3) by «*scire facias*» to revoke and annul grants made by the Crown improperly, or when forfeited by the grantee thereof; (4) by information, to recover money or other chattels or damages for wrongs committed on the land, or other possessions of the Crown; (5) by writ of *quo warranto,* to determine the right of him who claims or usurps any office, franchise, or liberty, and to vacate the charter, or annul the existence of a corporation for violations of its charter, or for omitting to exercise its corporate powers; (6) by writ of mandamus to compel the admission of an officer duly chosen to his office, and to compel his restoration when illegally ousted; (7) by information to chancery, to enforce trusts, and to prevent public nuisances, and the abuse of trust powers; (8) by proceedings *in rem,* to recover property to which the Crown may be entitled, by forfeiture for treason, and property for which there is no other legal owner, such as wrecks, treasure trove, etc.; (9) and in certain cases, by information in chancery, for the protection of the rights of lunatics, and others who are under the protection of the Crown.

Attor'ney at Law, an officer of a court of justice employed by a party in a cause to manage it for him. Appearance by attorney has been allowed in England from the time of the earliest records of the courts of that country. Such appearances were first allowed in France by letters patent of Philip le Bel, 1290 A.D. No one can, by consent, be the attorney of both the litigating parties in the same section or suit. The agreement of an attorney at law, within the scope of his employment, in general, binds his client (1 Salk. 86) as to amend the record, to refer a cause, not to sue out a writ of error, to strike out a *non pros,* to waive a judgment by default, etc. The principal duties of an attorney are to be true to the court and to his client, to attend to the business of his client with prudence, skill, and honesty (4 Burr. 2061, 72 Ga. 83); to keep his client informed as to the state of his business, and to keep his secrets confided to him as such, and an attorney is privileged from disclosing such secrets when called as a witness (16 N. Y. 180, 29 Vt. 701). An attorney is allowed considerable freedom of speech, and ordinarily, is not liable for the use of false, defamatory, or malicious language, provided it was material to the issues raised by the pleadings (Hastings *v.* Lusk, 22 Wend. N. Y. 410). He is liable, however, if his language is defamatory, if it can be shown that it was not relevant to the issues, and was used for the purpose of injuring the character of his adversary (1 Barn. & C. 258).

Attrac'tion, in physics, any force acting between two bodies, which tends to bring them nearer together, or to oppose their further separation. All attractions can be divided into two classes: (1) Those which act at sensible distances, such as gravity and magnetism, and (2) those which exert measureable effects only when the bodies are exceedingly close together. Cohesion and molecular forces are examples of the second class. See COHESION; ELECTRICITY; ETHER; GRAVITATION; MAGNETISM; MOLECULAR THEORY; SURFACE TENSION.

At'tribute, in philosophy, a quality or property of a substance, such as whiteness or hardness. A substance is known to us only as a congeries of attributes. In the fine arts an attribute is a symbol regularly accompanying and characterizing some personage. Thus the caduceus, purse, winged hat, and sandals are attributes of Mercury, the trampled dragon an attribute of St. George.

Attrition, a disposition of the soul which consists in sorrow for sin springing from a salutary fear of its consequences. Theologians of the Catholic Church teach that such sorrow joined to the absolution of the priest in the Sacrament of Penance is sufficient for the remission of sin, although the penitent is counselled to strive for the more perfect sorrow (contrition), which has its motive the love of God.

At'water, Lyman Hotchkiss, American theologian: b. Hampden, Ct., 23 Feb. 1813; d. Princeton, N. J., 17 Feb. 1883. He was pastor of the First Congregational Church in Fairfield, Ct., in 1835–54; in the last named year becoming professor of mental and moral philosophy at Princeton College, and, in 1869, professor of logic, metaphysics, political science, economics and ethics there. He was the author of a 'Manual of Elementary Logic' (1867).

At'water, Wilber Olin, American chemist: b. Johnsburg, N. Y., 3 May 1844. He was graduated at Wesleyan University in 1865; made a special study of chemistry in the Sheffield Scientific School of Yale and the universities of Leipsic and Berlin. He has been

successively professor of chemistry in East Tennessee University, Maine State College, and Wesleyan University. He was director of the Connecticut Agricultural Experiment Station, 1875–7, and was appointed director of the Storrs (Conn.) Experiment Station in 1887. He has been connected for several years with the United States Department of Agriculture; has published a large number of papers on chemical and allied subjects; and since 1894, has given much attention to nutrition investigations.

At'will, Edward Robert, American bishop: b. Red Hook, N. Y., 18 Jan. 1840. He was graduated from Columbus University in 1862, and General Theological Seminary, 1864. He was rector of St. Paul's Church, Burlington, Vt., 1867–80; of Trinity Parish, Toledo, O., 1881–90; and was consecrated first Protestant Episcopal bishop of West Missouri, 14 Oct. 1890.

At'wood, Charles B., American architect: b. Millbury, Mass., 18 May 1849; d. Chicago, 19 Dec. 1895. He studied at the Harvard Scientific School, and opened an office in 1872. Within three years he received prizes for designs for the San Francisco city hall, the Connecticut State capitol, the court house in Springfield, Mass., and a commission to build the Holyoke, Mass., city hall. Removing to New York in 1875, he designed residences for W. H. Vanderbilt, Elliot F. Shepard, and W. D. Sloane, and interior decorations for the houses of Mrs. Mark Hopkins in San Francisco and Gt. Barrington, Mass. In 1884 he gained the first prize for a design for the Boston Public Library, and later a prize of $5,000 for plans for a new city hall in New York city. From 1891–3 he was associated with D. H. Burnham in planning the World's Fair buildings in Chicago. The art building, peristyle, service building, and many minor features were from his designs. He was a close student of his art, and a marvelous draughtsman, using his left hand with sureness and rapidity. D. H. Burnham said of him, "He was of an honorable, charitable disposition, but like most great artists, a mere child in the practical things of life."

At'wood, George, an eminent English mathematician: b. London 1746; d. 11 July 1807. In 1874 he published 'Treatise on the Rectilinear Motion and Rotation of Bodies; with a Description of Original Experiments relative to that Subject'— a work remarkable for its perspicuity and the extensive information which it affords. About the same time he made public an 'Analysis of a Course of Lectures on the Principles of Natural Philosophy,' read at the University of Cambridge, which is not less valuable than the preceding. He published a 'Dissertation on the Construction and Properties of Arches' (1801), and several other valuable treatises relating to mathematics and mechanical science. He invented a machine still used in physical lecture-rooms, which affords great facilities for verifying the laws of falling bodies. See Atwood's Machine.

At'wood, Isaac Morgan, American educator: b. Pembroke, N. Y., 24 March 1838. He was ordained in the Universalist Church in 1861; held several pastorates; edited *The Christian Leader* (1867–73); became an associate editor of the *Universalist Leader;* and was chosen president of the Canton (N. Y.) Theological Seminary in 1879. His chief works are: 'Have We Outgrown Christianity?' (1870); 'Latest Word of Universalism' (1878); 'Manual of Revelation' (1888); 'Walks About Zion' (1881).

At'wood, Melville, Anglo-American geologist: b. 31 July 1812, Prescott Hall, England; d. Berkeley, Cal., 25 April 1898. He studied lithology, microscopy, and geology early in life, and engaged in gold and diamond mining in Brazil. In 1843 he made a discovery that greatly enhanced the value of zinc ore. After coming to the United States, in 1852, he invented the blanket system of amalgamation. He also established the value of the famous Comstock silver lode, by an assay of minerals in that region.

At'wood's Machine, an instrument devised by George Atwood, an English physicist, for illustrating the principles governing the motion of falling bodies, and described by him in a book published in 1784. It consists essentially of a light wheel or pulley, over which a thin, flexible cord passes. A mass of matter is attached to each end of the cord, and the experiment consists in observing the velocity acquired by the system at the end of a given time. The mass to be removed is evidently the sum of the two masses attached to the ends of the cord (assuming that the wheel is light enough to be disregarded); and the force tending to set the system in motion is the difference of the weights of the two masses. By making these masses nearly equal, the motion can be made slow enough to be conveniently studied. The intensity of gravity can be determined by the aid of this machine, with sufficient accuracy for class-room purposes, and it is an admirable device for illustrating the laws of uniformly accelerated motion. For a more detailed account see Gravity.

Atys, ă'tĭs, or **Attis.** (1) The favorite of Cybele, who, having broken the vow of chastity which he made to the goddess, castrated himself, as a punishment for his crime. (2) A son of Crœsus, king of Lydia — an affecting example of filial love. He was dumb, but, seeing a soldier in a battle who had raised a sword against his father, he exerted himself so much that the bands of his tongue gave way, and he cried out, "Soldier, kill not Crœsus!"

Aubanel, ō-bā-nĕl', **The'odore,** French poet, sometimes called "The Petrarch of France": b. 1829; d. 1886. He devoted his life to the restoration of the troubadour literature. His drama, 'Lou Pan don Pecat,' was successfully staged in 1878 at Montpellier.

Aube, ōb, a French department, formed out of the south of Champagne and a small portion of Burgundy; area, 2,351 square miles. The north and northwest districts are very bleak, bare of trees, and almost destitute of vegetation; the southern districts are remarkably fertile. The forests, which are extensive, furnish much fuel for the supply of Paris. The chief manufactures are worsted and hosiery. Troyes is the capital.

Auber, ō-bar′, **Daniel Francois Esprit,** celebrated French operatic composer: b. Caen, 29 Jan. 1782; d. Paris, 13 May 1871. From natural inclination he devoted himself to the study of music, in which he had the assistance of Cherubini. His first decided success was his opera 'La Neige,' produced in 1824. By this time he had associated himself with Scribe, a very skilful writer of *libretti;* and other operas now followed in quick succession, for which the words were supplied by Scribe, and the music by Auber. Some of these are still favorites, for example, 'Le Domino Noir,' 'Les Diamants de la Couronne' (Crown Diamonds), and above all, 'Fra Diavolo,' and 'La Muette de Portici' (usually known as 'Masaniello').

Aubigné, D', J. H. M. See D'Aubigné, J. H. M.

Aubigné, ō′be-nyā′, **Theodore Agrippa d',** French soldier and author: b. Saint Maury (Saintonge), 8 Feb. 1552; d. Geneva, 29 April 1630. He fought under Henry IV., king of France, who made him a gentlemen of his bedchamber; but when the king, thinking it necessary, favored the Roman Catholics more than the Protestants, Aubigné expressed his displeasure with little reserve, and lost the favor of Henry. He now retired to Geneva, where he devoted himself to literary pursuits. He wrote a valuable 'Histoire Universelle, from 1550 to 1601' (3 vols. folio), the first volume of which was ordered to be burned by the Parliament of Paris. A volume of sonnets and other poems, under the title 'Le Printemps,' also bears his name.

Aublet, ō-blā′, **Albert,** French painter: b. Paris. He studied historical painting under Gerome; won a first-class medal in the Paris Exposition of 1889, and the decoration of the Legion of Honor in 1890. His first great painting was the 'The Wash-room of the Reserves in the Cherbourg Barracks,' exhibited in the Salon of 1879, and probably his most celebrated one is the 'Meeting of Henri III. and the Duc de Guise,' shown in the Salon of 1880.

Aubrey, â′brĭ, **John,** English antiquary: b. Easton Pierse, 1626; d. 1697. He published little, but left large collections of manuscripts, which have been used by subsequent writers. He collected materials for the 'Monasticon Anglicanum', and afforded important assistance to Wood, the Oxford antiquary. His 'Miscellanies' (1696) contains a great deal of curious and interesting information, but also displays much credulity and superstition. Another work of his was published in 1719 under the title of the 'Natural History and Antiquities of the County of Surrey.' In 1898 appeared a work by him entitled 'Brief Lives Chiefly of Contemporaries,' edited by Andrew Clark.

Au′burn, Cal., a city and county-seat of Placer County, situated on the Southern P. R.R., 36 miles east of Sacramento. It was first settled in 1849 and was incorporated as a city in 1888. It is the seat of the Sierra Normal College. Gold and quartz is found in the vicinity and there are many quartz mills. The leading industries are mining, fruit-growing, and farming. Pop. (1900) 2,050.

Au′burn, Ind., city and county-seat of De Kalb County, situated on branches of the Lake Shore & M. S., and the Baltimore & O. R.R.'s, 22 miles north of Fort Wayne. It has a thriving trade in grain, live stock, etc., and its chief manufactures are furniture, carriages, automobiles, gas engines, windmills, and stoves. Auburn was first settled in 1833, became a borough in 1836 and a city in 1900. The mayor and other officials are elected biennally. Pop. (1900) 3,396.

Au′burn, Me., a city and county-seat of Androscoggin County, on the west bank of the Androscoggin River, on the line of the Maine C. and Grand Trunk R.R.'s, 34 miles north of Portland. The city is one of the most beautiful in the State. It rises westerly from the river in almost amphitheatre form, culminating in beautiful heights known as the Western Promenade. These heights are terraced by broad, handsome avenues, upon which, overlooking the city, are elegant residences with spacious and well-kept grounds. The view from the summit of these heights is one of the most striking in Maine. The beautiful Androscoggin River, with its waterfall grand and picturesque, flows through the valley below, the two thriving cities of Auburn and Lewiston on either bank, while broad and fertile fields dotted with comfortable farm homes stretch to the north and east. Taylor Pond and Lake Auburn lie to the west and are justly considered among the most beautiful lakes of Maine. The territory of the city covers an area of 65.4 square miles.

History.— Auburn is an old town and has an interesting history. Its territory is a part of a large tract of land, originally known as Bakerstown, granted by the general court of Massachusetts in 1765. It was settled as early as 1786 and Auburn was incorporated as a town in 1842, and as a city in 1869.

Industries.— Its largest single industry is the manufacture of boots and shoes, and in this branch of manufacture it is one of the foremost cities in the country. It has ten large shoe factories employing 3,325 persons. The value of their yearly product is $6,730,000, and the shoe shipments include every State in the Union, also Canada, England, Australia, South America, China, and the Philippine Islands. Its other industries include one cotton mill with 250 employees, last, box, and carriage factories, machine shops, shoe findings, dairy products, beef and packing houses, marble and foundry products, lumber, shuttles, and spools.

Banks.— There are two national banks and two savings banks located here. The capital stock of the two national banks is $350,000; surplus, $138,378. The deposits in the savings banks, $2,492,595.

Government.— The municipal government is created by charter of the State Legislature and consists of a Mayor, a Board of Aldermen, and a Board of Common Councilmen, all are elected annually by the people on the first Monday of March. One Alderman and three Common Councilmen are elected from each of the five wards into which the city is divided, while the Mayor is elected by the votes of the entire city. The administrative officers of the city are partly elected by the Board of Aldermen and Common Council in joint body known as the City Council and partly appointed by the Mayor with the confirmation of the Board of Aldermen. The police, including the chief, are

appointed by the Mayor, subject to confirmation by the Board of Aldermen. The Fire Department is under the management of a Board of Fire Commissioners consisting of three members elected by the City Council and holding office for a term of three years. The streets, sewers, and bridges, and all matters pertaining to the repair and maintenance of the same, are under the direction of a Board of Public Works of five members created by special act of the State Legislature, elected by the City Council and holding office for a term of five years. The city owns its waterworks and the same is under the management of a board of seven Water Commissioners of which the Mayor is a member ex-officio, also created by special act of the Legislature of the State. They are elected by the City Council, each holding office for a term of six years. The schools are under the control of a Superintending School Committee of ten members, two from each ward in the city. The members of the committee are elected annually by the voters of each ward and hold their office for a term of two years. The Mayor is ex-officio chairman of the board. The assessed valuation of the real and personal property in 1904 was $6,610,071: rate of taxation 20 mills; bonded debt $533,700; floating debt $56,820.

Churches and Schools.— The city has nine churches, one of them organized as early as 1807, supported by the following denominations: Baptist, Free Baptist, Universalist, Episcopal, Methodist, Congregational, and Catholic. The city has a school population of about 5,000. School accommodations are furnished absolutely free from the kindergarten to the completion of the high school course. Excellent buildings, commodious, well appointed, and equipped with modern improvements are distributed over the city sufficient for the full accommodation of all the pupils in the primary, intermediate, grammer and high school grades. At the head of the public school system stands the Edward Little High School, a noted institution having its origin in the old Lewiston Falls Academy, incorporated in 1834. In addition to the public schools there is a Catholic Parochial School of 300 scholars, supported solely by the Catholic portion of the population. There is also an excellent free public library. The city, generally speaking, is thriving and prosperous. Its population is composed largely of skilled workmen who own their own homes and are permanent residents. The streets are wide and well paved, regularly laid out, and in the residential sections adorned with beautiful shade trees. There is an excellent and extensive electric street railway, two large and centrally located hotels, a beautiful public park, a handsome and commodious set of County buildings in which are located the Supreme Court rooms and all the County offices, and the railroad facilities and connections with all parts of the country are of the best. The city is connected with the city of Lewiston (q.v.), located immediately across the river, by four large iron bridges, and the two cities are so closely related socially and in a business way, that they form practically one community and are known as the Twin Cities of Maine. Pop. (1842, at the time of its incorporation as a town), about 2,000 (1869, at the time of its incorporation as a city), 6,169; (1900) 12,951, a gain of 15 per cent. in the preceding decade, with one exception the largest percentage of gain of any city in the State.

D. J. McGillicuddy.

Au'burn, Neb., a city and county-seat of Nemaha County, situated on the Missouri P. and the Burlington & M. R. R.R.'s, 65 miles south of Omaha. It was first settled in 1861, became a borough in 1884 and a city in 1890. There are large fruit packing and canning plants and a flour mill here. Pop. (1900) 2,664.

Au'burn, N. Y., city, county-seat of Cayuga County; on Owasco River, the outlet of Owasco Lake, and on the New York Central and Lehigh Valley R.R.'s, 26 miles southwest of Syracuse. It was first settled in 1793 by Colonel John Hardenburgh, and was called Hardenburgh's Corners; in 1805 the name was changed to Auburn, and it was selected as the county-seat; in 1815 it was incorporated as a village, and in 1848 became a city. It is the seat of a session of the Federal Court. Auburn was the home of William H. Seward, of Gen. John S. Clark (Gen. Clark still lives here), the Indian archæologist, and of Theodore Cuyler. It is situated on hills commanding an extensive view to the northeast; the head of Owasco Lake is only a few miles from the city limits to the south; and the course of the outlet of the lake is very picturesque until reaching the manufacturing district. This outlet furnishes excellent water power for the numerous industries which have made Auburn prosperous. The largest establishment is a manufactory of agricultural implements which exports its goods to every part of the world; other industries of almost equal importance are tool, carpet, and shoe factories, woolen mills, cordage factories, and breweries. The city has a progressive board of trade, and six banks, two of which are national banks having a combined capital of $400,000. Auburn contains a number of fine public and private buildings, including a general hospital, costing $100,000, a municipal hospital for contagious diseases, the court-house, the United States government building, the Case Memorial Library, and the Burtis Auditorium (erected 1904–5). There are 14 public grammar schools, the public high school, and 4 Roman Catholic parish schools. Auburn is also the seat of the Auburn Theological Seminary (Presbyterian), which, with its four buildings, Welch Memorial, and Dodge Library, Morgan Hall and Williard Memorial Chapels, forms another interesting feature of the city. In 1883 the 400th anniversary of Luther's birthday was celebrated at the Seminary by the planting at Morgan Hall of a sprig of ivy from Wartburg Castle, Luther's prison home. The city government is vested in a mayor, elected every two years, and a board of aldermen of 10 members; the mayor has the power of appointing the heads of the city departments. The municipality owns and operates the waterworks. Pop. (1900) 30,345; (1905) 31,423.

Clinton S. Marsh,
Superintendent of Schools, Board of Education.

Au'burn Theological Seminary, a Presbyterian institution in Auburn, N. Y.; organized in 1820. At the close of 1905 it had 9 professors and instructors, 56 students, 30,240 volumes in the library, grounds and buildings valued at $300,000; aggregate endowment funds, $752,583; income, $63,823; benefactions, $11,456. Its graduates then numbered 1,608.

Auck'land, a province of New Zealand, forming the northern part of North Island, and with an area of 25,746 square miles. Auckland, a city and capital of the province, and formerly capital of New Zealand, is situated on the northeast coast of North Island. It has two excellent harbors, one at Waitemata and one at Manukan on the opposite side of the isthmus. The former is one of the finest in New Zealand. There are numerous wharves and two graving docks, one of which, the Calliope dock, opened in 1887, is one of the largest in the South Seas. Connected with the chief towns of the island by rail the city has a large and increasing trade. The site is fine, and there are numerous handsome public buildings, including churches, fine schools, and the Auckland Institute. Chief manufacturing interests are ship-building yards, boiler works, glass works, shoe factories, etc. There is a United States consulate here. Pop. (1901) 34,216.

Auck'land Islands, a group of islands in the Pacific Ocean to the south of New Zealand. The largest island is about 30 miles long by 15 broad, and is covered with dense vegetation. They belong to the English government, almost entirely uninhabited, and serve as a station for whaling ships.

Auction and **Auctioneer.** An auction is a public sale of property to the highest bidder. It is not material how the sale is conducted, whether by public outcry or other manner. The essential part is the selection of a purchaser from a number of bidders. Catalogues describing the property are usually printed, the terms of the sale are also usually stated in the catalogue. Auctions are generally conducted by persons licensed for that purpose. Bidders may be employed by the owner of the property, if it be done *bona fide* and to prevent a sacrifice of the property under a given price, but where the bidding is fictitious and by combination with the owner to mislead the judgment or inflame the zeal of others it would be a fraudulent and void sale. Unfair conduct on the part of the purchaser will avoid the sale. Misdescription of property sold will avoid the sale if it is material. An auctioneer cannot bid for himself; he cannot deny his principal's title; he cannot sell at private sale; he has ordinarily the power to collect the purchase price of goods sold from the buyer. The auctioneer must use ordinary care and skill in the discharge of hs duties, and like other agents he must obey the instructions he receives from the owner of property sent him for sale. An auctioneer, according to the weight of authority, who sells stolen property is liable to the owner, notwithstanding that the goods were sold by him, and the proceeds paid over to the thief without notice of the felony. An auctioneer is also liable for want of care of the goods while in his possession. The auctioneer has a lien upon the goods for the charges of the sale, and for his commission. He is the agent of the seller, and for same purposes, of the buyer.

Aucuba, â'kū-ba, a genus containing three species, of which *A. japonica* is the best known. They belong to the natural order *Cornaceæ*. The species mentioned is a dicœcious evergreen laurel-like shrub of many varieties, native of China and Japan, largely planted on lawns and in shrubberies. It withstands the dust, smoke, and gases of cities remarkably well, but is not hardy in the Northern States. The plants bear purple flowers in summer and the female ones are particularly beautiful when bearing their scarlet berries which ripen in early spring. It is easily propagated by seed, or by green wood cuttings, and succeeds in half shade where the soil is good, friable, moist, but well-drained.

Audæ'us (Syrian Udo), the founder of a religious sect called Audians, which held anthropomorphic views, and was established under the following circumstances: Audius (b. at the end of 3d century; d. 370), was a Mesopotamian, of singular purity and severity of character. He became disgusted with the Syrian clergy, and on expressing his opinion with more firmness than discretion, was excommunicated; when a considerable number of sympathizers gathered around him and constituted themselves into a church. But this sect could not long withstand the persecutions to which it was exposed, and died almost at the same time as its founder, who passed the latter part of his life in exile in Scythia, where he converted many pagans to Christianity by the force of his teachings, and the moral beauty of his ascetic life.

Aude, ōd, a maritime department in the south of France; area, 2,433 square miles. It is mainly covered by hills belonging to the Pyrenees or the Cevennes, and is traversed by a valley drained by the Aude. The loftier districts are bleak and unproductive; the others tolerably fertile, yielding good crops of grain. Its capital is Carcassonne. Pop. (1901) 311,386.

Aude, a river of France, which rises in the East Pyrenees, in the Department of Pyrénés Orientales, and after a course of nearly 130 miles, falls into the Mediterranean. It receives several affluents, of which the principal is the Orbieu.

Audebert, ōd-bār', **Jean Baptiste,** French naturalist and engraver: b. Rochefort, 1759; d. 1800. He went, at the age of 18, to Paris to learn drawing and painting, and made himself a skilful miniature painter. This occupation having awakened in him a taste for natural history, he undertook some works which laid the foundation of his fame. The first was 'Histoire Naturelle des Singes, des Makis, et des Galéopithéques' (1800), in which he shows himself an able draughtsman, engraver, and writer. Not satisfied with laying different colors on the same plate, so as to produce a kind of painting, he went farther, and, instead of water colors, used the more durable oil colors. He carried his art to still greater perfection by using gold in his impressions, the color of which he changed in different ways, in order to imitate the splendor of his patterns. Natural history was greatly benefited by his work, the splendor of which was astonishing. His 'Histoire des Colibris, des Oiseaux-Mouches, des Jacamars, et des Promerops' (1802), is esteemed the most complete work that has appeared in this department. Fifteen copies were struck off with golden letters.

Audette, â-dĕt', **Louis Arthur,** Canadian lawyer: b. Quebec, 14 Dec. 1856. He was educated at Quebec Seminary and Laval University; called to the bar in 1880; was secretary to the board of arbitrations appointed in 1893 to deter-

mine disputed matters of account between Canada and the provinces of Ontario and Quebec; and also became registrar of the exchequer court of Canada. He published 'The Practice of the Exchequer Court of Canada' (1895).

Audiffret-Pasquier, ō'dē-frā'pȧs-kyā', **Edme Armand Gaston, Duc d',** French statesman: b. Paris, 1823. He was president of the National Assembly in 1875 and was the first life-senator appointed by that body. In 1878 he was chosen to the French Academy.

Au'diom'eter, for the measurement of hearing, an instrument devised by Prof. Hughes, the English inventor of the microphone. Among its constituent parts are an induction coil, a microphone key and a telephone. The audiometer has been materially modified, and is now principally used for obtaining a balance of induction from two electric coils acting upon a third. A scale is provided to show the extent of the movement. A varying or interrupted current being passed through the two outer coils, the preponderating current will produce the most induction if the central coil is equidistant. It can always be moved to such a point that there will be no inductive effect, one counteracting the other. Thus its position measures the relative induction. A telephone is in circuit with the intermediate coil and is used to determine when its position is such that no current is induced in it.

Au'diphone, an invention to assist the hearing of partially deaf persons in whom the auditory nerve is not entirely destroyed. The instrument, made of a thin sheet of ebonite rubber or hard vulcanite, is about the size of a palm leaf fan, with a handle and strings attached to bend it into a curving form, and a small clamp for fixing the string at the handles. The audiphone is pressed by the person using it against his upper front teeth, with the convex side outward; when so placed it communicates the vibrations caused by musical sounds or articulate speech to the teeth and bones of the skull, thence to the organs of hearing. For different sounds it requires to be focussed to different degrees of convexity. A simple strip of fine glazed mill-board has been recommended by some experimenters as cheaper and equally serviceable; and birch wood veneer has been used with success for the same purpose.

Au'dit, a term denoting an examination into accounts or dealings with money or property, along with vouchers or other documents connected therewith, especially by proper officers, or persons appointed for the purpose. Also the occasion of receiving the rents from tenants on an estate.

Audition. See Ear; Hearing.

Au'ditor. An auditor is an officer of the government, whose duty it is to examine the accounts of officers who have received and disbursed public moneys by lawful authority. In practice an auditor is an officer of the court, assigned to state the items of debit and credit between the parties in a suit where accounts are in question, and exhibit the balance. They may be appointed either by courts of law or equity. They are appointed at common law in actions of account, and in many of the States in other actions, under statutory regulations. The auditor's report must state a special account, 4 Yeates, Penn. 514, giving items allowed and disallowed, 5 Vt. 70, but it is sufficient if it refer to the account, and it is their duty to report exceptions to their decisions of questions taken before them to the court, and exceptions must be taken before them, 4 Cranch, U. S. 308; 22 Bart. N. Y. 39; unless apparent on the face of the report. The report of the auditor as to facts is final in some of the States, unless impeached for fraud, misconduct, or very evident error. When the report is set aside in whole or in part, it may be referred back or may be rectified by the court, or accepted if the party in favor of whom the wrong decision is made, remits the item.

Auditory Canal. See Ear.

Auditory, or **Eighth, Nerve,** the nerve of hearing, and of the sense of position. It has its origin in two distinct portions of the ear, in reality being two distinct nerves, the *cochlear* and the *vestibular,* both of which are sensory in their function. The cochlear nerve originates in the cells of the organ of Corti in the cochlea of the ear, and is the one that carries sound impressions into the brain. The vestibular nerve has its origin in the semicircular canals and is the nerve that conveys the sense of localization of position. Both of these nerves soon join and run together in the internal meatus, where they lie in the same sheath for some distance with the seventh or facial nerve. They enter the medulla, the cochlear nerves forming the acoustic striæ on the floor of the fourth ventricle, and end about the superior olivary body and the nucleus of the trapezium. From here the fibres enter the fillet and end about the auditory centre in the brain in the second temporal convolution. Disease here causes auditory aphasia. The fibres of the vestibular branch end in the nuclei of Deiters and Bechterew in the medulla, and then further fibres pass for the most part into the cerebellum. Disease here causes cerebellar ataxia. See Ataxia; Aphasia; Equilibrium; Hearing.

Audley, a manufacturing town in Staffordshire, England. Pop. (1901) 13,700.

Audouard, ō'dowär', **Olympe,** French writer: b. 1830; d. 1890. She was married to a notary in Marseilles, but soon after divorced. She traveled in Egypt, Turkey, and Russia; and having conducted various journals in Paris since 1860, made a successful lecture tour through the United States in 1868–9. After her return she became interested in spiritism. She was an ardent advocate of woman's rights. Among her novels and books of travel may be mentioned: 'How Men Love' (1861); 'The Mysteries of the Seraglio and of the Turkish Harems' (1863); 'The Mysteries of Egypt Unveiled' (1865); 'War to Man' (1865); 'Across America' (1869–71); 'Parisian Silhouettes' (1883).

Audouin, ō'dooăn', **Jean Victor,** French naturalist: b. Paris, 1797; d. 1841. He was professor of entomology in the Paris natural history museum and was the founder and first president of the Entomological Society. He wrote much respecting the injuries done by insects to vine and silk culture.

Audran, ō-drăn', **Edmond,** French composer: b. Lyons, 1842; d. 1891. He composed several comic operas which were exceedingly

popular, among them 'La Mascotte' (1881); 'Olivette'; 'La Grand Mogul' (1884); 'Miss Helyett' (1890); 'La Ponpée.'

Audran, ō-drän', **Gerard,** French engraver: b. Lyons, 1640; d. Paris, 1703. After three years at Rome, where he acquired a high reputation by his engraving of Pope Clement IX., was recalled to France by Colbert, and appointed engraver to Louis XIV. Here he engraved the works of Lebrun, illustrating the battles of Alexander, and many paintings by Raphael, Titian, Domenichino, Poussin, and others. His nephews, Benoit (b. 1661, d. 1721) and Jean (b. 1667, d. 1756), were also engravers.

Au'drey, Saint. See Ethelreda, Saint.

Audrey, â'drĭ, a shepherdess in Shakespeare's comedy 'As You Like It.'

Auds'ley, George Ashdown, Scottish-American architect: b. Elgin, Scotland, 6 Sept. 1838. He established himself in the United States in 1892, and subsequently became prominent both as an architect and author. In collaboration with his brother, William J. A. Audsley, he was author of several works — on illuminating, decorating, Christian symbolism, etc., and, individually, published 'Keramic Art of Japan'; 'Ornamental Art of Japan'; 'The Art of Chromolithography'; 'The Practical Decorator,' etc.

Audubon, â'dŭ-bŏn, **John James Laforest,** American naturalist: b. Mandeville, La., 4 May 1780; d. 27 Jan. 1851. From 1827–38 he published a series of 1,065 colored figures of American birds in a descriptive work, 'The Birds of America,' which still holds its place as one of the most attractive and beautiful ornithologies of the world. He was a keen and sympathetic observer, rather than a trained specialist either in science or art. The full details of his life may be found in 'Audubon and His Journals,' by his granddaughter, Maria R. Audubon, with zoological and other notes by Elliott Coues (1897), and in an earlier biography by Lucy Audubon, as well as in 'The Life and Adventures of J. J. Audubon, the Naturalist,' by Robert Buchanan (1869). He was educated in France, and studied drawing for some time under the great artist, David, but in 1798 he returned to America and took possession of a farm owned by his father on the Perkiomen River, near Philadelphia. Here, in 1808, he married Lucy Bakewell, the daughter of an English neighbor; with her he moved to Kentucky and subsequently to Louisiana, meeting in both places with financial misadventures due to his inadaptability to attend properly to trade, which left him so poor that he was obliged to paint portraits and teach dancing and fencing. From his boyhood, however, in all fortunes, he had spent much time in sketching birds and studying their habits, and in 1826 he found means to take these sketches to England, where he elaborated them into the great series which made him famous and relieved his pecuniary troubles. In 1830 he returned to America to travel for new material and, in 1831, began the publication of his 'Ornithological Biography,' in five volumes. In 1842, after 12 years spent chiefly in explorations, he bought a home on the Hudson River at a spot considerably north of New York city at that time, but now within the city limits and known as Audubon Park; here his two sons, Victor Gifford and John Woodhouse Audubon, also lived with their families. In 1843 the naturalist took another long journey, going to the Missouri River region. After 1844 he devoted himself with Dr. John Bachman (q.v.) and his sons, to a new publication, 'The Quadrupeds of America.' After 1847 his health began to fail. He was buried in Trinity Cemetery, New York.

Au'dubon Societies are organizations of bird-lovers who work to educate public opinion to a proper appreciation and protection of bird-life. They have now (1903) been organized in 30 States and have 60,000 members. Thus the efforts of a few lovers of birds have developed into a widespread movement of national importance. Hundreds of thousands of circulars, explaining the economic, educational, and esthetic value of birds, were distributed. Meetings were held; classes for bird-study formed. Whenever public opinion in a State seemed ripe, a bill was introduced in the legislature and many a law-maker was surprised to discover an active interest in birds that he had never suspected. Even the department of Agriculture at Washington began to inform him of their economic value. The bird law of the American Ornithologists' Union, which forbids the killing at any time of non-gamebirds, has been adopted in all the New England States, in New York, New Jersey, Delaware, Florida, Ohio, Kentucky, Indiana, Illinois, Wisconsin, Arkansas, and Wyoming. It is probable that within 10 years birds will be protected by law practically throughout the Union. But even then the labors of the Audubon Societies will by no means end. The laws must be enforced and the public conscience kept alive until sentiment enforces them.

Auenbrugger von Auenbrug, ow'ĕn-brûg'-ĕr fŏn ow'ĕn-brûg, **Leopold,** Austrian physician: b. Gratz, 1722; d. Vienna, 1809. As early as 1754 he had discovered the method of studying internal diseases (percussion) which made him famous; but not until after seven years of experiments and verification did he publish his treatise, entitled 'Inventum Novum ex Percussione Thoracis Humani Interni Pectoris Morbos Detegendi' (1761).

Auer, ow'ĕr, **Adelheid von,** pseudonym of Charlotte von Cosel, German novelist: b. Berlin, 6 Jan. 1818. She is the author of many stories of real life, among them, 'Footprints in Sand' (1868); 'A Sister of Charity' (1870); 'In the World's Labyrinth' (1878); 'Castles in the Air' (1882).

Au'er, Alois, Ritter von Welsbach, Austrian printer: b. Wels, 1813; d. 1869. He was trained as a compositor and in his leisure moments acquired several languages, becoming a professor of Italian in the Gymnasium of Linz. From 1841 to 1868 he was at the head of the imperial printing office at Vienna. He made many typographical discoveries and published 'Die Sprachenhalle oder das Vaterunser in 608 Sprachen' (1844); and 'Das Vaterunser in 206 Sprachen' (1847).

Auerbach, ow'ĕr-baH, **Berthold,** German novelist: b. Nordstetten, Würtemberg, 28 Feb. 1812; d. Cannes, France, 8 Feb. 1882. He began to write while a student in Heidelberg, and under the pseudonym «Theobald Chauber» pro-

duced a 'Biography of Frederick the Great' (1834–6). A series of novels from the history of Judaism, under the collective title 'The Ghetto,' of which 'Spinoza' (1837) and 'Poet and Merchant' (1839) were printed in separate editions, was followed by a translation of Spinoza, with a critical biography (1841). 'Black Forest Village Stories' (1843), was received with universal favor, translated into nearly all European languages, and established his fame. To this class of tales belong also 'The Professor's Lady' (1847); 'Little Barefoot' (1856); 'Joseph in the Snow' (1860); 'Edelweiss' (1861); 'After Thirty Years' (1876). His first effort in the field of the novel, 'New Life' (1851), met with little favor; but 'On the Heights' (1865) constituted the crowning success of his literary career. It was followed by 'The Villa on the Rhine' (1868); 'Waldfried, a Family History' (1874); and 'The Head Forester' (1879).

Au'erbach, Henry: b. 1482, at a place of the same name in Bavaria, the builder of the Auerbach court and cellar at Leipsic, mentioned in Goethe's 'Faust.' The building was erected in 1530, and tradition reports that five years after Dr. Faust was seen riding out of it on a barrel of wine. This tale Goethe has made use of in his famous poem.

Au'erbach's Kel'ler. See AUERBACH, HENRY.

Auerlite, a rare North Carolina mineral, remarkably rich in thoria, named after Dr. Carl Auer von Welsbach, the inventor of the Welsbach incandescent gas mantel. It was originally described as a hydrous silico-phosphate of thorium, $ThO_2.(SiO_2.\frac{1}{3}P_2O_5)+2H_2O$. It occurs in yellowish, zircon-like crystals of resinous lustre and having a hardness of 2.5 to 3 and a specific gravity of 4.1 to 4.7.

Auerstadt, ow'ėr-stĕt, a village in Saxony, famous for the great battle which took place there 14 Oct. 1806, between the French under Davoust, and the Prussian army under Duke Charles of Brunswick, which ended in a great victory for the former. The Prussians, who numbered 48,000, left nearly half of their men dead or wounded on the ground, while the French (30,000) escaped with a loss of only 7,000. Napoleon made Davoust Duke of Auerstadt.

Augean (â'jē-an) **Co'dex** (*Codex Augiensis*), a noted Greek and Latin MS. of the Epistles of St. Paul, supposed to have been written in the 9th century, and so called from *Augia Major,* the name of a monastery at Rheinau. After passing through several hands it came, in 1718, to Dr. Bentley, who purchased it for 250 Dutch florins, and is now in the library of Trinity College, Cambridge. This MS. is written in uncial letters, and without accents; not *continua serie,* as is common with the more ancient copies, but with intervals between the words, and a dot at the end of each. The Greek text is written in capitals, the Latin in Anglo-Saxon letters; hence it is tolerably clear that it must have been written in the west of Europe, where that formation of the Latin letters, usually called *Anglo-Saxon,* was in general use between the 7th and 12th centuries.

Au'geas, in Greek legend, a king of Elis, famed for his stable, which contained 3,000 oxen and had not been cleaned for 30 years. Hercules was desired to clear the filth away in one day, and Augeas promised if he performed it to give him a tenth part of the cattle. This task Hercules is said to have executed by turning the River Alpheus, or as some say, the Peneus, through the stable, which immediately carried away the dung and filth. Augeas refused to perform his engagement. Upon this a war ensued and Hercules conquered Elis and put Augeas to death.

Au'ger-shell, a common designation of the spiral gastropod mollusks of the *Tereboidæ* family. The shells are slender and tapering, sometimes ending in a sharp point, and are usually decorated with brown, orange, and red spots or patches. More than 200 species are known, all inhabitants of tropical waters, where they occur from the shallow waters of the shore to very great depths.

Augereau, ōzh-rō', **Pierre François Charles,** Duke of Castiglione, a marshal of France: b. Paris, 1757; d. 12 June 1816. He distinguished himself in 1794 as general of brigade in the army of the Pyrenees, and in 1796 as general of division in the army of Italy. He made himself master, 16 April, of the intrenched camp of the Piedmontese at Ceva, afterward of that at Casale; threw himself on the Bridge of Lodi, and carried it with the enemy's intrenchments. 1 August he came to the assistance of Masséna; maintained during a whole day a most obstinate struggle against a superior number of troops and took the village of Castiglione, from which he derived his ducal title. In the battle of Arcole, when the French columns wavered, Augereau seized a standard, rushed upon the enemy, and gained the victory. The directory bestowed this standard on him 29 Jan. 1797. In 1799 he was chosen a member of the Council of Five Hundred, and therefore resigned his command. He then obtained from the consul Bonaparte the command of the army in Holland. Being superseded in October 1801, he remained without employment till 1803, when he was appointed to lead the army collected at Bayonne against Portugal. When this enterprise failed, he went back to Paris, and 19 May 1804, was named marshal of the empire, and grand officer of the Legion of Honor. In July of this year the king of Spain sent him the order of Charles III. He contributed to the successes which gave birth to the peace of Pressburg, and in March 1806, had possession of Wetzlar and the country around, until, in the autumn of this year, a new war called him to Prussia. Early in 1811 Napoleon gave him the command of a corps in the army of Spain. After the entrance of the allies into France, he made submission to Louis XVIII., who made him a peer. Napoleon, on his landing in 1815, declared him a traitor. Augereau, however, expressed himself in his favor, but took no active part in the new order of things. After the return of the king he took his place again in the chamber of peers.

Augier, ō-zhyā', **Guillaume Victor Emile,** (ōzh-yā'), French dramatic poet: b. Valence, 20 Sept. 1820; d. 25 Oct. 1889. 'La Ciguë,' his first piece, in two acts, after being rejected at the Théâtre Française in 1844, was accepted by the managers of the Odeon Théâtre, and there brought out. It had a run of three months, and established the popularity of the author. The

latter subsequently produced other light pieces. These, however, were thrown in the shade by 'Gabrielle,' a five-act comedy, which has been pronounced by competent critics to be Augier's most finished and best constructed work, whether as regarding lot, poetry or the delineation of character. At the solicitation of Mlle. Rachel, Augier wrote 'Diane.' In 1868 his 'Fils de Giboyer' was successful. The style of Augier is at once classic and easy, dignified and yet pictorial. He may be said to have founded a new school in French dramatic literature, and his works, partly by their originality, and partly by intrinsic merit of a kind possessed in common with other dramatic productions, have acquired very great popularity.

Aug'ite. See PYROXENE.

Augsburg, owgz'bûrg, a city of Bavaria; situated on a plain, 35 miles northwest of Munich. It was founded by the Emperor Augustus, 12 B.C. The streets are narrow but picturesque, the buildings retaining many mediæval characteristics. Among the most notable are the cathedral, arsenal, town hall and Abbey of St. Ulrich. Napoleon III. received his early education in a gymnasium of this city. It is a centre of the book trade. Augsburg has been prominent since the Middle Ages for its commercial and financial operations and was long the home of merchant princes such as the Fuggers. It was the scene of the Augsburg Diet. It was a free city till 1806, when Napoleon ceded it to Bavaria. Pop. (1900) 88,700.

Augs'burg Confession, a document adopted by the Protestants in 1530 as a declaration of faith. Charles V., on his accession to the throne of Germany (1520), found his new dominion the theatre of religious dissensions. The insurrection in Castile, and the war with France and Italy, called Charles into Spain, diverting his attention from the Lutheran schism. The Diet of Spires (1529) had issued a decree for the purpose of conciliating the Lutherans to the proposed Roman Catholic reform, and uniting them against the Sacramentarians and Anabaptists. At this juncture, Charles returned, and the German princes and estates were summoned to convene in diet at Augsburg in June. The summons was conciliatory, and called for aid against the Turks, making no reference to the religious difficulties of the kingdom, further than to promise at no distant time a speedy adjustment of them. On the 25th of the month, a confession, prepared by Melanchthon, and approved by Luther, was presented and read by Dr. Christian Bayer in the diet. This confession is said to have been prepared on the basis of the Swabach and Torgau articles, although these had been drawn up (1528–9) in the attempt to unite with the Zwinglians, and the object of the present confession was to become reconciled to the Roman Catholic reform party. A copy of the confession, in German and English, was delivered to Charles. Two days after the reading of the confession, it was delivered to the Roman Catholic theologians for a reply. The reply was read in the diet on 3 August following, and called forth from Melanchthon a defense (*Apologia Confessionis*), which was afterward enlarged and published in Latin, and then in German. The object of the Augsburg Confession was not attained, and the edict of the emperor (22 September) gave the Lutherans until the following April to bring themselves into conformity with the requirements of the Church, and required their co-operation with the throne against the Zwinglians and Anabaptists. The Augsburg confession and Melanchthon's defense were generally circulated in western Europe, and became a sort of rallying point among the reformers.

Augs'burg, League of, a league concluded at Augsburg, 9 July 1686, for the maintenance of the treaties of Münster and Nimeguen, and the truce of Ratisbon, and to resist the encroachments of France. The contracting parties were the Emperor Leopold I., the kings of Spain and Sweden, the electors of Saxony and Bavaria, and the circles of Suabia, Franconia, upper Saxony and Bavaria.

Augs'burg Seminary, an educational institution in Minneapolis, Minn., under the auspices of the Lutheran Church. It was organized in 1869 and reported in 1902: Professors, 10; students, 170; grounds and buildings valued at $50,000; income, $12,250; graduates, 374.

Au'gur, Christopher Colon, American military officer: b. New York, 10 July 1821; d. Washington city, 16 Jan. 1898. He was graduated at the United States Military Academy in 1843; became major of the 13th United States Infantry in 1861; colonel of the 12th Infantry in 1866; brigadier-general, United States army, 4 March 1869; major-general in the volunteer service in 1862; mustered out of that service in 1866; and was retired in the regular army, 16 July 1885. He commanded a division in the battle of Cedar Mountain, being severely wounded.

Au'gur, Hezekiah, American sculptor: b. New Haven, Conn., 21 Feb. 1791; d. 10 Jan. 1858. 'Jephthah and His Daughter,' in the Trumbull gallery at Yale, is the most important of his works. In addition to his skill as a sculptor, he possessed much mechanical genius, inventing among other machines one for carving wood.

Au'gurs, a celebrated college of diviners in ancient Rome, who predicted future events and determined the will of the gods from the occurrence of certain signs, connected with thunder and lightning; the flight and cries of birds; the feeding of the sacred chickens; the action of certain quadrupeds or serpents; accidents, such as spilling the salt, etc. The answers of the augurs and the signs were called auguries; bird-predictions were auspices. Nothing was undertaken without the advice of the augurs, and by the words *alio die* ("meet on another day"), they could dissolve the assembly of the people and annul decrees passed at the meeting.

August, ow'gŭst, the name of many princes of the German principalities: (1) AUGUST WILHELM, prince of Prussia, brother of Frederick the Great, and general in the Prussian army: b. Berlin, 9 Aug. 1722; d. 12 June 1758. He took an active part in the Silesian campaign, and distinguished himself at the battle of Hohenfriedberg (in June 1745), but owing to the fatal retreat of Zittau, in 1756, he incurred the displeasure of his brother, and withdrew from the army. This conflict between the two brothers led to a correspondence, which was published in 1769. (2) AUGUST EMIL LEOPOLD, duke of Saxe-Gotha and Altenburg, successor to the throne,

20 April 1804. He was twice married, and the first marriage left him issue, one daughter, who became the reigning duchess of Saxe-Coburg, and died in 1822. By the second marriage he had no children, and on his death he was succeeded on the throne by his brother, Frederick IV., with whose decease, 11 Feb. 1825, the line of Saxe-Gotha became extinct. Duke August Emil Leopold was a favorite of Napoleon, and his duchy enjoyed perfect immunity from the burdens of French invasions and French wars. He was a man of taste and considerable literary talent. (3) AUGUST FRIEDRICH WILHELM HEINRICH, prince of Prussia: b. 19 Sept. 1790; d. 19 July 1843, in Bromberg; the son of Prince August Ferdinand, the brother of Frederick the Great, who died in 1813. He was considered one of the richest men in Prussia, and left various children by morganatic marriages. He took an active part in the campaign against Napoleon in 1806, by whom he was taken prisoner, and detained in Paris until after the peace of Tilsit. On his return to Prussia in 1813, he resumed his duties in the Prussian army, fought at Dresden, Ulm, and Leipsic, distinguished himself during the campaign of 1814, on various occasions, and bore throughout his life the character of a gallant soldier and an upright man. (4) AUGUST PAUL FRIEDRICH, grand duke of Oldenburg: b. 1783; d. 27 Feb. 1853; mounted the throne 21 May 1829, under the title of grand duke, which had been conferred upon his family by the Congress of Vienna; but of which his father had never availed himself. When Oldenburg was invaded by the French, in 1811, he accompanied his father to Russia, where his younger brother (b. 1784, d. 1812) was married to the Grand Duchess Catharine. He distinguished himself in the Russian war, and in 1813 was appointed governor of Revel. His reign, after his return to Oldenburg, was marked by political and material progress. In 1830 he concluded a treaty with Prussia for the annexation of Birkenfeld to the Prussian-Hessian Zollverein, and a reciprocal treaty of navigation. In 1836 he prevailed upon Hanover and Brunswick to make satisfactory arrangements for the regulation of excise duties. In 1831 he laid the foundation for a constitution of Oldenburg, which was ratified in 1848, and which, although modified in 1852, still secures much civil and religious freedom to the people. In 1817 he married the Princess Adelaide of Anhalt-Bernburg, who died in 1820, leaving him two daughters, Frederica and Amalie; the latter, in 1830, married King Otho of Greece. In 1825 he married the sister of his first wife, Ida, who died in 1828, having borne him a son. In 1831 he married for the third time, Cecilia, youngest daughter of the former king of Sweden, Gustavus Adolphus IV., who died in 1844, leaving a son. He was succeeded by his first son, Nicholais Frederick Peter, grand duke of Oldenburg.

Au'gust, the eighth month of our year, named by the Roman Emperor Augustus after himself, being associated with several of his victories and other fortunate events. Before this it was called Sextilis or the sixth month (counting from March). July had been named for Julius Cæsar, and the Senate, to gratify Augustus, decreed that August should have equal length, taking a day from February.

Augus'ta, a title first given to his wife Livia, after the death of Augustus, according to the will of the emperor. It was afterward conferred by Claudius on Agrippina (51 A.D.), and by Nero on his wife, Poppæa, as well as her daughter (64 A.D.). Eventually it became a common title of the mother, wife, sister, or daughter of an emperor.

Augusta, ow'gŭs-tạ, **Marie Luise Katharina,** a queen of Prussia, and empress of Germany: b. 1811; d. 1890. She was the daughter of Charles Frederick, grand duke of Saxe-Weimar, and was educated at the Weimar court. In 1829 she married William, then crown prince of Prussia, afterward emperor of Germany.

Augus'ta Victoria, duchess of Schleswig-Holstein-Sonderburg-Augustenburg: b. 22 Oct. 1858. She is the daughter of the late Duke Friedrich; married Prince Friedrich Wilhelm, afterward Wilhelm II., 27 Feb. 1881, and became empress of Germany and queen of Prussia on the accession of her husband to the thrones in June 1888. In 1900 she had borne the emperor seven children, the crown prince, Friedrich Wilhelm, being born 6 May 1882.

Augus'ta, Ga., the third city of the State in population and wealth. It is the capital of Richmond County, and at the head of navigation on the Savannah River, 231 miles by water above its mouth. It is 132 miles by rail from Savannah, 171 miles east of Atlanta, and 137 miles northwest of Charleston. It lies about 150 feet above sea level, has an even temperature and dry, invigorating atmosphere very different from most riverside cities, being indeed a well-known health resort for pulmonary invalids, particularly its suburb Summerville, on the Sand Hills 400 feet above it. It is laid out in broad rectangular streets, many of them beautifully shaded, and with a good electric car service; and has several parks, of which the chief is May Park of about 11 acres. The city hall is in a park containing a granite monument to the Georgia signers of the Declaration of Independence; while on Broad Street, the principal thoroughfare of the city, is a noble monument to the Confederate dead. The cemetery and fair grounds are also suburban attractions.

Manufactures.— The power is chiefly derived from a dam across the river seven miles above the city (enlarged from a smaller one in 1875, at a cost of about $1,000,000), 150 feet wide at top, 106 at bottom, and 11 feet deep; turning a part of the river into a canal affording 14,000 horse-power, sold to industries at $5.50 per horse-power per annum, with a working day of 16 hours. Augusta is one of the chief seats of cotton manufacture in the South. Eli Whitney's cotton gin was invented on a farm on the outskirts, and the first working gin was set up in the city. In 1902 there were 13 cotton mills with offices in the city, having a capital of nearly $6,000,000, operating 329,740 spindles, and 19,360 looms, and employing some 8,000 hands. During 1899, of about $8,000,000 new capital invested in Georgia cotton manufacturing, fully a third was in Augusta. There are also four large cotton-seed oil mills, and a bleachery. Of other manufactures, the chief are of lumber and wood products, bricks and tile drain pipe from the fine clays in the vicinity, flour, and iron goods. In 1900 there were 388 manufacturing establishments, with $9,016,619 capital and 7,042 em-

ployees; paying $2,093,915 for wages and $6,244,286 for materials; and having a total output valued at $10,069,750. The increase within the past three years, however, has been very large; and it is proposed to utilize the river still more for electric power, the present manufactories practically exhausting the direct water power. The river at Augusta is about five feet deep the year round, and fair-sized passenger and freight steamers make semi-weekly trips to Savannah. Augusta is the largest inland cotton market in the South; and it has also a large shipping trade in lumber, fruit and vegetables. Its annual trade exceeds $80,000,000, its cotton receipts amounting to 200,000 bales. The water supply is derived from the Savannah River and is unlimited. The city abounds in educational and charitable institutions. Most notable among the former is the Georgia Medical College, a branch of the State University at Athens; there are also Richmond Academy, which has recently been put under the care of the State University; Saint Mary's and Sacred Heart (Roman Catholic) academies, Paine's Institute for Colored Students, and high schools for white and colored youth. There is also a public library of 10,000 volumes. There is an orphan asylum, two public hospitals (white and colored), a juvenile reformatory, and the Louise King Home. A United States arsenal, a Masonic temple, an Odd Fellows' hall, a Chamber of Commerce, and a cotton exchange are also among the notabilities. The city has three daily and several weekly newspapers. The assessed property valuation exceeds $20,000,000, and the bonded debt in 1900 was $1,752,300. There are two national and several state banks. Augusta is on the line of many railroads, among them the Central of Georgia, the Charleston & West Carolina, the South Carolina & Georgia, the Southern, etc. Its original charter was obtained in 1798, and revised 1882; the mayor is elected for three years, and a city council, consisting of 15 members, is also elected for three years, one third being elected each year. The board of education is elected by the people. All other offices are appointive by the council, save that the mayor appoints the superintendent of canal and waterworks, and of streets and drains.

Population.— In 1800, 2,215; (1840) 6,403; (1852) 10,217; (1860) 12,493; (1870) 15,389; (1880) 21,891; (1890) 33,300; (1900) 39,441. It suffers on the census returns, however, from having suburbs, North Augusta, across the river in South Carolina; Summerville, and others not counted in; and claims about 60,000 at present.

History.—Augusta was founded in 1736 by Gen. James Edward Oglethorpe (q.v.), the founder of Georgia, and named after the Princess Augusta of Saxony, who married Frederick, Prince of Wales, in that year, and became the mother of George III. All through its early period it was the chief trading station in Georgia, and a very important military post; especially notable as the seat of conferences and treaties with the southern Indians, who under the treaties of 1763 and 1773 ceded large tracts of land to the whites; the latter, however, had to occupy much of it at the same risk of Indian warfare as before. In 1778 it was made the State capital, and remained such till 1798. The building of the Georgia railroad in the middle of the 19th century was a heavy blow to its prosperity for a time, carrying trade over new routes; but its natural advantages enabled it to recover itself.

THOS. W. LOYLESS,
Editor 'The Augusta Chronicle.'

Augusta, Maine, city county-seat of Kennebec County and capital of the State; on the Kennebec River, 40 miles above its mouth, at the head of tidal navigation, and on the Maine Central R.R., 63 miles northeast of Portland. It is situated on both sides of the Kennebec, mainly on the right or west bank, and some portion of it, including much of the residential section, occupies an elevation considerably above the river, along which the principal business part of the city extends. The Augusta, Winthrop and Gardiner electric railway connects the city with neighboring places, and its water communications afford excellent facilities for travel and trade.

Public Buildings and Institutions.— The State Capitol is a handsome granite building, for which the stone was quarried from the surrounding hills. It stands on high ground overlooking a wide extent of pleasant country. Among other noteworthy buildings are those of the Maine Insane Hospital, the City Hospital, the public library, the county buildings, and the United States arsenal. The churches include those of the Congregationalists, Episcopalians, Free Baptists, Colonist Baptists, Christians, Universalists, Unitarians, Methodists, Roman Catholics, and the People's Church. The public schools include all grades from the primary to the high school. In the capitol are the State library, a notable collection of portraits of American statesmen, and, in the rotunda, an impressive array of the Civil War battle flags of Maine soldiers. In the principal park is a soldiers and sailors' monument.

Industries.— Augusta, by reason of its railroad and river facilities, is the trade centre of a large region, and the water-power furnished by the Kennebec, across which, just above the city, extends a dam nearly 1,000 feet in length, affords abundant means for manufacturing. The cotton factories here employ about 1,100 persons; shoe manufacture, 300; pulp mill, 250; lumber mill, 100; sash and blind factory, 75; and besides various smaller establishments the city has publishing houses in which some 400 persons are employed.

Banks, etc.— There are two national banks in the city, with a combined capital of $350,000, a trust company having a capital of $100,000, and two savings banks. The deposits of these institutions aggregate $11,000,000.

Municipal Government.— The city is governed by a mayor and a city council, a body consisting of boards of aldermen and common council, elected by the people.

History.—Augusta was first permanently settled in 1754 by colonists from Massachusetts; was incorporated under the name of Hallowell in 1771; and upon the setting off of Hallowell in 1797 became a separate town. In 1831 it became the capital of the State, and has been the scene of many important political events. It received a city charter in 1849. Its population in 1900 was 11,683; in 1903 it was estimated at 12,031. The employees of the cotton factories

are mostly French Canadians, the other inhabitants chiefly natives. Consult: North, 'History of Augusta' (1870). FRED'K W. PLAISTED, *Editor 'The New Age.'*

Augus'ta, the name of many ancient European towns, as Augusta Trevirorum, now *Treves;* Augusta Taurinorum, now *Turin;* Augusta Vindelicorum, now *Augsburg,* etc.

Augus'ta, a city of Sicily. See AGOSTA.

Augus'ta Histo'ria, a series of Roman biographies of the emperors from the accession of Hadrian to the death of Carinus, the predecessor of Diocletian, a period covering 167 years. The writers included in this collection are six in number, namely, Ælius Spartianus, Julius Capitolinus, Ælius Lampridius, Vulcatius Gallicanus, Trebellius Pollio, and Flavius Vopiscus.

Augus'tan Age, the Latin literary epoch of the reign of the emperor Augustus Cæsar. During this period Horace, Ovid, Virgil, Tibullus, and other writers flourished; also great patrons of literature like Mæcenas. The poets of the Augustan Age are noted for their pure Latinity. The name is applied in England to the reign of Queen Anne (1702–14). By far the foremost name is that of Sir Isaac Newton, and of commanders, John Churchill (Duke of Marlborough). The poets were Congreve, Garth, Gay, Parnell, Philips, Pope, Prior, Rowe, and Swift. The other authors were Addison, Barnes, George Bull, Anthony Collins, Jeremy Collier, Roger Cotes, Defoe, Dodwell, Flamsteed, George Hickes, Dr. John Jeffery, John Norris, Ray, South, Steele, etc. Wren, Archibald Pitcairn, and Sir Cloudesley Shovel also lived in this reign.

Au'gusta'na Col'lege, a co-educational institution in Rock Island, Ill., organized in 1860 under the auspices of the Lutheran Church; reported in 1902: Professors, 31; students, 250; volumes in the library, 18,000; ground and buildings valued at $166,000; productive funds, $225,000; income, $32,119; graduates, 881.

Au'gustine, Saint (AURELIUS AUGUSTINUS), one of the most renowned fathers of the Christian Church: b. Tagaste, in Numidia, 13 Nov. 354; d. Hippo, 28 Aug. 430. His father, Patricius, was a pagan, his mother, Monica, a Christian. He has related his own early life in the work to which he gave the title of 'Confessions.' His mother instructed him in Christianity, but for many years this faith had little influence on his life. He was long devoted to pleasure, and when quite young became father of a son by a woman with whom he was not connected by marriage. He was intended for the profession of rhetorician, and was sent to Carthage to study with this object in view. Cicero's work, 'Hortensius,' which has not come down to our times, first led him to speculative studies, and he now became a member of the sect of the Manichæans. He was one of their disciples for nine years; but after having obtained a full knowledge of their doctrine, he found it unsatisfactory and left them. In 383 he left Africa for Rome, and after a short stay there proceeded to Milan, where he was invited as a teacher of rhetoric. St. Ambrose was bishop of this city, and his eloquent discourses, combined with the study of the Scriptures, converted Augustine to the orthodox faith, and wrought an entire change in his life and character. His conversion appears to have taken place in 386. He now retired into solitude, and prepared himself for baptism, which he received in the 33d year of his life, together with his son Adeodatus, from the hands of Ambrose, his mother being then with him. Returning to Africa, he sold his estate, and gave the proceeds to the poor, retaining only enough to support him in a moderate manner. For three years he lived a retired life, devoting himself to religious duties, and to the composition of several treatises. Chancing on one occasion to be present in the church at Hippo, the bishop, who was a very old man, signified a desire to consecrate a priest to assist and succeed him. At the desire of the people Augustine entered upon the holy office, preached with extraordinary success, and in a few years became Bishop of Hippo. The remainder of his life was occupied with his ecclesiastical labors, and with various controversies in which he warmly engaged, such as those with the Donatists, the Manichæans, and more especially the Pelagians, concerning the doctrines of free-will, grace, and predestination. Augustine maintained the necessity of divine grace in determining man's moral acts to salvation, and he supported the doctrine of predestination, including election and reprobation, but always allowing for free-will and for the merit of the individual. His authority has always been very influential in the Roman Catholic Church, and his view upon any doctrinal matter has at all times carried great weight and is constantly cited in controverted questions. He died at Hippo, while the town was besieged by the Vandals. There have been more learned fathers of the Church, but none have ever more powerfully touched the human heart, and warmed it toward religion. Painters have, therefore, given him for a symbol a flaming heart. His writings (which are in Latin) are very numerous. The most celebrated are his 'Confessions' (belonging to the year 397), his 'De Civitate Dei' (On the City of God), a work on the Christian Church, his treatise on the Trinity, 'Christian Doctrine'; 'Nature and Grace'; 'Grace and Free-Will'; 'Immortality of the Soul,' and his 'Letters.' His works have been published at Paris in 22 volumes, and an English translation in 15 volumes has appeared at Edinburgh, edited by Dr. Marcus Dods See Neander, 'Church History'; Milman, 'Latin Christianity'; Farrar, 'Lives of the Fathers,' etc. Two monastic bodies, the *Augustinian Canons,* or *Black Canons,* and the *Augustinian Hermits* (q.v.), claimed to derive their origin from St. Augustine. Life by Hatzfeld.

Au'gustine, or **Austin, Saint,** the first archbishop of Canterbury: d. 26 May 604. While prior of the Benedictine monastery of Saint Andrew at Rome he was selected by Pope Gregory I., together with 39 other monks, to convert the Anglo-Saxons to Christianity, and establish the authority of the Roman See in Britain. In the spring of 597 the missionaries landed on the Island of Thanet and were kindly received by Ethelbert, king of Kent, whose wife Bertha was already a Christian. The conversion of the king speedily followed, contributing greatly to the success of Augustine's work, large numbers of persons were converted and baptized, and it was soon manifest that a new influence for good had come into the lives of

the Anglo-Saxons. In acknowledgment of his success, the Pope directed Augustine in 597 to go to Arles, where he was consecrated archbishop of Canterbury and metropolitan of England. On his return he at once informed the Pope of his success, sending a presbyter and a monk to Rome for that purpose and also to obtain instructions concerning other questions with regard to the propagating of the faith. The answer of Gregory to the archbishop's inquiries are fine examples of tact, good sense and judgment in dealing with the problems confronting the early missionaries, and instead of destroying the heathen temples they were converted into Christian churches. Saint Augustine was a zealous missionary of the Church and labored with untiring energy to extend the authority of the Church and to convert the ancient Britons, whom the English had driven into the mountains of Wales. In this, however, he was only partially successful, some of the British bishops refusing to acknowledge his authority and to unite with the English Church. Augustine died in Canterbury, and eight years afterward his body was removed to the Cathedral of Canterbury. Consult: Bede, 'Historia Ecclesiastica Gentis Anglorum'; Mason, 'The Mission of Saint Augustine to England' (1897).

Augustinianism, the system of philosophy and theology taught by Saint Augustine. In order to reach a just estimate of the teachings of Augustine, we must remember that we are not dealing with a philosopher simply, or with a theologian simply, but with one whose nature combined in a marked degree, the philosophical and theological strains together. He was both philosopher and theologian. These elements are so mixed in him at times as to reciprocally reinforce one another, but again so disparate as to cause irreconcilable inconsistencies and bold contradictions. There is a most excellent analysis of this exceedingly complex nature by Teuffel in his 'History of Roman Literature,' remarkable alike for its comprehensiveness and brevity. «Augustine combined in his character qualities seemingly opposite: an abundant imagination, and penetrating intellectual vigor, a passionate want of regard and affectionate tenderness, a tender heart and zealotism, a blind belief in superior authority and originality of thought, zeal for unity of the Church and individual piety, romanticism and scholasticism, mysticism and sophistry, poetical talent and philosophical genius, rhetorical pathos and grammatical pedantry, — himself a psychological mystery.» With this portrait of his personality before us, let us examine his teachings. For him, the source of all truth is to be found in the interpretation of the inner experience. His philosophy is primarily anthropocentric. In consciousness lies the assurance of the reality of one's own being. This is the earnest and the warrant of all reality. Without this central and elemental knowledge all other knowledge would be vague, and illusory. This assurance is given even in the very act of questioning it; for, as Augustine insists, the simple fact that I am conscious of doubting even the doubting of my own reality, is in itself an indication that I the doubter am. Man cannot escape himself. Such an analysis of the implications of self-consciousness forms a striking anticipation of Descartes' famous *Cogito ergo sum.*

With the reality of human personality firmly established upon a basis which even the most searching skepticism is unable to shake, but on the contrary the rather confirms, Augustine proceeds through a profound analysis of the human reason to disclose abundant intimations of a divine reason, and therefore of a divine being. For in his subtle examination of the processes of reason, he points out that these processes are ever working toward one and the same end,— the constructing of a body of knowledge consisting of truths universally valid, that is, truths which hold not merely for the individual but which necessarily hold for all individuals, under all circumstances and at all times. They become moreover, the norm or standard for all our thinking and their sway embraces the complete range of all human activity. These truths are so universal, so complete, so commanding as to indicate a oneness of origin which can be nothing less than that of an eternal mind. Moreover, the eternal mind must be an eternal personality. The universal truths, therefore, which lie at the basis of all thought, of all being, of all desire, and all activity are according to Augustine ideas in God. In regarding the Absolute as not merely the sum total and unification of all truth, the *unum, verum bonum,* but also a living personality, the divine Logos, we recognize the marks of the religious teacher, and in this respect Augustinianism is to be regarded as a significant advance beyond the doctrines of Neo-Platonism. From this exposition, it should not be inferred, however, that in the Augustinian psychology, the primary, or the sole basis of our conscious life is knowledge. On the contrary it is quite evident throughout the works of Augustine that he exalts the will above knowledge. He finds in consciousness three elements, *memoria, intellectus, voluntas.* Of these memoria is equivalent to a reproducible idea (*Vorstellung*), an idea which, moreover, carries with it the warrant of the reality which underlies it as its ground; *intellectus* is the judgment; and *voluntas* of course, the will. The three form a psychological trinity corresponding to the trinity which is manifested in the unity of the divine nature. Both in God and man, the will is supreme. *Omnes nihil aliud quam voluntates sunt.*

Certain difficulties emerge at this point in the exposition of the Augustinian system owing to the shifting of the point of view. The philosopher gives way to the theologian. Augustine's philosophy is essentially anthropocentric; his theology, theocentric. And in discussing the relations which obtain between God and man Augustine naturally subordinates the human to the divine, so much so indeed that the Augustinian system is severely criticised because, as it is alleged, it leads logically to a pantheism which wipes out the individuality and responsibility of man. For Augustine insists that to appreciate divine truth and the will of God for man there is need of an inner spiritual illumination, and that such an illumination comes only to the soul in which faith resides, and that faith is the gift of divine grace. Faith, therefore, must precede knowledge, that is, knowledge of things divine and knowledge of things as they are. Insight may be regarded as the fruitage, but faith is the root of knowledge. There is a grave difficulty at this point in reconciling such a doctrine with Augustine's fundamental posi-

tion which puts supreme emphasis upon the dignity and worth of man's inner nature, and the trustworthiness of that inner guiding light. It can only be said by way of explanation that in the one the theologian, and in the other, the philosopher, speaks.

Moreover, in this view of the human consciousness the primacy of the will is in a large measure denied by the insistence that man is wholly dependent upon divine grace in order to exercise his will aright. He alone is free, says Augustine, whose will has been touched by the divine will, and whose desires and activities are found wholly in accord with the will of God. The natural man is not free unless emancipated by divine grace; for Adam, the representative of humanity, the federal head of the race, abused his natural freedom of will and in his fall has left as an inheritance to the race the tendency to sin. And the most significant consequence of sin is the bondage of the will, which divine grace alone can overcome. Augustine, therefore, seems to solve the problem of free will and predestination by denying to man a real freedom. He indulges in many subtle distinctions as to the various kinds of grace. There is, for instance, the prevenient grace, also the supporting grace, active grace, and grace bestowing the gift of perseverance which seals all previous effects. No distinction, however, is drawn which relieves the system from the criticism already mentioned of minimizing the autonomy of the human will.

This position of Augustine naturally raises the question as to how the evil in the world can be reconciled with the idea of divine power and divine goodness. For if God alone is free, He alone is responsible; and man should not be held accountable for that which he unaided is unable to prevent. Such a criticism Augustine meets by the statement that the evil in the world is after all not a real evil; it is not a *causa efficiens,* but merely a *causa deficiens,* in fact only an *incausale.* Such an explanation, however, is not satisfactory and does not squarely meet the difficulty of the problem which the common experience of humanity all too unhappily emphasizes.

Augustine's type of mind is essentially that of a great systematizer of doctrine. He could rest content with no form of knowledge unless it could be reduced to a *schema* in which part fitted to part in an exact and inflexible manner. Augustine's system has been criticised for this very reason that its lines are hard and fast, yielding at no point the full rigor of its inexorable doctrines. But while in a certain sense such a criticism is justified, there was, in addition to this pronounced synoptical tendency of thought, an equally profound strain of sentiment and feeling. Augustine was essentially human, and wont to be moved by the passions and aspirations common to man. Within the very body of this system of doctrine, and its closely concatenated dogmas, it is possible to discover a deep underlying current of mysticism, which may be traced no doubt to its source in Neo-Platonism,—a mysticism manifesting itself in that compulsion of the soul, to long for communion with God, and to behold Him face to face. It is this intensely human strain, this mystical element, which relieves the Augustinian system as a system from its more severe and sombre features. The great system builder after all subordinates the system to that which is the ground of the system. Not in the processes of reason, but in a direct and immediate consciousness of God, does he find the ultimate certitude. Nothing can more beautifully or more adequately express this mystical strain in Augustine's nature than those words which embody both a philosophy and a creed: «Thou hast made me for thyself and my heart is restless until it finds rest in thee.»

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Au'gustin'ians, hermits of St. Augustine (calced), brotherhood of churchmen, devoted to the spread throughout Christendom of the principles of the higher life, of religion as well as earthly science, and searchers, too, after peace of the spirit, established in the 4th century, at Tagaste in Africa, by the famed St. Augustine, later Bishop of Hippo and illustrious doctor of the Church. Up to the 13th century Augustinians were engaged mainly in the practices of ascetic life, a course of seclusion, or retirement from the bustle and troubles of worldly affairs in trade, politics, commerce. As hermits, at first they lived, some alone in their cells in out-of-the-way places in forest and mountain, others in community-groups outside of towns. Here their life was passed in quiet, in contemplation, study, prayer, copying MSS., and manual toil, as farm, and garden-work, reclaiming waste lands, digging canals for irrigation and drainage. Eminent among them in this peaceful era were two reformers of their brotherhood, famed in hagiography, who by centralizing the energies of their followers on set lines of work, sought to render their societies more potent factors for the common good, as adepts in intellectual, artistic, and more industrial spheres. William IX., duke of Aquitaine, an old-time leader in the crusades, now a dweller in a monastery of the Tuscan hills, and John Bonus, The Good, of Mantua, a one-time strolling player by profession, now penitent, who by their wonderful powers of nature and grace employed in the service of their respective communities, reached high rank in the world of saintly heroism in southern Europe, in France, and Italy, then in the north, in Germany and England, wherein were founded congregations under their rule. Spreading thence throughout the various quarters of Christendom, especially in western Europe, their followers settled in Spain, Portugal, Belgium, and Ireland, where they established houses of their brotherhood in the principal cities and towns of the civilized world. In 1256, in pursuance of the designs of his predecessors in the papal chair, Alexander IV. moved to ensure the complete union of all the different congregations of Augustinians in Europe, succeeded finally in merging their several branch orders into one body politic and social under the leadership of Lanfranc Septala, of noble Milanese birth, the first superior general of the Augustinian Hermits, chosen thereto in the first general chapter of the brethren at Rome in the above year. Nor were the successors of Alex-

ander slow in their recognition of the powers of this new association. To them were entrusted several places of honor in the pontifical court, among them the offices of apostolic confessor, of librarian, papal sacristan, the latter subsequently declared by Sixtus IV. as of perpetual right of the Augustinians. Not long after they were entrusted with the collection of papal revenues in many countries, and even charged by some of the republics of Italy with the handling of state funds.

In the Middle Ages as in later days many of this brotherhood won fame in the higher realms of life, by their gifts of spirit in science and art, as saints, writers, masters in theology, Scripture-study, philosophy, history, law, antiquities, letters and poetry. Celebrated as teachers in schools of their order as well as outside were such masters as Egidius Colonna of Rome, known as the "Fundamental Doctor"; then Augustine of Ancona, who won renown in scholastic theology; John Capgrave in history; Onuphrius Panvinio in antiquities; Luis de Leon in theology and poetry; John Laurence Berti in history; John Baptist Cotta in poetry, John Michael Cavalieri in liturgy, and lately Augustine Ciasca in Oriental languages. Eminent for their supernatural gifts, many of the most singular character, were Nicholas of Tolentine, "wonder-worker of the Church," so styled by Pope Eugene IV.; Clare of Montefalco, the stigmatized, in whose heart were discovered the insignia of Christ's passion; Rita of Cascia, ecstatic, known as "the saint of the impossible"; Thomas of Villanova, almsgiver of Spain, and John de Schagun, reformer of the clergy of that country. They are of prominence from the 16th century especially in various mission fields in Mahometan and heathen countries; in Asia, in China, India, Persia, Japan, and the Philippines; in Africa, in Zanzibar, Mozambique, and the Guineas; then in America, both north and south, and Australia. In later times during the closing years of the 18th century, was established the first English-speaking branch of the Augustinians in the United States, where, in 1796, a house of that brotherhood was opened in Philadelphia, by two members of Irish blood,— Dr. Matthew Carr and John Rosseter,— the latter said to have been formerly an officer under Rochambeau. They are the calced communities. Here their aim chiefly has been mission work among the faithful in pulpit and school. Offshoots from Philadelphia, now thriving in the United States as well as in Cuba and the Philippines are some 20 convents and houses of the order, as mission-centres, with 113 members in residence or in study-houses in Europe. Seventy-five are priests, actively engaged in two colleges, one of them in Havana, 1 academy, 10 parish-schools, besides the congregations of 29 parishes. Furthermore attached to every central establishment the Augustinians have charge of various guilds, or societies, devoted to such aims as religion, social improvement, beneficence in the promotion of good works in the several fields of charity, patriotism, letters, and science.

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Augus'tulus, Romulus, the son of Orestes, a general of the Roman emperor Julius Nepos. Orestes deposed the emperor, and placed his son upon the throne, in 475. In the following year Odoacer, a commander of the German forces in the Roman service, revolted, put Orestes to death, obliged Augustulus to resign, and thus put an end to the Roman empire in the West. The emperor's name was originally Romulus Augustus, but the Romans changed the latter into the diminutive form Augustulus, out of contempt for his character.

Augus'tus, Gaius Julius Cæsar Octavianus, originally called GAIUS OCTAVIUS, the celebrated Roman emperor: b. 23 Sept. 63 B.C.; d. Nola, 19 Aug. 14 A.D. He was the son of Gaius Octavius and Atia, a daughter of Julia, the sister of Julius Cæsar. The Octavian family originated at Velitræ, in the country of the Volscians. The father of Octavius had risen to the rank of senator, and had gone to Macedonia, after being chosen prætor, where he was a civil and military officer. Octavius lost his father when young, but was carefully brought up by his mother and L. Marcius Philippus, the second husband of Atia. His talents gained him the regard of his great-uncle, Julius Cæsar, who declared himself willing to adopt him as his son, in case he himself should remain without children. Octavius was studying under the renowned orator Apollodorus, when he received the news of the tragic death of his uncle, and of his having adopted him as his son. Notwithstanding the anxiety of his friends, he went to Italy, and on landing at Brundusium, deputies from the veterans collected there came to him. Conducted in triumph to the city, and saluted as the heir and avenger of Cæsar, he made his adoption publicly known, and took the name of his uncle, adding to it that of Octavianus. He then advanced to Rome, where there were now two parties, that of the republicans, who had killed Cæsar, and that of Antony and Lepidus, who, under the pretense of avenging him, strove to establish their own authority. Octavianus addressed himself first to Cicero, at Cumæ, being desirous to gain over this great orator, and from thence he went to Rome, where the greater part of the magistrates, soldiers, and citizens came to meet him, Antony alone paying no attention to his return. After Octavianus had caused his adoption to be confirmed in the most solemn manner, he went to Antony, and demanded of him the inheritance left him, in order to pay the legacies mentioned in his uncle's will. Antony at first haughtily refused to acknowledge his claims, but changed his attitude when he found the influence of Octavianus continually increasing, and his own proportionably diminishing. There could be no real union, however, between two equally ambitious rivals. In their hearts they cherished reciprocal hatred and jealousy; and their enmity was so little a secret that Octavianus was accused of having wished to get Antony murdered. He afterward, when Antony, together with Lepidus, entered Italy at the head of a powerful army, united with him, and a triumvirate was formed by the three generals, who defeated the republican army under Brutus and Cassius, at Philippi in Macedonia (42 B.C.). After his return to Rome he satisfied the demands of his soldiers by dividing among them confiscated lands. This division caused great disturbances. In the midst of the stormy scenes which convulsed Italy, he was obliged to contend with Fulvia, whose daughter, Clodia, he had rejected, and with Lucius, the brother-in-law o:

Antony. After several battles, Lucius threw himself into the city of Perusia, where he was soon after obliged to surrender. The city was given up to be plundered, and 300 senators were condemned to death. After the return of Antony, an end was put to the proscriptions. Octavianus allowed such of the proscribed persons as had escaped death by flight, and whom he no longer feared, to return. There were still some disturbances in Gaul, and the naval war with Sextus Pompeius continued for several years. By a skilful course of conduct he brought about the defeat of Pompeius and reduced Lepidus to a nullity, thus leaving Antony alone as his rival. The empire was now divided between him and Antony; but while the former, in the East, gave himself up to a life of luxury, the young Octavianus pursued his plan of making himself sole master of the world. He especially strove to obtain the love of the people. He displayed mildness and magnanimity, without the appearance of striving after the highest power, and declared himself ready to lay down his power when Antony should return from the war against the Parthians. He appeared rather to permit than to wish himself to be appointed perpetual tribune — an office which gave him supreme power. The more he advanced in the affections of the people, the more openly did he declare himself against Antony.

By making public a will, wherein his rival appointed his sons by Cleopatra his heirs, he stirred up the ill-will of the Romans against him. Availing himself of this feeling, Octavianus declared war against the queen of Egypt, and led a considerable force, both by sea and land, to the Ambracian Gulf. Here his admiral Vipsanius Agrippa gained the naval victory of Actium (q.v.), which made Octavianus master of the world, 31 B.C. He pursued his rival to Egypt, and ended the war, after rejecting the proposal of Antony to decide their differences by a personal combat. Cleopatra and Antony having killed themselves, Octavianus caused them to be buried with imposing ceremonies. A son of Antony and Fulvia was sacrificed to ensure his safety, and Cæsarion, a son of Cæsar and Cleopatra, shared the same fate. All the other relations of Antony remained uninjured, and Octavianus, on the whole, used his power with moderation. He spent two years in the East, in order to arrange the affairs of Egypt, Greece, Syria, Asia Minor, and the islands. On his return to Rome he celebrated a triumph for three days in succession, and (29 B.C.) closed the temple of Janus — for the third time since the foundation of Rome. Freed from his rivals and enemies, and master of the world, he is said to have been undecided as to how he should exercise his power, or whether he should even retain it. He first set about correcting the abuses which had prevailed during the civil war, established a general peace, ejected unworthy members from the Senate, restored ruined temples, and built new ones.

At the end of his seventh consulship, he entered the Senate house, and declared his resolution to lay down his power. The Senate, astonished at his moderation, besought him to retain it. He yielded to their pressing entreaties, and continued to govern through them. He now obtained the surname of Augustus, which marked the dignity of his person and rank, and united, by degrees, in himself, the offices of imperator, or commander-in-chief by sea and land, with power to make war and peace; of proconsul over all the provinces; of perpetual tribune of the people, which rendered his person inviolable, and gave him the power of interrupting public proceedings; and, in fine, of censor, and pontifex maximus, or controller of all religious matters. The laws themselves were subject to him, and the observance of them depended upon his will. It was the spirit of his policy to retain old names and forms, but he steadfastly refused to assume the title of dictator, which latterly had become especially odious. He conducted many wars in Africa, Asia, and particularly in Gaul and Spain, where he triumphed over the Cantabrians after a severe struggle. His arms subjected Aquitania, Pannonia, Dalmatia, and Illyria, and held the Dacians, Numidians, and Ethiopians in check. He concluded a treaty with the Parthians, by which they gave up Armenia, and restored the eagles taken from Crassus and Antony. At the foot of the Alps he erected monuments of his triumphs over the mountaineers, the proud remains of which are yet to be seen at Susa and Aosta. After he had established peace throughout the empire, he again closed the temple of Janus. But this peace was interrupted, 9 A.D., by the defeat of Varus, who lost three legions in an engagement with the Germans, under Arminius, and killed himself in despair. The information of this misfortune greatly agitated Augustus. He let his beard and hair grow, and often cried out in the deepest grief, "O Varus, restore me my legions!" Meanwhile the Germans were held in check by Tiberius. During the peace, Augustus had issued many useful decrees, and abolished abuses in the government. He gave a new form to the Senate, employed himself in improving the manners of the people, particularly by promoting marriage, enacted laws for the suppression of luxury, introduced discipline into the armies, and order into the games of the circus. He adorned Rome in such a manner that it was truly said, "He found it of brick, and left it of marble." He made journeys, as Velleius says, everywhere, to increase the blessings of peace; he went to Sicily and Greece, Asia Minor, Syria, Gaul, etc.; in several places he founded cities and colonies. The people erected altars to him, and, by a decree of the Senate, the month Sextilis was called August. The debauchery of his daughter Julia gave him great pain, and he showed himself more severe against those who destroyed the honor of his family, than against those who threatened his life. History says that, in his old age, he was ruled by his wife Livia, the only person, perhaps, whom he truly loved. He had no sons, and lost by death his sister's son, Marcellus, and his daughter's sons, Gaius and Lucius, whom he had appointed his successors. Also, Drusus, his son-in-law, whom he loved, died early; and Tiberius, the brother of the latter, whom he hated, on account of his bad qualities, alone survived.

These numerous calamities, together with his continually increasing infirmities, gave him a strong desire of respose. He undertook a journey to Campania, from whose purer air he hoped for relief; but disease fixed upon him, and he died, in the 79th year of his age, and 45th of his reign. When he felt his death approaching he is said to have called for a mirror, arranged his hair, and demanded of the by-standers,

«Have I played my part well?» and, an answer being returned in the affirmative, «Then,» added he, using the form of the players, «farewell, and applaud» (*valete, et plaudite*). If this last passage in the life of Augustus is true, it is certainly indicative of his character, his policy, and even of his fortune. He conquered Brutus by means of Antony, and Antony by means of Agrippa. He several times changed his party, but never his purposes, and knew how to cause power to be offered, and pressed upon him, while it was, in fact, the object of all his exertions. It cannot be denied that he used his power with wisdom, and became the benefactor of his country, which he had previously plunged into the horrors of civil war. His taste and active mind led him to favor and protect the learned; and he even exercised the art of the poet himself; so that he was not unworthy of giving his name to an age distinguished for intellectual creations. His death plunged the empire into the greatest grief. He was numbered among the gods, and temples and altars were erected to him. See Gardthausen, 'Augustus und seine Zeit' (1891); Schuckburg, 'Augustus' (1903).

Augus'tus I., elector of Saxony: b. 1526; d. 1586. During a peaceful reign, he greatly beautified Dresden, his capital, and built the palace of Augustenburg.

Augus'tus II., Frederick, elector of Saxony and king of Poland, second son of John George III., elector of Saxony: b. Dresden, 1670; d. 1 Feb. 1733. He was noted for his activity. In 1695 he became elector and in 1696 was candidate for the vacant Polish throne. The French ambassador and the nobles supported the Prince of Conti, but Augustus by acceptance of the Roman Catholic faith, by bribery and intimidation secured the election, 27 June 1697. Early in his reign, a treaty was made between Denmark, Poland, and Russia against Charles XII. of Sweden, for the conquest of Livonia. But Charles, after having defeated the Danes and the Russians, turned toward Poland. Thus began the celebrated Northern war, which lasted 20 years. Charles gained a complete victory, 20 July 1702, and on 1 May 1703, the Saxon army was defeated again at Pultusk. The diet assembled at Warsaw declared Augustus, 14 Feb. 1704, incapable of wearing the crown of Poland, and Stanislaus Lesczinsky, waywode of Posen, was chosen king, 12 July 1704. Charles, victorious on every side, advanced into Saxony, and Augustus found himself obliged to negotiate a secret peace, at Altranstadt, 24 Sept. 1706.

He now devoted himself to the domestic affairs of Saxony. His love of splendor involved him in many expenses, by which the finances of his kingdom were disordered. In 1709, after the defeat of Charles at Pultawa, the Poles recalled Augustus, who united himself anew with Peter the Great. A confederation was now formed in Poland against the Saxon troops, by the party of Stanislaus, in the belief that Augustus was aiming at absolute power. The Saxons were attacked and obliged to surrender. At length, through the mediation of Peter, an arrangement was concluded at Warsaw, 1717, between Augustus and the Polish leaders. The Saxon troops were removed from the kingdom, and Augustus agreed not to maintain more than 17,000 soldiers in Poland, who were to be under the Polish authorities. The last years of his reign were characterized by boundless luxury and corruption of manners. He was not disliked by his subjects, and filled with dignity his station among the European powers. In his character generous ideas were united with despotic feelings, a taste for pleasure with the cares of ambition, and the restlessness of a warlike spirit with the effeminacy of a luxurious life. By his mistresses he had many children. The Countess of Königsmark bore him the celebrated Maurice of Saxony.

Augus'tus III., Frederick, elector of Saxony and king of Poland, son of Augustus II.: b. Dresden, 1696; d. there 5 Oct. 1763. He succeeded his father as elector in 1733. A part of the Polish nobility chose Augustus king; and in 1736 he was first generally recognized as such by the congress assembled at Warsaw to conclude a peace. Although without the great and amiable qualities of his father, in other respects he closely followed his example, distinguishing himself by the splendor of his feasts and the extravagance of his court. His system of politics consisted in entire dependence upon Russia. He preferred Dresden to Warsaw, and through his long absence from Poland the government sank into entire inactivity. When Frederick attacked Saxony itself in 1745, Augustus deserted his capital, and preserved his pictures and porcelain, but lost the archives of the state, which fell into the hands of the victors. By the peace of Dresden, 25 Dec. 1745, he was reinstated in the possession of Saxony, in the next year. In 1756 he saw himself involved anew in a war against Prussia, and fled to Königstein, and afterward to Poland. His authority in this country had always been inconsiderable, and after the loss of Saxony, became still more insignificant. The accession of Catherine to the Russian throne was a source of disquietude, for she sought to deprive the Saxon princes, who were allies of France, of the Polish thrones. The Peace of Hubertsberg was hardly concluded when Augustus returned from Warsaw to Dresden, where he died. His son, Frederick Christian, succeeded him as elector of Saxony, and Stanislaus Poniatowsky as king of Poland.

Auk, âk, a diving sea-fowl of the family *Alcidæ* found in the northern regions, the term covering guillemots, murres, lomvias, puffins, and others. They are thick-set birds, seldom more than a foot long, which move about with difficulty on land, from the fact that their legs are set very far back, giving them an erect, penguin-like attitude. In color they are dark brown, black, or lead-color above, and white beneath, except in the breeding season, when bright colors and ornamental plumes temporarily appear on the males of some species. The wing-feathers are so short as to be of little service for flight, and the wings are more used as aids in swimming under water, where they pursue fishes with great speed. The bill is much compressed, but in the breeding season, among the puffins, which show the most marked compression of bill at other times, the bills increase in size and develop ornamental appendages which disappear as the moulting season comes on. The most important North Atlantic auks are the now-extinct great auk (*plautus impennis*) which was as large as a goose and within historic times abounded as far south as the Hebrides

(see GAREFOWL); the little auk (*Alle alle*), not larger than a robin and very abundant, sometimes in winter coming as far south as New York and the Great Lakes (see DOVEKIE); and the razor-billed auk (*Alca torda*), which has a bill of remarkable length and sharpness, and which breeds even as far south as the Maine coast. (See MURRELET; PUFFIN; RAZOR-BILL.) The auk lays only a single large egg, which, as no nest is prepared, the parents care for by holding upon the top of their webbed feet and between their thighs. These eggs are a staple food for the natives of the arctic regions, as are the birds, also. They are taken in summer and preserved for winter use, as in the autumn the auks migrate from the frozen coasts and spend the winter in the open spaces of the sea. Consult American and British ornithologies; and Selous, 'Bird Watching' (1901).

Auld Lang Syne, âld lạng sīn, a song attributed to Burns, who added a couple of stanzas to a poem known to have existed in 1600 and set to an old Lowland air by George Thompson.

Auld Licht Idylls, âld lĭcht ī'dĭlls, a work by James M. Barrie. It is a series of 12 sketches of life in Glen Quharity and Thrums. In all of them the same characters appear.

Auld Rob'in Gray, a famous Scottish ballad by Lady Anne Barnard, published anonymously in 1722, but unacknowledged till 1825.

Au'lic (Latin, *aula,* a court or hall), a term applied to a council (the *Reichshofrath*) in the old German empire. It was one of the two supreme courts of the German empire, the other being the court of the imperial chamber (*Reichskammergericht*). It had not only concurrent jurisdiction with the latter court, but in many cases exclusive jurisdiction, in all feudal processes, and in criminal affairs, over the immediate feudatories of the emperor and in affairs which concerned the imperial government. The title is now applied in Germany in a general sense to the chief council of any department, political, administrative, judicial, or military.

Aulich, ow'lih, Ludwig, Hungarian general: b. Presburg, 1792; d. Arad, 6 Oct. 1849. After the evacuation of Pesth by the imperial troops in 1849, Aulich made his triumphant entry into that capital, and was received with enthusiasm by the people. In his famous proclamation of Gödöllö, Kossuth paid also an appropriate homage to Aulich's gallantry. Subsequently, when Görgey was forced to renounce either the army or the ministry of war, he took the latter alternative, and Aulich was appointed his successor. But although he might have used his authority as minister of war to frustrate Görgey's negotiations with the Russians, he actually assisted Görgey to bring these negotiations to a successful close. He was then delivered over to Austria by the Russians, and, in company with 12 others, perished on the gallows.

Au'lis, in ancient Greece, a seaport in Bœotia, on the strait called Euripus, between Bœotia and Eubœa, noted chiefly for its temple of Artemis, and as the scene of the sacrifice of Iphigenia.

Aullagas, owl-lä'gas, a salt lake in Bolivia, which receives the surplus waters of Lake Titicaca through the Rio Desaguadero, and has only one perceptible, insignificant outlet. The disposition of its superfluous water is, therefore, still a matter of uncertainty.

Au'lula'ria (from *Aulula,* a pot), a comedy by Plautus. Euclion, an old miser, is the principal character.

Aumale, ō-mal', **Henri Eugène Philippe Louis d'Orleans, Duke of,** 4th son of king Louis Philippe: b. Paris, 16 Jan. 1822; d. 7 May 1897. He entered the military service at the age of 17, and distinguished himself by his bravery. At the age of 20, he was promoted to the rank of brigadier-general, and was sent to Algeria, in October 1842. Intrusted with the command of the district of Medeah, he attacked the smala of Abd el Kader with such impetuosity that in less than two hours the emir's troops were entirely routed. As a reward, Aumale was made lieutenant-general and commander of the province of Constantine. In 1847, the young prince, but 25 years old, was intrusted with the general governorship of Algeria, which was taken from the hands of Marshal Bugeaud. This appointment was not approved either by the army or the French nation, and it was the occasion for loud complaints against the ambition of the king, who was concentrating the direction of the whole military service in the hands of his sons. After the revolution of 1848, he went to England, where he devoted his attention to literary pursuits. His latest years were passed in Sicily. He wrote 'Les Institutiones Militaires de la France' (1867); 'Histoire des Princes Conde' (1869).

Aumale, a town in France, 35 miles northeast of Rouen, which has given titles to several notables in French history: Jean d'Arcourt, Eighth Count d'Aumale, fought at Agincourt, and defeated the English at Gravelle (1423). Claude II., Duc d'Aumale, one of the chief instigators of the Massacre of St. Bartholomew, was killed 1573. Charles de Lorraine, Duc d'Aumale, was an ardent partisan of the League in the politico-religious French wars of the 16th century. Pop. (1900) 2,219.

Aumont, ō-môn', the name of one of the great historical families of France. The first Aumont mentioned in history is JEAN III., SIRE D'AUMONT, who, in 1328, took part in the battle of Cassel, and served under Philip de Valois, on many other important occasions. A more distinguished member of the family was JEAN D'AUMONT: b. 1522; d. 1595. He was on the battlefield almost from his cradle to his grave, and served under six kings: Francis I., Henry II., Francis II., Charles IX., Henry III., and Henry IV. ANTOINE D'AUMONT: b. 1601; d. 1669; served with distinction under Louis XIV., and in 1662 was appointed governor of Paris. LOUIS MARIE VICTOR D'AUMONT and DE ROCHEBARON: b. 1632; d. 1704; took an active part in the war in Flanders under Louis XIV., was governor of Boulogne and the Boulonnois, and member of the academy of inscriptions and belles-lettres. JACQUES, DUC D'AUMONT: b. 1732; d. 1799; was the commandant of the national guard, on 5 Oct. 1789, when Louis XVI. was forcibly taken away from Versailles. LOUIS MARIE CÉLÉSTE DE VIENNE, DUC D'AUMONT: b. 1762; d. 1831; served in Germany, Spain, and Sweden, until the restoration, when he was appointed lieutenant-general. He made

himself very useful to the cause of royalty in suppressing the troubles in Normandy, and in 1815 was created peer of France, and raised to the office of first chamberlain. He was one of the most prominent men at the courts of Louis XVIII. and Charles X., but he exchanged politics for theatres, and became the chief director of the comic opera.

Aungerville, ân'gėr-vĭl, **Richard,** known as Richard de Bury (from his birthplace, Bury St. Edmunds), an English statesman, bibliographer, and correspondent of Petrarch: b. 1281; d. 1345. He entered the order of Benedictine monks, and became tutor to the Prince of Wales, afterward Edward III. Promoted to several offices of dignity, he ultimately became Bishop of Durham, and Lord Chancellor of England. He made the acquaintance of many of the eminent men of the day, and was a diligent collector of books. He was the author of 'Philobiblon,' 'Epistolæ Familiarium,' including letters to Petrarch, etc.

Aura. See Epilepsy.

Au'ramine. See Coal Tar Colors.

Aurangabad, ow-rŭn'ga-bäd', a town in India; 175 miles from Bombay, and on the Kaum River, a small tributary of the Godavery. It is surrounded by walls with semicircular towers at the different angles, and contains a ruined palace of Aurengzebe and a mausoleum erected to the memory of his favorite wife. A mile to the west of the town are cantonments for cavalry, infantry, and artillery. Aurangabad was founded early in the 17th century, and rose to be a considerable trading centre, but its commercial importance decreased when Hyderabad became the capital of the Nizam. In late years the trade has revived considerably, and embraces wheat, cotton, and manufactured goods. Pop. (1891) 33,887.

Auran'tia. See Coal Tar Colors.

Au'rates. See Auric Acid.

Aurbacher, owr'bä-hėr, **Ludwig,** German author: b. 1784; d. 1847; well remembered by his 'Volksbüchlein' (1827–9); a collection of popular tales, ranking among the best productions of this kind in German literature.

Aure'lia. See Jellyfish.

Aure'lian, Lucius Domitius Aurelianus, one of the later emperors of Rome: b. about 212; d. 275. He was the son of a peasant of Illyricum, and rose to the highest rank in the army, and even to the consulate; which good fortune was increased by a wealthy marriage. Claudius II., on his death-bed, in 270, recommended Aurelian to the choice of the troops of Illyricum, who readily acceded to his wishes. He delivered Italy from the barbarians, reduced Tetricus, who had been unwillingly made to assume the purple in Gaul, and conquered the famous Zenobia, queen of Palmyra. Aurelian followed up his victories by the reformation of abuses, and the restoration throughout the empire of order and regularity, but tarnished his good intentions by the general severity of his measures, and the sacrifice of the senatorian order to his slightest suspicions. He had planned a great expedition against Persia, and was waiting in Thrace for an opportunity to cross the straits, when he lost his life by assassination, the result of a conspiracy excited by a secretary whom he intended to call to account for peculation. Aurelian was a wise, able, and active prince, and well deserved the title given him by the Senate of "Restorer of the Roman Empire."

Aure'lian, a historical novel by William Ware, an American author born in 1797. It was first published in 1838 under the title 'Probus,' and was a sequel to 'Letters of Lucius M. Piso,' published the year before; and like that novel, written in the form of letters. The full title is 'Aurelian; or, Rome in the Third Century. In Letters of Lucius M. Piso, from Rome, to Fausta, the daughter of Gracchus at Palmyra.' The novel presents a singularly faithful picture of the Rome of the second half of the 3d century.

Aure'lian Wall, a wall around Rome, built mostly by the emperor Aurelian, but completed in the reign of Probus. It was almost 12 miles long, and 54 feet high, enclosing an area of 5,000 square miles, and marking the boundaries of Rome in the time of Aurelian. The wall was built in great haste as a defense against the barbarians, and includes the remains of house- and garden-walls. It was fairly well preserved until recently, but is now rapidly falling to decay.

Aure'lius Antoninus, Marcus, often called simply Marcus Aurelius, a distinguished Roman, and according to Canon Farrar, "the noblest of pagan emperors": b. Rome, 29 April 121 A.D.; d. Vindobona,— the modern Vienna — 17 March 180 A.D. He was descended from an illustrious line which tradition declared extended to the good Numa, the second king of Rome. In the descendant Marcus were certainly to be found, with a great increment of many centuries of noble life, all the virtues of his illustrious ancestor. Doubtless the cruel persecutions of the infamous emperors who preceded Hadrian account for the fact that the ancestors of Aurelius left the imperial city and found safety in Hispania Bætica, where in a town called Succubo, — not far from the present city of Cordova — the emperor's great-grandfather, Annius Verus, was born. From Spain also came the family of the emperor Hadrian, who was an intimate friend of Annius Verus. The death of the father of Marcus Aurelius when the lad was of tender years led to his adoption by his grandfather and subsequently by Antoninus Pius. By Antoninus he was subsequently named as joint heir to the imperial dignity with Commodus, the son of Ælius Cæsar, who had previously been adopted by Hadrian. From his earliest youth Marcus was distinguished for his sincerity and truthfulness. "Hadrian's bad and sinful habits left him," says Niebuhr, "when he gazed on the sweetness of that innocent child. Punning on the boy's paternal name of Verus, he called him Verissimus, 'the most true.'" Among the many statues of Marcus extant is one representing him at the tender age of eight years offering sacrifice. He was even then a priest of Mars. It was the hand of Marcus alone that threw the crown so carefully and skilfully that it invariably alighted upon the head of the statue of the god. The entire ritual he knew by heart. The great emperor Antoninus Pius lived in the most simple and unostentatious manner; yet even this did not satisfy the exacting, lofty spirit of Marcus. At 12 years

of age he began to practise all the austerities of Stoicism and became a veritable ascetic. He ate most sparingly; slept little, and when he did so it was upon a bed of boards. Only the repeated entreaties of his mother induced him to spread a few skins upon his couch. His health was seriously affected for a time; and it was, perhaps, to this extreme privation that his subsequent feebleness was largely due. His education was of the highest order of excellence. His tutors, like Nero's, were the most distinguished teachers of the age; but unlike Nero, the lad was in every way worthy of his instructors. His letters to his dearly beloved teacher, Fronto, are still extant, and in a very striking and charming way they illustrate the extreme simplicity of life in the imperial household in the villa of Antoninus Pius at Lorium by the sea. They also indicate the lad's deep devotion to his studies and the sincerity of his love for his relatives and friends. When his predecessor and adoptive father Antoninus felt the approach of death, he gave to the tribune who asked him for the watchword for the night the reply "Equanimity," directed that the golden statue of 'Fortune' that always stood in the emperor's chamber be transferred to that of Marcus Aurelius, and then turned his face and passed away as peacefully as if he had fallen asleep. The watchword of the father became the life-word of the son, who pronounced upon that father in the 'Meditations,' one of the noblest eulogies ever written. It would be impossible here to detail even briefly all the manifold public services rendered by Marcus Aurelius to the empire during his reign of 20 years. Among his good works were these: the establishment, upon eternal foundation, of the noble fabric of the civil law — the prototype and basis of Justinian's task; the founding of schools for the education of poor children; the endowment of hospitals and homes for orphans of both sexes; the creation of trust companies to receive and distribute legacies and endowments; the just government of the provinces; the complete reform of the system of collecting taxes; the abolition of the cruelty of the criminal laws and the mitigation of sentences unnecessarily severe; the regulation of gladiatorial exhibitions; the diminution of the absolute power possessed by fathers over their children and of masters over their slaves; the admission of women to equal rights to succession to property from their children; the rigid suppression of spies and informers; and the adoption of the principle that merit, as distinguished from rank or political friendship, alone justified promotion in the public service. But the greatest reform was the reform in the imperial dignity itself, as exemplified in the life and character of the emperor. It is this fact which gives to the 'Meditations' their distinctive value. The infinite charm, the tenderness, and sweetness of their moral teachings, and their broad humanity, are chiefly noteworthy because the emperor himself practised in his daily life the principles of which he speaks, and because tenderness and sweetness, patience and pity, suffused his daily conduct and permeated his actions. The horrible cruelties of the reigns of Nero and Domitian seemed only awful dreams under the benignant rule of Marcus Aurelius. It is not surprising that the deification of a deceased emperor, usually regarded by senate and people as a hollow mockery, became a veritable fact upon the death of Marcus Aurelius. He was not regarded in any sense as mortal. All men said he had but returned to his heavenly place among the immortal gods. As his body passed, in the pomp of an imperial funeral, to its last resting-place, the tomb of Hadrian,— the modern Castle of St. Angelo at Rome, — thousands invoked the divine blessing of Antoninus. His memory was sacredly cherished. His portrait was preserved as an inspiration in innumerable homes. His statue was almost universally given an honored place among the household gods. And all this continued during successive generations of men. Marcus Aurelius has been censured for two acts: the first, the massacre of the Christians which took place during his reign; the second, the selection of his son, Commodus, as his successor. In extenuation of his persecution of the followers of Christianity, it has been alleged in his behalf that he was deceived by evil councillors, who misrepresented the conduct of the Christians to him. This excuse impinges upon his wisdom as a ruler and his admittedly wide knowledge of the conditions of the empire. It is further urged that when we take into consideration the environment of the emperor, no just cause for condemnation of his course remains. He imbibed a bitter prejudice against the new religion from his beloved friend and instructor, Fronto. In the writings of Epictetus, whom he greatly revered, he found severe condemnation of the Christians as fanatics. With such a profound natural bias, it is urged, it is no wonder that he was led to regard the new creed with aversion. But the reason of his course is to be found rather in his deep-rooted attachment to the heathen beliefs of his ancestors and of the empire. It was rather his fear that the ancient cult, bound up as it seemed in the character of Roman rule, was seriously menaced by the progress of Christianity, which actuated him to the severe and bloody measures he took to root out a dangerous rival. Regarding Christianity as a «pernicious sect,» a «secret conspiracy» against the empire, an «immoral superstition,» whose poison was eating into the social life, and himself as the conservator of the empire and its traditions, some extenuation might be conceded to such fierce zeal in persecuting the Christians in almost any other emperor that Marcus Aurelius. For there is a glaring inconsistency in his character in the adoption of so cruel and monstrous a course by one who appears otherwise so admirable. In this signal instance he is as bloody and heartless as a Domitian, a Nero or a Caligula; in all other things merciful, in this pitiless; in his general administration, just and humane; in this, singularly unjust and even vindictive. Whatsoever may be urged in his defense, this relentless persecution of the Christians is a dark blot on his fame. Whatever extenuating circumstances may seem to condone it, his policy in this instance was utterly inconsistent with his general character.

His first edict against the Christians was published in 177. Multitudes perished in the fierce persecutions which followed. Notable amongst the victims were St. Polycarp in Smyrna and St. Caecilia at Rome. The manner in which they were tortured before being relieved from sufferings by death was more befitting a savage chief than a civilized ruler.

Of the appointment of Commodus as his successor, it may be said that the paternal heart hoped against hope for filial excellence. Marcus Aurelius believed, as clearly appears from many passages in the 'Meditations,' that men did not do evil willingly, but through ignorance; and that when the exceeding beauty of goodness had been fully disclosed to them, the depravity of evil conduct would appear no less clearly. The emperor who, when the head of his rebellious general was brought to him, grieved because that general had not lived to be forgiven; the ruler who burned unread all treasonable correspondence, would not, nay, could not believe in the existence of such an inhuman monster as Commodus proved himself to be. The appointment of Commodus was a calamity of the most terrific character; but it testifies in trumpet tones to the nobility of the emperor's heart, the sincerity of his own belief in the triumph of right and justice. See Farrar, 'Seekers after God' (1868); Renan, 'Marc Aurèle' (1881); Pater, 'Marius the Epicurean.'

Aure'lius Victor, Sextus, Roman historian of the 4th century whose 'History of the Cæsars' is a collection of biographical sketches of the emperors from Augustus to Constantine.

Aurengzebe, â'rĕng-zēb'. See AURUNGZEBE.

Au'reo'la, or Aureole, in paintings, an illumination surrounding a holy person, as Christ, a saint, or a martyr, intended to represent a luminous cloud or haze emanating from him. It is generally of an oval shape, but may be nearly or quite circular, and differs from the nimbus surrounding the heads of sacred personages in being an emanation of light from the whole body.

Aure'osin. See COAL TAR COLORS.

Aureus, â'rę-ŭs, or **Aureus Nummus,** the earliest gold coin of Rome, coined 207 B.C., in the second Punic war. It weighed 2 denarii, and 1 quinarius, and was worth 25 denarii, or 100 sesterces. In later times it was called *solidus,* but had diminished in value.

Auric Acid. Trioxid of gold, Au_2O_3, does not combine with acids to form salts, but a hydrated form of the oxid, $Au_2O_3.H_2O$, is known, which unites with bases to form salts. From this acid-like property, the hydrated oxid has been called "auric acid." Compounds of auric acid with bases are called "aurates." Aurate of potassium, $Au_2O_3.K_2O.3H_2O$, is a crystalline substance, readily dissolving in water with the formation of an alkaline solution. When digested with ammonium sulphate, it yields an aurate of ammonia of undetermined composition, called "fulminating gold." This substance, yellowish-brown in color when in the solid form, decomposes explosively upon percussion, or when heated to 212° F.

Aurichal'cite (-kal'-), a native basic carbonate of copper and zinc, usually occurring in beautiful bright blue or green, pearly incrustations, composed of ill-defined monoclinic (?) crystals or scales. Its hardness is 2, and its specific gravity about 3.6. It has been found in Greece, Italy, England and various other European countries, and in fine specimens at Morenci in Arizona, Magdalena in New Mexico, in Colorado, Montana, Utah and elsewhere.

Auricle. See EAR.

Auricles of the Heart. See HEART; CIRCULATION.

Auric'ula, a hardy perennial herb, *Primula auricula,* of the natural order *Primulaceæ,* found in the mountainous parts of central Europe. The wild plant has an umbel of small yellow flowers on a short stalk, which rises from a set of radial leaves. By selection a very large number of varieties have been produced. These have long stalks and very diversely colored, fragrant large flowers, for which the plant is widely cultivated in Europe. Since the climate of the United States is hot and dry, the plant is almost confined to greenhouses. It is propagated by means of seeds and offsets, and succeeds best on rich, light, loamy soil.

Auric'ular Confes'sion. See CONFESSION; PENANCE; SACRAMENTS.

Au'rifa'ber, the Latinized name of JOHANN GOLDSCHMIDT, one of Luther's friends: b. 1519; d. Erfurt, 1579. He became pastor at Erfurt in 1566. He collected the unpublished manuscripts of Luther, and edited the 'Epistolæ' and the 'Table-Talk.'

Auri'ga, in astronomy, the Wagoner, a constellation of the northern hemisphere, containing as its chief luminary Capella, a star of the first magnitude.

Aurillac, ō're-yak', a town of France, 272 miles south of Paris. It is noted for its ancient buildings, among which are the Church of Notre Dame, constructed in the 13th century, and the castle of St. Stephen. It has manufactures of jewelry, copper, kettles, paper, woolen stuffs, and carpets. Pop. (1896) 13,531.

Au'rin, Au'rine, a trade name for impure rosolic acid.

Au'ringer, Obadiah Cyrus, American poet: b. Glens Falls, N. Y., 4 June 1849. He served for some years in the United States navy. In 1875 he became a farmer in his native place. Among his works are: 'Voices of a Shell,' 'Scythe and Sword' (1887); 'Episode of Jane McCrea'; and 'The Book of the Hills.'

Aurochs, ä'rŏks, the European bison (*Bos bonasus,* or *Bison europæus*) called by the Germans "wisent" and in the Slavonic languages "zubr" or "suber." This great bison stands six feet or more in height at the shoulder, and closely resembles the American bison or "buffalo" (q.v.); it is believed, indeed, that the American animal descended from the ancestral race of aurochs. When the Romans spread northward into Europe they found these and other oxen in the forests wherever they went, and even down to the days of Charlemagne they were spread over Germany and were beasts of chase. They have steadily diminished, however, until now they exist only as a single herd in the royal forest-preserves of Bielovege, in Lithuania, which in 1899 numbered 700, while a few hundred roam in the Caucasian Mountains. See BISON.

Aurora, Ill., city, Kane County; on Fox River, and on the Chicago, B. & Q., the Chicago & N. W., the Elgin, J. & E., and the Illinois, I. & M. R.R.'s. It was founded in 1834 by Joseph and Samuel McCarty; was organized as a village in 1857, and was incorporated as a city in 1887. It is an important manufacturing city, having a variety of extensive establishments; these include the shops of the Chicago, Burling-

ton & Quincy Railroad, cotton mills, a wheel-scraper manufactory, carriage and wagon factories, smelting-works, and foundries and machine shops. There are five national banks with a combined capital of $600,000, and a State bank. There are 38 churches, a good system of public schools including two high schools, the East Aurora High School and the West Aurora High School, the latter established in 1870; and a public library, a building for which was presented by Andrew Carnegie. It is also the seat of Aurora Business College and of the Jennings Seminary for young women. The government is vested in a mayor and a city council of 14, seven of which are elected each year for a term of two years; the city officials are elected by the people. The waterworks and the electric light plant are owned and operated by the city. Pop. (1890) 19,688; (1900) 24,147; (1904; estimated) 28,000.

Auro'ra, Ind., town in Dearborn County, on the Ohio River; C., C., C. & St. L., and the Ohio and Miss. R.R.'s. It has regular steamboat connection with Cincinnati. There are extensive car shops here, and a large grain and hay trade. Pop. (1900) 3,645.

Auro'ra, Mo., a city in Lawrence County, situated on the Kansas City, Fort Scott, and Memphis R.R.'s., about 18 miles northwest of Pierre City. The chief industries are fruit growing, lead and zinc mining, and farming. There are also flour mills, foundries, and machine shops. Aurora has two banks with $75,000 capital. Pop. (1900) 6,191.

Auro'ra, N. Y,. a village in Cayuga County, situated on Cayuga Lake; 25 miles northwest of Ithaca; on the Lehigh Valley R.R. It is the centre of an agricultural region, and is a residental town and excellent summer resort. It is the seat of Wells College for Women. Pop. (1900) about 1,000.

Auro'ra (Greek, *Ēōs*), in mythology, daughter of Hyperion and Theia, and sister of Helios and Selene. She is goddess of the dawn; rises from the ocean, drawn by the celestial horses, Lampus and Phæthon, and with rosy fingers raises the veil of night, shedding light upon the world.

Auro'ra, a famous painting by Guido Reni, on the ceiling of the Casino Rospigliosi in Rome.

Auro'ra Bo'rea'lis (French, *aurore boréale;* German, *Nordlicht*), the northern light. An illumination in the sky, seen oftenest north of middle latitudes in the northern hemisphere, and south of them in the southern hemisphere. In our hemisphere it is generally visible in the north, and has, therefore, been called the Aurora Borealis. In the southern hemisphere it is called the Aurora Australis.

The frequency with which it is seen varies with the latitude of the place. It is comparatively rare within 45° of the equator, but becomes more frequent toward the north up to the latitudes of about 60°, where it sometimes becomes almost a nightly occurrence. Nearer the pole it again becomes less frequent. We shall first describe it as it is commonly seen in our own latitudes. The first noticeable phenomena commonly occurs after the end of twilight, when the northern sky near the horizon will be seen illuminated with a light somewhat like that of the dawn. Careful examination will show, however, that the illumination is in the form of a broad arch, highest near the magnetic north, and reaching the horizon in the northeast and northwest directions. Presently beams of light are seen crossing this arch with a quivering or flickering motion, and shooting toward the zenith. Each beam constantly varies in brightness and seemingly fades away to give place to another.

In more northern latitudes, say north of 45° or 50°, these beams form the most brilliant feature of the aurora. Sometimes they are arranged in curved, wavy lines like the slats of a window shade flying in the wind, giving the appearance of a scroll in the process of being unrolled. In the case of a very brilliant aurora the beams may cover almost or quite the entire sky. In this case they will be seen to converge toward a point commonly not far from the zenith. The appearance presented by the beams grows out of the direction in which they are seen and to the laws of perspective. Long-repeated observations show that the rays are really parallel to the direction of the dipping needle, or to the lines of the earth's magnetic force. In the latitudes which we have mentioned, the dip is commonly more than 60°, increasing to 90° at the magnetic pole; hence when a great number of beams, all parallel to each other, are viewed from a point on the earth's surface under the region in which they are found, they all seem to converge according to the laws of perspective, toward that part of the sky to which the upper (south) pole of a dipping needle is directed. If the parallelism to the magnetic lines is exact, the direction of this point should be the same as that of the compass needle itself. It is still an open question where the parallelism is exact. Many observations seem to show a deviation of 10° or more, but the determination of the exact centre of convergence is difficult unless the rays are so numerous as to cover a large part of the sky, and it is not certain that the deviation may not be due to errors of estimation.

The Nature of the Auroral Light.—As a general, perhaps universal, rule, the rays or beams which we have described have a slightly yellowish tinge. When their light is analyzed with the spectroscope, several lines, sometimes as many as 12, are found in the spectrum. Of these the brightest and most constant is in the yellowish green part of the spectrum, having a wave length of 557. This line is characteristic of the aurora, but has not been identified with that emitted by any known substance.

The light of an aurora does not proceed wholly from the beams. Very irregular sheets of light, having the appearance of thin luminous clouds, are often seen. These are of various colors, red being especially frequent. The appearance is then that of a red cloud illuminated by the rays of the sun sometime after the latter has set. The light can, however be easily distinguished from that of a cloud by its diffused character and the absence of any definite outline. The height of the region in which the auroras are formed has never been definitely determined. The most important question is, whether the height is, in any case, above the upper limit of the atmosphere. This question is all the more difficult in that this limit is in itself an uncertain quantity. Observations of shooting

stars show that these objects become visible at a height of about 100 miles above the earth's surface. The limit of the atmosphere must therefore be as high as this, and may be much higher. The difficulty of making observations upon the same auroral beams, at one moment, at different points of the region from which they are visible, is such that no exact determination of the height of a beam has ever been made. There is some reason to believe that the height may range from 100 to 150 miles, but there is no reason to believe that a beam is ever seen above the possible limit of the atmosphere.

The lower limit of the aurora is undetermined. Observers have sometimes been supposed to see a beam between their own position and a mountain or other terrestrial object, but this was probably one of those optical illusions from which even the best observers can scarcely free themselves. It is also very frequently believed in countries where auroras are numerous that the phenomenon is accompanied by a crackling sound, somewhat resembling the rustling of silk or straw. As these sounds have been more difficult to hear, the more accurate and well-trained the ear of the observer, the presumption is that they are entirely illusory. It is a well-known psychological fact that when a phenomenon is seen which is commonly associated with sound, many people fancy that the latter is heard even in cases where it is manifestly impossible. A familiar instance of this sort is the rocket-like sound which many persons fancy to accompany the passage of a brilliant meteor through the air. Apart from the fact that such a sound could not possibly have come from the meteor, we have the fact that only untrained observers ever hear these sounds.

Cause of the Aurora.— Science has not been able to as yet determine with certainty and precision the cause of this very common phenomenon. When the luminous effect produced by the passage of electricity through the highly rarefied air of a vacuum tube was first observed, its resemblance to the aurora led to the view that the latter was produced by electric currents in the upper regions of the atmosphere. Although it is not impossible that such currents may be associated with the aurora, they do not adequately explain its light, and are apparently inadequate to explain its rays. Yet there is no doubt that the aurora is associated in some way with the magnetism of the earth. The coincidence of the rays of the aurora with the direction of the magnetic needle is one proof of this relation; another proof is found in the relation of the aurora to magnetic storms. The general rule is, that a very brilliant aurora is associated with such a storm, disturbing the magnetic needle not only at the point where the aurora is visible, but perhaps over the whole earth. Earth currents so strong that from time to time a line of telegraph may be run by them are also occasional accompaniments of a brilliant aurora, but although the intimate connection of the two phenomena is so well established, the exact relationship is yet to be worked out. In recent years Arrhenius has propounded a theory, based on the very probable fact that the sun emits a flood of corpuscles of a nature similar to that of the mysterious rays known as X-rays, cathode rays, electrons, etc., the investigation of which has occupied so large a place in recent physics. His theory is, that these corpuscles on approaching the earth are acted on in the direction of the lines of its magnetic force round which they describe helices. While nothing as yet has been found to disprove this theory, it is one which still needs much proving. What can be said with reasonable probability is that the aurora is caused by irregular emanations of corpuscles from the sun, which are stopped in the upper regions of our atmosphere.

Periodicity of the Aurora.— Records of auroras extending back two centuries or more show that they have been much more numerous at some period than at others. Sometimes it has been supposed that they have been more numerous at intervals of 33 or some fixed number of years, but this has not yet been proved, nor has any law been determined by which we can definitely say at what times they appear in the greatest number. But several periods are observed which show that the appearance of the aurora is in some way connected with the sun. The first instance of this is the fact that they are more numerous when the spots of the sun are more numerous. As there is an 11-year period in the spots on the sun, so there is a corresponding period in the aurora. There is also a semi-annual period in the frequency of the aurora, the greatest number being observed in March and September and the smallest in June and December. Arrhenius has connected this with the fact that in March and September the earth is over the region of the sun's surface in which spots are more numerous. Statistics also show that there are more auroras in the northern hemisphere when the moon is south of the equator than when she is north. This, however, is not proved to be a general law. There is also an observed period of 25.93 days in the frequency of the aurora. This is so near the time of the sun's rotation that it may be connected with the latter. Consult: Angot, 'The Aurora,' International Scientific Series.

SIMON NEWCOMB, LL.D.

Auro'ra Leigh, lē, a blank verse novel by Mrs. Browning, published 1857. The book discusses various theories for the regeneration of society, and is filled with passages of great beauty, and ethical utterances of a lofty nature.

Aurungzebe, â'rŭng-zēb', the last important emperor of Hindustan, of the Mogul dynasty: b. 22 Oct. 1618; d. Ahmednuggur, 21 Feb. 1707. He was the son of Shah Jehan, and properly named Mohammed, but received from his grandfather that of Aurungzebe (Ornament of the Throne), by which he is known to history. Aurungzebe, in 1658, was crowned sole monarch of the great Mogul empire.

Ausable (ō-sä'b'l) **Chasm,** a picturesque and popular American summer resort, in New York State; 12 miles from Plattsburg, and 1 mile from Keeseville. It is an isolated formation, wholly independent of, and disconnected from, any other similar panorama. At the beginning of the chasm, the river is hemmed into a channel not more than 10 feet wide by walls of rock from 100 to 200 feet high. Lower down the walls gradually spread apart till in some places there is a distance between them of 50 feet, and then extend with sharp turns and occasional enlargements for nearly 2 miles.

Lateral fissures, narrow, and deep, project from the main ravine at nearly right angles, and through one of these a staircase of over 200 feet reaches to the abyss. The walls are formed of laminæ of sandstone, laid in precise and regular order, and their crevices are filled with a thick growth of hardy pines and cedars. The trip through the chasm may be made in a small boat or on foot. For the accommodation of tourists, stone walks with substantial iron railings and firm bridges have been constructed.

Auscultation, a method of examining the body by means of the sounds given to the ear. The naked ear may be used, or instruments, such as the stethoscope (q.v.), or the phoneidoscope be employed. The natural sounds may be alone investigated, as in listening to the breathing sounds, or the heart sounds, or the organ, or that portion contiguous or remote from the organs, may be tapped, or percussed, to determine variations in the resonance. All of the parts of the body may be investigated by these means. Auscultation is probably, next to inspection, the oldest mode of investigation. Hippocrates II. used it extensively, but it was not until Lænnec, in 1816, gave his demonstrations that the method came to be recognized as one of the most important in the diagnosis of diseased conditions. Consult Butler, 'Diagnostics of Internal Medicine' (1901); Sahli, 'Untersuchungsmethoden.' See Percussion.

Auso'nia, a poetical synonym for Italy; so used by Virgil and other Roman poets.

Auso'nius Decimus Magnus, the most distinguished Roman poet of the 4th century A.D.: b. Burdigala (Bordeaux) about 310; d. about 392. He studied under several distinguished masters, and became at last professor of rhetoric in his native city, whence his fame extended through the whole empire. Valentinian intrusted to him the education of his son, Gratian, and appointed him afterward quæstor and prætorian prefect. After Gratian had ascended the throne he showed himself not less grateful to his preceptor. About the year 379 he appointed him consul in Gaul. After the death of Gratian, Ausonius lived upon an estate at Bordeaux, devoted to literary pursuits. As Valentinian was of the Christian religion, it is probable that Ausonius was so, too; and many of his writings confirm this conjecture. Critics are not unanimous on the subject of his poetical merits. He is undeniably learned and ingenious, but his style and versification have the blemishes of the age, and his Latin is impure. His epigrams, idyls, eclogues, letters in verse, etc., are extant. The best edition is that of 'Peiper' (1886).

Aus'pices, among the Romans, omens, especially those drawn from the flight or other movements of birds, supposed to be indications of the will of heaven, and to reveal futurity. At first only the augurs took the auspices, but after a time civil officers, discharging important functions had the right of doing so. Two kinds of auspices, however, arose — a greater and a lesser; the former reserved to dictators, consuls, censors, prætors, or the commander-in-chief in war; the latter permitted to less exalted functionaries. The glory of a successful enterprise was universally assigned to the person who took the auspices, and *not* to the leader of the enterprise itself; hence, the phrase arose, to carry on a war "under the auspices" of the emperor or some other high authority. See Augurs.

Aussig, ow'sĭg, a town in Bohemia, near the junction of the Bila with the Elbe; 42 miles north-northwest of Prague. It has large manufactures of woolens, chemicals, etc. Pop. (1901) 38,407.

Austen, Jane, English novelist: b. Steventon, Hampshire, 16 Dec. 1775; d. Winchester 18 July 1817. Miss Austen was the daughter of the Rev. George Austen, rector of Steventon and Deane, and Cassandra Leigh Austen, daughter of the Rev. Thomas Leigh and niece of Theophilus Leigh, for many years master of Balliol College, Oxford. Jane was the youngest of seven children, of whom others besides herself, particularly Admiral Francis William Austen, became distinguished. Until 1801 she lived at Steventon. Her life here was quiet, domestic, and moderately studious. Much of her spare time she spent in writing, chiefly for her own amusement. In 1801 the family removed to Bath, whence Miss Austen made visits to Lyme, Southampton, and other places in the south of England. Her father died in 1805, and in 1809 she settled at Chawton, in Hampshire, where she remained until within two months of her death. In May 1817, after some months of ailing health, she went to Winchester for treatment, and there died in the following July.

Miss Austen began writing stories at an early age, and before 16 is said to have composed good-humored nonsense. The first of her extant novels, 'Pride and Prejudice,' was written between October 1796 and August 1797. Before that she had written 'Eleanor and Marianne,' which, in 1797–98, she altered into the present 'Sense and Sensibility.' Her third novel, 'Northanger Abbey,' belongs to 1798. The first of these novels to be published was 'Sense and Sensibility,' in 1811. Two years later 'Pride and Prejudice,' which had been refused by a publisher in her father's lifetime, made its appearance. 'Northanger Abbey' had an even longer period of darkness; in 1803 it had been sold to a publisher for £10, but the publisher, after keeping it ten years or more, sold it back to the family, by whom it was issued in 1818, the year after the author's death. In 1804, Miss Austen began 'The Watsons,' but never finished it, and until 1811 apparently did comparatively little writing. Between that year and 1816, however, she wrote 'Mansfield Park,' 'Emma,' and 'Persuasion,' published respectively in 1814, 1816, and 1818. There is also an unfinished story, 'Lady Susan.'

The novels were not especially popular in the author's lifetime, though Scott and Macaulay (a little later) paid sincere and high tribute to their excellence. To-day they are regarded as among the best novels in the language and are probably as widely read as those of any first-rate woman novelist in English. The reason for their high place appears to lie in Miss Austen's skill as a story-teller and a drawer of character. The people she deals with are chiefly from the higher middle classes in the English country, and she rarely goes above or below them. In a time, that of the Napoleonic wars, when there was every temptation to write battle stories and heroics, Miss Austen kept her eye on the life

that she knew, and had nothing to do with spectacular means of arousing interest. The aspect of the few warriors and seamen who come into her pages is domestic rather than martial. Nor is there any very serious adventure of any sort; the worst that happens is an elopement, or when a heroine slips down stairs and is stunned. Her people are quite unintellectual and in no wise grand or heroic. On the whole, her material is less startling than that of any English novelist, but the picture which she gives is unsurpassed in the perfection of truth, humor, and vivacity. As a story-teller, she has, in point of technical construction, no superior. Her plots are not elaborate and there is no conspicuous wealth of invention; in all her six novels the plot turns on an elopement or a hidden engagement; but, granting this, the construction of 'Pride and Prejudice,' 'Emma,' and 'Mansfield Park' is not to be bettered. They are models of their class of story telling. As an artist in character drawing, Miss Austen has contributed to the gallery of familiar persons such figures as Miss Bates, Mr. Woodhouse, Mrs. Bennet, Mrs. Norris, and a number of others, all of whom are brilliant, though occasionally exaggerated, creations. All her important characters are strongly individual, and are so firmly drawn that there is no tendency to confuse them as types or as persons.

'Pride and Prejudice' is usually regarded as the best of the novels in point of liveliness of style, neatness of structure, and vigor of substance. This position would be disputed by admirers of the more intricate 'Emma' and the more intricate and gloomy 'Mansfield Park,' both of which probably surpass 'Pride and Prejudice' in maturity and variety of characterization. 'Northanger Abbey' is less ambitious than either of the preceding; it is a very vivacious burlesque, with a charming moral. The other two novels, 'Sense and Sensibility' and 'Persuasion,' are usually thought to be inferior.

Bibliography.— Excellent editions of the novels of Jane Austen are easily to be had. The principal life is the Rev. J. E. Austen Leigh's 'Memoir of Jane Austen.' There is also a life by Goldwin Smith in the 'Great Writers' series (1890). The place of Jane Austen in literature is treated in such literary histories as Mrs. Oliphant's 'Literary History of the 19th Century,' and W. L. Cross's 'The Development of the English Novel.' W. D. Howells, in 'The Heroines of English Novels' (1901) and 'Criticism and Fiction' (1891) pays very high tribute to Miss Austen as an artist and as a creator of character.

W. T. Brewster,
Professor of English in Columbia University.

Aus'ten, Peter Townsend, American chemist: b. Clifton, S. I., N. Y., 10 Sept. 1852, and educated at Columbia University, School of Mines, and in Germany and Switzerland. In 1876, he was appointed instructor of chemistry at Dartmouth; in 1877, professor of chemistry at Rutger's. From 1887 to 1893 he was engaged in industrial work, and 1893–8 was professor of chemistry at Brooklyn Polytechnic Institute. He has invented several useful manufacturing processes; has written a number of valuable papers, and translated Pinner's 'Repetitorium der Organischen Chemic' under the title 'An Introduction to the Study of Organic Chemistry.'

Austerlitz, ows'ter-lets, Moravia, a town on the Littawa, 13 miles southeast of Brünn. In the vicinity, on 2 Dec. 1805, was fought the famous battle between the French army of 80,000 men, commanded by Napoleon, and the combined Russian and Austrian armies, numbering 84,000, under their respective emperors; in which the former achieved a signal victory. According to Alison, the allies lost 30,000 in killed, wounded, and prisoners, and the French, 12,000. The battle was followed by an armistice, the terms of which were dictated by Napoleon; and immediately after, on 26 December, by the Treaty of Presburg, which disastrously affected Austria. The battle of Austerlitz is sometimes called "The Battle of the Three Emperors."

Aus'terlitz, The Sun of, a term given to any favorable omen, in allusion to the brilliant appearance of the sun just before the battle of Austerlitz, and which Napoleon accepted as a token of coming victory.

Aus'tin, Saint. See Augustine, Saint.

Aus'tin, Alfred, English poet, critic, and journalist: b. Headingly, near Leeds, 30 May 1835. He graduated from the University of London in 1853, was called to the bar in 1857, and was editor of the 'National Review,' (1883–93). In 1896 he was appointed poet laureate of England. He is the author of political books, novels, and many volumes of verse. The latter include 'The Season: a Satire' (1862); 'The Human Tragedy' (1862); 'The Golden Age: a Satire' (1871); 'The Tower of Babel,' a drama (1874); 'Savonarola,' a tragedy (1881); 'Veronica's Garden,' in prose and verse (1895). 'The Garden That I Love,' 'In Lamia's Winter Quarters,' 'Haunts of Ancient Peace' (1902), and 'A Lesson in Harmony' (1904), are delightful volumes of mingled prose and verse. Opinion is much divided as to his merits as a poet, particularly in such works as 'Fortunatus, the Pessimist' (1891). In December 1899, he published a war poem, 'To Arms!' and, in May 1900, one on the relief of Mafeking.

Aus'tin, George Lowell, American physician and writer: b. Massachusetts, 1849; d. 1893. Among his numerous works are 'Perils of American Women'; 'Water-Analysis' (1882); 'Under the Tide'; 'Life of Franz Schulbert'; 'Popular History of Massachusetts'; 'Life of Wendell Phillips' (1888).

Aus'tin, Henry, American lawyer and legal writer: b. Boston, Mass., 21 Dec. 1858. He has been a commissioner of insolvency for six years and is an associate justice of the municipal court of Boston (West Roxbury district). He is the author of 'American Farm and Game Laws'; 'American Fish and Game Laws'; 'Liquor Law in New England.'

Aus'tin, Jane (Goodwin), American novelist: b. Worcester, Mass., 25 Feb. 1831; d. Boston, 30 March 1894. Her works include 'Fairy Dreams' (1860); 'Moonfolk' (1874); 'Mrs. Beauchamp Brown' (1880); 'A Nameless Nobleman' (1881); 'The Desmond Hundred' (1882); 'Nantucket Scraps' (1882); 'Standish of Standish' (1889); 'Betty Alden' (1891); and 'David Alden's Daughter and Other Stories (1892).

From the Hollyer photograph after Linnel

JANE AUSTEN

Aus'tin, John, English writer on jurisprudence: b. Creeling Mill, Suffolk, 3 March 1790; d. Weybridge, 1 Dec. 1859. From 1826 to 1835 he filled the chair of jurisprudence at London University. He served on several royal commissions, one of which took him to Malta; lived for some years on the Continent, and finally settled at Weybridge in Surrey. His fame rests on his great works, 'The Province of Jurisprudence Determined,' published in 1832; and his 'Lectures on Jurisprudence,' published by his widow between 1861 and 1863. His wife, Sarah, one of the Taylors of Norwich: b. 1793; d. Weybridge, 8 Aug. 1867; produced translations of German works, and other books bearing on Germany or its literature; also 'Considerations on National Education,' etc.

Aus'tin, Jonathan Loring, secretary and treasurer of Massachusetts: b. Boston, 2 Jan. 1748; d. 10 May 1826. He remained two years in Paris as Dr. Franklin's secretary. He also spent two years in England as agent of Dr. Franklin. On his return in May 1779, he was liberally rewarded by Congress. In 1780, in his passage to Spain as agent of the State, he was taken and carried to England. He afterward held the offices of state secretary and treasurer in Massachusetts, and died universally respected. His son, James Trecothic: b. Boston, 7 Jan. 1784, studied law, rose in the profession, and was attorney-general of the State from 1832 to 1843.

Aus'tin, Moses, an American who obtained the first grant from the Mexican government for the formation of an American colony in Texas: b. Durham, Ct.; d. January 1821. He forwarded to the commandant-general at Monterey, an application for permission to colonize 300 families in some part of Texas. The application was successful, and the enterprise prosecuted by his son, Stephen F. Austin (q.v.).

Aus'tin, Oscar Phelps, American statistician, chief of the bureau of statistics, treasury department: b. Illinois. At the age of 12 he removed with his parents to Nebraska, where he remained until manhood. He then engaged in journalism until his appointment as chief of the bureau of statistics, 9 May 1898. He has since lived in Washington, serving as Washington correspondent for newspapers in New York, Chicago, and other cities. He is the author of 'Uncle Sam's Secrets'; 'Uncle Sam's Soldiers'; and other publications for the instruction of youth in national and international affairs; also of official monographs 'Commercial China in 1900'; 'Commercial Japan'; 'Commercial Africa'; 'Russia and the Trans-Siberian Railway'; 'American Commerce'; 'Commercial Alaska'; 'Submarine and Land Telegraphs of the World'; 'Colonies of the World and Their Government'; 'Colonial Administration'; etc. He is associate editor of the 'National Geographic Magazine.'

Aus'tin, Stephen Fuller, American pioneer: b. 1792; d. 27 Dec. 1836. He was a son of Moses Austin (q.v.), followed up the grant previously issued to his father. By it he was clothed with almost absolute power over the colonists, and only obliged to report to the captain-general. He founded what is now the city of Austin, the capital of Texas. The colony prospered, and, being accompanied by a considerable number of similar associations, promoted an influx of Americans to such an extent that they met 1 March 1833, without the concurrence of the Mexican population, in a convention to form a constitution for the as yet Mexican state of Texas. Austin was one of the delegates chosen to carry the result of their deliberations to the central government at Mexico, and obtain its ratification. The delays and frequent revolutions at Mexico leading him to despair of ever bringing his commission to a close, he addressed a letter, 2 Oct. 1833, to the municipality of Bexar, and through them to the people of Texas, recommending a union of all the municipalities to provide against the consequences of a probable refusal of their applications by organizing a state under the *Acta constitutiva* of 7 May 1824. This letter was considered treasonable, and Austin was arrested and held as a hostage for the good behavior of Texas. There he was detained until September 1835. He was appointed a commissioner to the United States in November 1835. This was before the Texan declaration of independence; and it was not till after his arrival at New Orleans, and the information of the union of Santa Anna with the federal party for the invasion of Texas, that he was brought to the point of recommending such a measure. He acted with prudence and patience, and was successful in preparing for the independence and annexation of the new republic. He is looked upon as one of the most eminent and honorable of the founders of Texan prosperity.

Aus'tin, William, American author: b. 1778; d. 1841; remembered for his striking and original tale, 'Peter Rugg, the Missing Man,' in effect a New England variant of the Wandering Jew legend.

Aus'tin, Minn., a city and county-seat of Mower County, situated on Red Cedar River, and on the Chicago G. W., and the Chicago, M. & St. P. R.R.'s. It is the centre of a fertile agricultural region, and has a large export trade, as well as a variety of manufacturing establishments, including a meat-packing factory, flour mills, cement works, railroad shops, brick works, creamery, etc. It is the seat of the Southern Minnesota Normal College, and has several fine public buildings, among them a Carnegie library. Austin was first settled in 1852. Pop. (1900) 5,474.

Aus'tin, Tex., the capital and county-seat of Travis County, on the Colorado River. It is 81 miles north-northeast of San Antonio by the International & G. N. R.R., 186 miles west by north of Houston, and 230 miles northwest of Galveston, by the same, and the Houston & T. C. R.R.; and on the Austin & N. W. R.R. It is beautifully situated about 40 feet above the river, which here flows through attractive scenery, is navigable for river steamers in the winter, and is spanned by two bridges. An immense dam, 1,275 feet long by 67 feet above bed rock, the twelfth longest in the world, was completed in 1892, for water supply and power; but was carried away by a flood 7 April 1900. During its existence it created a large and handsome sheet of water called Lake McDonald, a favorite resort for fishing, hunting, and health-seeking parties, and famous for having two international regattas on it, Stansbury of Australia winning the championship of the world. There

are manufactories of lumber and iron goods, flour and leather; and oil refineries. There is a very large export trade in agricultural produce and live stock, hides and wool, cotton and grain; it is also the wholesale supply centre for a great district in provisions, dry goods, drugs, agricultural implements, ranching supplies, etc. The city is well built with wide and well-shaded streets. The most prominent building is the capitol, one of the largest of such structures in the United States, built of granite at a cost of $3,500,000. There are also the main building of the State University, which accommodates the law and literary departments; State asylums for the insane, blind, and deaf-mutes, and for colored patients of these classes; the State Confederate Home; St. Edward's College; the Tillotson Institute for Colored Pupils; seminaries and academies, besides the public school system. The State land office and the county court-house are prominent buildings. The government is administered under the revised charter of 1901, is by mayor, biennially elected; a city council, chosen half by wards and half at large; and officials elected partly by the council and partly by popular vote. The city owns its own waterworks and electric plant. The settlement was first called Waterloo, but in 1837, after the Texan revolution, incorporated and re-named after Stephen F. Austin (q.v.), the county being likewise named from William B. Travis (q.v.), killed at the Alamo. It was made the capital in 1839, and remained such after the admission of Texas as a State. The first free school in the State was established here in 1871. Pop. (1900) 22,258.

Australasia, âs'trăl-ā'shĭa, a geographical term of loose application, but usually regarded as comprehending the continental island of Australia and an unascertained number of other islands, some of them very little known, lying between lon. 110° and 180° E., and stretching from Papua or New Guinea, the farthest northern island of the division, to lat. 50° S. Besides the great island of Australia, it thus includes Tasmania, New Zealand, the Loyalty Islands (New Caledonia, etc.), Norfolk Island, New Hebrides, Solomon Islands, New Ireland (Neu-Mecklenburg), New Britain (Neu-Pommern), Admiralty Islands, and New Guinea, besides numerous other islands and island groups. The island of Timor and those lying west of it, though coming within the general boundary above indicated, belong to the Eastern or Indian Archipelago, called also Malasia. Australasia is estimated to have an area of 3,740,000 English square miles, and a population of 6,400,000. It forms one of three portions into which some geographers have divided Oceania, the other two being Malasia and Polynesia. Consult A. R. Wallace, (Australasia.)

AUSTRALASIA
SCALE OF MILES ON THE EQUATOR.
0 100 200 400 600 800
Population of places is indicated by different lettering, thus
100,000 and over SYDNEY
50,000 to 100,000 Melbourne
10,000 to 50,000 Adelaide
1,000 to 10,000 York
Smaller Towns Eyre
Cable and Telegraph Lines.
Railroads.
Steamship Routes, Distances in Miles.
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INDIAN OCEAN
AUSTRALIA
WESTERN AUSTRALIA
PHILIPPINE ISLANDS
CELEBES SEA
BORNEO
SUMATRA
JAVA
SINGAPORE
PALEMBANG
BATAVIA
SURABAYA
DJOKJOKARTA
SURAKARTA
COCHIN CHINA
SIAM
PENINSULA
MOLUCCA IS.
BANDA SEA
FLORES SEA
TIMOR
ARAFURA SEA
Christmas I. (Br.)
Cocos or Keeling Is.
Perth
Fremantle
Albany
Geraldton
Kalgoorlie
Coolgardie
Esperance
Eucla
Nullarbor Plain
Great Victoria Desert
Great Sandy Desert
Gibson Desert
Mt. Macpherson
Mt. Magnet
Mt. Leonora
Mt. Sir Samuel
Mt. Labouchere
Mt. Cristopher
Mt. Augusta
Mt. Wells
Mt. Barlee
Mt. Turnbull
Mt. Wilson
Mt. Woodroffe
Mt. Donnell Ra.
Mt. Turnbull
Warburton Mt.
Ashburton R.
Fortescue R.
Gascoyne R.
Murchison R.
Swan R.
Darling Ra.
Musgrave Ranges
Nullarbor Plain
Eyre Pen.
Spencer Gulf
Gulf St. Vincent
Adelaide
Port Augusta
Port Pirie
Broken Hill
Salt Lakes
Lake Eyre
Lake Torrens
Lake Gairdner
Lake Amadeus
Lake Macdonald
Lake Baron von Muller
Lake Carey
Lake Barlee
Lake Darling
Lake Moore
Lake Menzies
Lake Austin
Lake Gregory
Lake Disappointment
Lake Mackay
Lake Christopher
Lake Augusta
Lake Wells
Lake Townsend
Lake Macdonald
Lake Amadeus
Lake Eyre
Lake Torrens
Lake Gairdner
Lake Frome
Lake Callabonna
Lake Blanche
Lake Namma
Lake Gantheaume
Lake Anne
Lake Hamelin
Lake Dirk Hartog
Lake Steep Pt.
Lake Naturaliste
Lake Leeuwin
Lake Flinders
Lake Irwin
Lake King George Sound
Lake Doubtful Island Bay
Lake Esperance
Lake Bremer
Lake Victoria
Lake Kanowna
Lake Lefroy
Lake Cowan
Lake Dundas
Lake Barlee
Lake Moore
Lake Menzies
Lake Austin
Lake Gregory
Lake Disappointment
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Lake Gairdner
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Lake Callabonna
Lake Blanche
Lake Namma
Lake Gantheaume
Lake Anne
Lake Hamelin
Lake Dirk Hartog
Lake Steep Pt.
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Lake Flinders
Lake Irwin
Lake King George Sound
Lake Doubtful Island Bay
Lake Esperance
Lake Bremer
Lake Victoria
Lake Kanowna
Lake Lefroy
Lake Cowan
Lake Dundas
LONDON TO HOBART VIA DIEGO GARCIA & FREMANTLE
LONDON TO SYDNEY VIA DIEGO GARCIA & KG. GEORGE SOUND
GALLE TO KG. GEORGE SOUND 3705
COLOMBO TO ADELAIDE, MELBOURNE & SYDNEY
CAPE TOWN TO FREMANTLE 4050
CAPE TOWN TO ADELAIDE
CAPE TOWN TO HOBART 5527
ADELAIDE TO KG. GEO. SD. 1015
LONDON TO HOBART VIA FREMANTLE
KG. GEO. SD. TO MELBOURNE 1340
Extreme Limit of Drift Ice
100° 110° 120° 130° Longitude
10° 20° 30° 40° Latitude

150°
160°
170°
180°
10
20
30
40
EQUATOR
TROPIC OF CAPRICORN
Greenwich I.
Atlantic L.
Pacific Ocean
CORAL SEA
TASMAN SEA
MARSHALL ISLANDS
CAROLINE ISLANDS
GILBERT ISLANDS
PHOENIX IS.
LAGOON OR ELLICE IS.
SOLOMON ISLANDS
SANTA CRUZ IS.
NEW HEBRIDES
NEW CALEDONIA
FIJI ISLANDS
TONGA OR FRIENDLY IS.
NORTH ISLAND
SOUTH ISLAND
NEW ZEALAND
TASMANIA
NEW SOUTH WALES
QUEENSLAND
VICTORIA
SYDNEY
MELBOURNE
BRISBANE
SYDNEY TO NOUMEA 1077
SYDNEY TO SUVA 1753
MELBOURNE TO SUVA 1753
SYDNEY TO APIA 2354
AUCKLAND TO SUVA 1140
AUCKLAND TO HONOLULU 3815
SYDNEY TO AUCKLAND 1284
SYDNEY TO WELLINGTON 1280
HOBART TO AUCKLAND 1537
HOBART TO WELLINGTON
MELBOURNE TO BLUFF HAR. 1200
HOBART TO BLUFF HAR. 930
WELLINGTON TO CAPE HORN 7400
SUVA TO HONOLULU 3225
SUVA TO APIA
SUVA TO TONGA
Ralik Chain (German)
Ratak Chain (German)
Nugnor Is.
Greenwich I.
Pleasant I.
Nameless I.
Howland I. (U. S.)
Baker I. (U. S.)
Phœnix Is.
Arthur I.
McKean I.
Gardner I.
Hull I.
Jarvis I.
Malden I.
Starbuck I.
Caroline I.
Flint I.
Vostok I.
Penrhyn I.
Suwarrow Is.
Manihiki Is.
Rakahanga I.
Pukapuka I.
Nassau I.
Danger Is.
Palmerston I.
Niue or Savage I.
Horne Is.
Wallis Is.
Futuna I.
Alofi I.
Rotuma (Br.)
Sophia I.
Eagleston Reef
Bayonnaise Bk.
Independence I.
Hunter I.
Keppel I.
Exploring Is.
Lakemba Is.
Vatoa Is.
Tofua
Hapai Group
Namuka
Nukualofa
Eoa I.
Pylstaart
Minerva Rfs.
La Rance Bk.
McLeod Bk.
Kermadec
Raoul or Sunday I.
Macauley I.
Esperance Rk.
Curtis I. (Br.)
Haure Rk.
Norfolk I. (Br.)
Lord Howe I. (Br.)
Balls Pyramid
Solitary Is.
Port Macquarie
Port Stephens
Newcastle
Sydney
Botany B.
Wollongong
Jervis Bay
Ulladulla
Bateman B.
Mt. Dromedary
Twofold B.
Gabo I.
Cape Howe
Port Phillip B.
Port Melbourne
Williamstown
Geelong
Portland
Warrnambool
Port Fairy
Cape Otway
Cape Schanck
Wilsons Promontory
Western Port
Port Albert
Lakes Entrance
Gippsland Lakes
Twofold B.
Eden
Mallacoota Inlet
Cape Howe
Flinders I.
Furneaux Group
Banks Str.
King I.
Hunter I.
Launceston
St. Marys
Macquarie Har.
Oyster B.
Maria I.
Hobart
Tasman Peninsula
Port Davey
S.W. Cape
Bruny I.
D'Entrecasteaux Channel
Huon R.
Derwent R.
Tamar R.
Mersey R.
Devonport
Circular Head
Table Cape
Cape Grim
Macquarie Har.
Campbell Town
Ross
Oatlands
Swansea
Great Oyster B.
Schouten I.
Freycinet Peninsula
Maria I.
Tasman Peninsula
Port Arthur
Eaglehawk Neck
Tasman Pen.
Cape Pillar
Tasman I.
Cape Raoul
Pirates Bay

AUSTRALIA:
HISTORY AND MODERN DEVELOPMENT.

1. **Australia — Areas and Divisions.** Australia, the largest island in the world, is of continental dimensions, with an area of approximately 2,946,691 square miles. The smaller island, Tasmania, which is now included in the general term «Australia,» as well as in the federal Commonwealth, and has an expanse of 26,215 square miles, is 150 miles south of Australia. The total area of the federated states is thus 2,962,906 square miles. This does not include British New Guinea, a territory of about 90,540 square miles, which is practically under the direction of the Commonwealth. The area of the respective states is — Western Australia, 975,876 square miles; South Australia (including the Northern Territory, which is for all practical purposes part of the state), 903,690 square miles; Queensland, 668,497 square miles; New South Wales, 309,175 square miles; Victoria, 87,884 square miles; Tasmania, 26,215 square miles. With the exception of a small space in the northwest part of the Continent the whole of the land has been more or less explored and mapped and a fairly accurate idea may be formed of its physical features, though new facts are naturally frequently disclosed with the gradual advance of settlement over a sparsely populated country. (Pop. 31 Dec. 1905 — males, 2,135,728; females, 1,921,033; total. 4,056,761, exclusive of aborigines). The coastline of Australia is somewhat less than 8,000 miles. Its widest part from east to west is 2,400 miles, and its deepest from north to south nearly 2,000 miles. The configuration of the island in places is so irregular that the political terminology of some of the states is misleading. Victoria, for example, is more southerly than South Australia.

Geology.— The east coast of Australia is mostly rugged and rocky, and fringed with many islets. Part of the south coast is low and sandy, but on other portions are bold cliffs rising several hundred feet sheer from the sea. The north and west coasts are generally depressed and scenically uninteresting, with monotonous sandhills. The interior, so far as explored, is largely composed of rocky tracts and sandy plains with little or no surface water, though thousands of artesian bores have revealed the presence of underground currents, which fertilize the soil, and transform deserts into highly productive areas. The whole continent is an irregular plain with high ridges in the east, and a marked depression in the centre, in some parts beneath sea-level. The base of the table-land is granite, which appears on the surface on the southern and western sides. Silurian rocks are prominent in South Australia, where unmistakable marks of glacial action have recently been discovered. In the southeast and east the rocks are volcanic, Silurian, carbonaceous, and carboniferous; the coal deposits on the eastern and parts of the western coasts are extensive, and brown coal has been found in South Australia, but at too great depths to be profitably worked, at a long distance from the seaboard.

Minerals, etc.— West of the Dividing Range are extensive plains largely used for pastoral and for agricultural purposes. The comparatively dry and scrub, or saltbush-covered lands in the interior are in many cases richly mineralized, and succeeding years show that they deserve less and less their old designation of «desert.» On one of such «deserts» is situated the famous Broken Hill Silver mine in New South Wales, and on others the celebrated Coolgardie and Kalgoorlie gold mines in Western Australia. In various parts of Australia and Tasmania are found, often in payable quantities (besides the royal metals and coal), tin, as well as nearly all the minor minerals and precious stones; while on the northeastern, northwestern, and northern coasts are probably the most extensive and productive pearl-shelling waters known. It has been shown, too, that the monotonous and extensive mallee country everywhere yields profitable returns when farmed under mixed cultivation and grazing systems; while some varieties of the mallee itself contain water-yielding roots long used by the aborigines and capable of sustaining the life of lost travelers.

Mountains.— There is no active volcano in the Commonwealth but some craters show signs of only recent extinction and of intermittent previous eruptions. A mountain range varying from 100 to 200 miles in width outlines the eastern and southern border of the continent; and, broadly speaking, all the rivers of Southern Australia take their rise in this Great Dividing Range. The Australian Alps, in the southeast part of the Dividing Range, contain the highest mountain summits in Australia — Kosciusko (N.S.W.), 7,308 feet; Mount Bogong (Vic.), 6,508. These are the most elevated points on the Continent. In Queensland peaks in the Belenden Ker range rise to 5,400 feet, and in other parts of the state are several eminences of about 4,000 feet. In South Australia the loftiest range is the Flinders — Mounts Remarkable and Brown, 3,100 feet each; and the principal elevation in the Gawler range in the northwestern interior is about 2,000 feet. In western Australia Mount William (3,000 feet) in the Darling Range, and Ellen's Peak (3,420 feet), are the loftiest. Tasmania is very mountainous — highest peaks, Cradle Mountain 5,069 feet, and Ben Lomond 5,010 feet.

Rivers and Lakes.— The Australian «Father of Waters» is the river Murray, which with its chief tributary, the Darling, flows 2,400 miles before reaching the Southern Ocean on the South Australian coast, and with its Queensland extensions has in favorable seasons a length of about 3,000 miles navigable by small steamers. It is probable that under agreement between the riparian states (South Australia, Victoria, and New South Wales), the river will be locked to improve navigation, and also to provide water for irrigation. In the Northern Territory of

South Australia, as well as elsewhere, some of the rivers are of large volume, and are navigable for comparatively short distances. On the east coast are the Hunter, Clarence, Brisbane, Fitzroy, and Burdekin; on the west the Swan, Murchison, Gascoyne, Ashburton, and De Grey; on the north the Fitzroy, Victoria, Flinders, and Mitchell. A considerable river of the interior is Cooper's Creek, or the Barcoo, which falls into Lake Eyre, one of a group of lakes on the south side of the continent having no outlet, and, accordingly, salt. The principal of these are lakes Eyre, Torrens, and Gairdner, all of which vary in size and saltiness according to the season. Another large salt lake of little depth, Lake Amadeus, lies a little west of the centre of Australia. Various others of less magnitude are scattered over the interior.

Rainfall.— Speaking generally, wherever the land is elevated the rainfall is good. It varies from about 70 inches annually in the tropical zone to three or four inches or even less, in the arid interior regions, and in the southern part to about 40 inches. The fall diminishes in close relation to the decline in the elevation of the land, allowing for coastal influence in the south, and tropical or sub-tropical conditions in the north.

Climate.— The climate of Australia is generally temperate, and in summer hot and dry, especially in the southern and central parts, but very healthy. In the tropical portions heavy rains fall and in most of the coast districts there is a sufficiency of moisture, but in portions of the interior the heat and drought are sometimes extreme. The air is, however, so exhilarating that even 120° Fahr. of shade heat in Australia is less oppressive than 90° in London, Paris, or New York, and cases of sunstroke are rare. This dry-hot atmosphere is especially recommended by medical men as an essential for sanitoria for sufferers from lung disease, and among the artesian waters in some of the arid country are highly mineralized springs with valuable medicinal properties. The dangers of drought, too, are being largely reduced by the rapid extension of the artesian boring area. At Melbourne (Vic.) the mean temperature is about 57°; Sydney (N.S.W.), about 63; Adelaide (S.A.), 61; Perth (W.A.), 64; Brisbane (Q.), 68; and Port Darwin (N.T.), 82 (tropical); Hobart (Tas.), 55. In the mountainous and more temperate parts of Australia snow falls in winter (June, July, and August), and long remains unmelted on portions of the Great Dividing Range, as well as in Tasmania. Practically, however, at no time of the year is it possible to skate on ice in any division of the Commonwealth. Australia is essentially a warm country throughout, but the winters are keen and bracing.

Fauna (extinct).— The distinguishing features of the extinct fauna (of which most interesting discoveries have been made) are specially worthy of note. In the mammalian class the great majority are marsupials, though the dingo and the whale (non-marsupial) are also found in a fossil state. Fossil remains of birds, reptiles (such as crocodile monitor), turtles, and fishes, have also been unearthed, some in the banks of the rivers in the interior. This indicates that the ancient vertebrate fauna of Australia was very similar to what it is now. The preponderant type of mammal was marsupial. In most respects, however, the species and even the genera were different, and many (such as *diprotodon, nototherium,* and the giant kangaroo) were much larger animals and of a more generalized type than exist at present. One living type (a wombat) is precisely of the same specie as is found in a fossil condition. Regarding the probable cause of the destruction of the extinct animals, it is impossible to give a general statement applicable to such a wide-stretching country as Australia, any more than such a statement could be applied to other countries where there has been a wholesale disappearance of once numerous groups. Changes of climate or physical conditions rendering the country or district unsuitable for their maintenance; over-specialization in structure causing the types to be incapable of adapting themselves to changed conditions; not impossibly the ravages of infectious or parasitic diseases—all these have had their effect. As a probable explanation in the special case of the Lake Callabonna fossils (a remarkable discovery in South Australia) the following occurs in 'The Physical Features of Lake Callabonna and the Account of the Discovery' by Prof. Stirling (Director of the South Australian Museum), which was published in the 'Memoirs of the Royal Society': "The facts that the bones of individuals are often unbroken, close together and frequently in their proper relative positions—the attitude of many of the bodies and the character of the matrix in which they are imbedded—negative any theory that they have been carried thither by floods. The likelihood, rather, is that they met their death by being entombed in the effort to reach food and water. . . The accumulation of so many bodies in one locality points to the fact of their assemblage around one of the last remaining oases in the region of desiccation which succeeded an antecedent condition of plenteous rains and abundant waters." An identical explanation has been suggested by Daintree in his 'Notes on the Geology of the Colony of Queensland.' Among the extinct fauna the most remarkable of the mammals is the Diprotodon australis; size 10 to 11 feet in length, five and one-half to six feet in height. Of the birds, the most noteworthy is *Genyornis newtoni*, a large bird with bones as big and massive as the elephant-footed moa of New Zealand, and the *Aepyornis* of Madagascar. It stood about six and one-half feet high, but is remarkable mostly for its massiveness. The deposit of this treasure trove of natural history at Callabonna is large and valuable, but (so far as the ground has been explored) it does not equal the immense deposits in certain places of fossil mammals and reptiles in the United States of America. Still, only one area of limited extent in Lake Callabonna has been exploited. Owing to the superior resources of the United States, and the greater generosity displayed there in this direction, much more systematic search has been undertaken both in that country and in South America than in Australia; but the possibilities are cherished of further revelations of the highest importance in this branch of research in the Commonwealth.

Fauna (existing).—To the northwest of Australia between the Dutch-Javanese islands of Lombok and Bali runs the Lombok Strait, which

curiously marks a dividing line between the fauna and the flora of Asia and those of Australia. The channel is narrow, if very deep, and the Asiastic birds might easily fly across it in one direction, and the Australian in another. So might a natural growth of plants be encouraged by the agency of wind and feathered carriers of seed; but none of these things has happened to any extent; the individuality of the relative fauna and flora has been strongly preserved. A number of the birds in Australia, however, migrate from one part of the Commonwealth to others with the changes of the seasons, and some pass to and from the continent of Asia—e.g., the sandpiper or sharp-tailed stint, that each season comes from Siberia, a distance of 10,000 miles. As already indicated, the existing fauna does not differ widely (except in proportions) from the extinct; and the forms observed in some instances are exceedingly interesting, if not bizarre. The "Bunyip" of the aborigines' legends (a monster that lurked in certain rivers and creeks and swamps) has never yet been proved to be other than fabulous. Much speculation and some mystery, however, surround the occasionally recurring visitations of plagues of rats in the far-northerly country, and of mice in the more southerly or agricultural areas. At periods of several years the rodents suddenly appear in vast numbers, and as suddenly disappear after doing, in some cases, much damage. The locust or grass-hopper plague, which at one time was much feared, is now almost unknown. In a generalization, Australia may claim to be free from all animals that attack man, except in exceedingly rare instances when a large kangaroo may be brought to bay, and in frenzy of fear strive to defend itself almost invariably vainly. Introduced animals, such as the rabbit and the fox, the sparrow, the starling, and other old-world birds, as well as the snail, multiply literally by millions, and become a scourge to pastoralists, farmers, and gardeners. The imported dog running wild has sometimes been confused with the aboriginal dingo (*canis dingo*) (q.v.) or "warrigal" (native name), a predatory animal, the wolf of Australia, that has caused heavy losses among sheep and lambs, which he destroys in mere wantonness. The dingo never barks, but howls dismally in the bush at night. Kangaroos once abounded virtually all over Australia, and varied in size from the "old man" of six feet to the most minute specimens, including wallabies and kangaroo rats. The most interesting example is the tree kangaroo, discovered in Queensland about 100 years after and not far from the spot (Endeavour River), where the first kangaroo (*Macropus major*) was found by Captain Cook, the great navigator, in 1770. In particularly the southern and western parts of Australia is seen a small "native bear," that inhabits trees, and, in Tasmania, the "Tasmanian devil," (*sarcophilus ursinus*) fierce and (like the dingo) untamable, and the "Tasmanian tiger" (*Thylacinus cynocephalus*) are the principal examples of fauna. The numbers of these latter, like those of the kangaroos and the opossum, have been largely reduced through indiscriminate slaughter with the advance of settlement; but recent legislation for the protection of the kangaroo (the skin of which is valuable for export) has stayed the race toward destruction. The wombat (*Phascolomys*) is a curious, burrowing, land animal, resembling in some respects the platypus and kindred creatures; but the most extraordinary is the platypus itself (*ornithorhynchus anatinus*), an amphibious animal that forms a connecting link between the mammals, birds, and reptiles. Of the birds the emu (*Dromaius novæ hollandiæ*) is from five to six feet high, and ranks next to the African ostrich, which it resembles in its habits; its numbers, as with the kangaroo, have been greatly reduced as settlement has progressed. The cassowary (*Casuarius australis*) is small, and not nearly so widely diffused as the emu; and the native companion or Australian Crane (*Grus australasianus*) is still slightly smaller than the cassowary, and an exceedingly graceful bird of somewhat eccentric habit. The black swan (*Cygnus atratus*) is scarcely so large as the white swan of the northern hemisphere, but is a beautiful bird. Strange in its habits is the satin bower bird (*Ptilonorhynchus holosericeus*) that forms for itself a playground or bower in which it sports with a miscellaneous collection of bright objects. Altogether about 750 species of birds have been found, mostly in Northeast Australia (which has been chiefly explored), but some of them are gradually becoming extinct. The old idea that Australian birds are songless is only relatively true. The flute-like note of the magpie or shrike is one of the most mellifluously melodious sounds in nature, and has been declared to surpass that of the nightingale. The reptiles are numerous. The largest of the snakes is the carpet snake (*Morelia variegata*), non-venomous, with an average length of about seven or eight feet, but with authenticated specimens up to 15 feet and even more; its habits are generally similar to the python's. Of the five principal poisonous reptiles the most deadly is the death adder (about three feet). Not more than 12 or 15 fatal cases of snakebite occur annually throughout Australia, but this comparative immunity is due partly to the prompt application of effective remedies. The white ant is common in the northern part of the Commonwealth, and is very destructive to wooden buildings in the early stages of settlement; its nests of mud and clay, generally with angles pointing north and south, range from 20 feet in height downward. The seas abound in numerous varieties of fish. In the period of pioneer settlement the Australian whaling grounds were very productive, and still are occasionally exploited with profit. Sharks are exceedingly numerous. The largest, the white pointer or white shark, (*Carcharodon rondeletii*) to the length of 16 feet and over has been caught, and attended by the pilot fish (*Naucrates ductar*) it preys upon man as well as upon denizens of the deep. Deaths through sharks are rarer even than those from snakebite, but this is to a large extent due to the precautions taken in bathing in the seas. The crocodiles or alligators, as they are popularly called (*Crocodilus Porcatus and Phyllas johnsonii*—a small variety), are plentiful in the tropical and sub-tropical zone on the northeast, northwest, and north coasts, they vary from about 20 feet (an unusual length) to five or six feet. In common with the shark the larger alligator sometimes attacks human beings, but the aborigines evidently stand in little fear of it. In the warmer waters is found the dugong (*Halicora australis*), from whose habits and

structure doubtless originated the fables concerning the mermaid. Seals are still seen on the remote parts of the coast and the southern islands. The most noteworthy is the sea bear (*Otaria cinerea*) from about seven feet in length, that are more prized for their oil than for their skins. In the northern waters turtles, the edible green (*Chelone Mydas*), and the shell-yielding hawkbill (*Chelone imbricata*) varieties are very numerous, and attain to a large size. The trepang or beche-de-mer is found, with the mother-of-pearl oyster—large (*Meleagrina margaritfera*) and small (*Meleagrina radiata*). The former frequently yield fine pearls, some single specimens of which have been sold for thousands, and many for hundreds of pounds. The edible rock oyster is widely represented, and the mangrove tree-climbing fish (*periophthalmus*) abounds, particularly in the northern waters.

Flora.— In a concise description the Australian flora may be said to possess peculiarities which distinguish it unmistakably. Many of its most striking features bear a natural relation to the general dryness and greatly differing conditions of the climate, owing to the vast area of the Commonwealth. The trees and bushes have mostly a scanty foliage, with little surface for evaporation, or thick leathery leaves well fitted to retain moisture. Nearly all are evergreen, but the effect upon the landscape is rather monotonous. The most extensively spread types of vegetation are the various kinds of gumtree (*Eucalyptus*), the shea-oak (*Casuarina*), the acacia or wattle, the grass tree (*Xanthorrhœa,* many varieties of the *Proteaceæ,* a few baobab trees, and very many ferns and tree-ferns. Of the gumtree there are more than 150 species, nearly all valuable for timber, and for their essential oils, which possess important medicinal properties. The wattle or acacia includes about 300 species, some of which also yield good timber or bark for tanning. The most beautiful, the most fragrant, and the most useful in these latter respects is the golden wattle (*Acacia dealbata*). Palms (of which there are at least 24 species, all, except the cocoa-palm, peculiar to Australia) are mostly confined to the northern and eastern coasts. The mallee scrub is formed by a dwarf eucalyptus, and the mulga scrub by a thorny acacia. A plant which covers large areas in the arid regions is the spinifex or porcupine grass (coarse and spiny), which renders traveling difficult, and is uneatable by any animal. Other expansive tracts are occupied by useful herbs and fodder bushes. Foremost among those stands the salt-bush (*Atriplex mummularia,* order *Chenopodiaceæ*), an exceedingly hardy plant, upon which the sheep and other animals thrive, and which has strong drought-resisting powers. Beautiful flowering plants, especially in Western Australia, are almost innumerable. Australia also possesses many turf-forming grasses, particularly the kangaroo grass (*Anthistiria australis*), which survives in even a protracted rainless period. The native fruits, including the native cherry (*Exocarpus cupressiformis*), the nut of which grows partially outside of the fruit proper, are few and of little practical worth, and the plants yielding roots used as food are not of much economic value; but exotic fruits and vegetables grow everywhere in unstinted abundance, and some of the cherished garden blooms of the older countries flourish so riotously as to become a pest in Australia. The vine and the olive thrive better than in the country of their origin, and enormous quantities of wine and oil are produced and exported. The cereals of Europe and maize are extensively cultivated, and large tracts of country, particularly in Queensland, are under the sugar cane, the pineapple, the cocoanut and other tropical exotics.

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Editor of South Australian 'Register.'

2. Australia—The Aborigines. The aborigines of Australia are fast dying out — slain by civilization through interference with the game that they formerly hunted and lived on, added to the influence of the white man's diseases and vices. It has always been impossible to number the aborigines with any certainty on

account of the immense territory over which they were scattered, and of the nomadic habits of the people — habits which quite unfitted them for any sustained industrial work; but, according to the most trustworthy estimates which can be obtained, only about 150,000 of the blacks (including half-castes) now remain upon a territory of nearly 3,000,000 square miles. Certainly this is nearly four times the number of Maories who are left in New Zealand, but the territorial and other conditions are so essentially different in the two countries that comparisons are practically valueless. It is assumed that the representatives of the Australian aborigines are distributed in these proportions in the respective states: Western Australia, 70,000; South Australia (including the Northern Territory), 50,000; Queensland, 25,000; New South Wales, 6,828, and a few hundreds divided between Victoria and Tasmania. In Tasmania the last pure bred aborigine died in 1877; but 157 half-castes remain. Even on the Australian continent the sight of a full-blooded black near to a centre of settlement is very rare; and probably during the next 20 years the few survivors of the original owners of the soil will be found in only the remote districts. Already there is a striking disparity between the number of the natives as shown relatively in the estimates and the actual official records. The latest census gave these figures (which included half-castes as well as full-bloods in the cases of New South Wales and Western Australia): New South Wales, 4,287; Queensland, 6,670; South Australia, 3,888; Tasmania (half-castes only), 157; Victoria, 652; Western Australia (settled districts only), 5,261; total, 20,915.

Treatment of the Aborigines.—Although the racial antipathies and collisions due to the seizure by superior races of the lands of inferior peoples have been at least as marked in Australia as elsewhere, and although the treatment of the aborigines by many of the pioneer settlers did not err on the side of scrupulous humaneness, the governments, as such, have done a good deal to mitigate the sufferings of the unfortunate people, the dealing with whom was more difficult than it would have been if the vast majority of them had not in hopeless indolence always manifested an unconquerable repugnance to systematic labor or anything like sustained industry. The policy shown towards them might well have reflected — and in some cases it has done so — the fact that the conquest of the natives in Australia has been exceedingly easy owing to their utterly disorganized condition and their almost complete helplessness. These defects were in contrast to the valor, the country-love, and the mental alertness of the colored inhabitants whom the early white settlers found in New Zealand. As a rule the Australian aborigine — while in good districts physically stalwart and strong — was not of a ferocious or blood-thirstily aggressive nature; and in most cases when numbers of them have attacked a few isolated European settlers or travelers, the cause has been either a lack of firmness or judicious care on the part of the persons molested, or else revenge for wrongs inflicted upon the natives by other white men, mostly in the shape of interference with the black women, or by way of reprisals for the killing of cattle, the intrusion of which upon their former hunting grounds the blacks naturally connected with the gradual disappearance of the indigenous game.

All the state governments have enacted, and so far as possible enforced, laws for the protection of the blacks — laws in some instances providing for them special reserves within which the Europeans must not kill game or depasture stock; prohibiting the supply of intoxicating liquor or opium to the aborigines, and defending them against anything like enslavement or other ill-usage. During many years past at least a yearly — and in bad seasons a more frequent — distribution of flour, tobacco, blankets, and other useful articles has been made by the governments among the natives; and the state-aided efforts have been liberally supplemented by the benefactions of private persons and philanthropic institutions, especially in relation to education, spiritual and otherwise by missionaries who have established aboriginal stations. In the latest year for which statistics are available the purely governmental expenditure amounted annually (with allowances for endowed lands) to £20,000 in New South Wales, £9,000 in Queensland, £5,000 in South Australia, £5,000 in Victoria, and £12,000 in Western Australia.

Origin and Characteristics.—The origin of the aboriginal tribes of Australia has been a theme of much controversy; and the space available here is not adequate for even an enumeration of the many theories — including one comprehending an invasion by representatives of the Lost Tribes of Israel — advanced by various differing authorities. This seems to be a problem insoluble. In such circumstances sufficient must be the statement that there is a fair consensus of opinion to the effect that the native black races, as they were found by the European pioneers, had apparently been substantially affected (especially in the northern areas, which were for many centuries visited periodically by Malay proahs in search of pearl shell, trepang, and other products) by strains of blood introduced from beyond the island continent. A judicious balance of the evidence adduced by the most trustworthy ethnographers tends to the conclusion that the two points whence Australia benefited or otherwise by migration of fauna and flora, as well as ethnologically, were the group culminating in New Guinea on the one hand, and on the other in the chain of islands and peninsulas touching Australia on the Northwest. Certain plants and animals came from Asia to Australia, and it is held to be extremely probable that the ancestors of the Australian native tribes (who differ somewhat from those of Tasmania) crossed over to Australia from those two points. The native population is declared to be an admixture of at least two distinct elements. The skin of the one was a true yellow, and that of the other was a velvety black. The hair varies from straight to woolly, and the face and skull also have material dissimilarities. The nose assumes various grades, from the flat negro to the arched Jewish, and these contrasted types are believed to be due to the immigration of Malays and Papuans as indicated.

One reason why the black had no means of sea navigation was that "the negroid blood in his veins fetters the Australian so firmly to the

soil;» and another was that unkindly nature made the pressure of food requirements so heavy that the black was forced to be a wanderer, and had little time for anything else than the sustaining of bare life. As, however, this judgment reflects disparagingly upon the natural resources of the land, it is important to add that on their advent Australia's «Pilgrim Fathers» surprised the black inhabitants in a state of the most primitive savagery. There was not anywhere the remotest sign of any cultivation of the soil, or of the slightest attempt at tillage, or the thrift or providence which stores food for emergencies. Neither had the natives made—though they possessed roughly hewn bark or log canoes—any effort to clothe themselves, or—apart from miserable hovels constructed of rank grass or reeds, or boughs or bark of trees—to provide shelter from the cold of winter or the heat of summer. They had no written language, unless one may include in that characterization such crudely artistic representations as were inscribed on rocks or in caverns. Some of these, like the message sticks sent from one part of the country to another, are ideagraphic—or picture-writing — but none was at any rate unmistakably idealistic. Though most of the tribes paid deference to their «medicine men» or sages — mostly the older members of the tribal camps, who were always well treated by the younger blacks — they possessed practically no conception of abstractions. In this respect they were, while less provident than the ants, essentially untutored children of Nature — almost as much so as the dogs and the lower animals. They were endowed with instinct rather than with intuition. No bloodhound ever displayed keener sight or scent than the Australian blacktrackers, whose power in following a trail seems almost miraculous.

On the other hand, a close study of the aborigines reveals curious anomalies. Speaking generally the natives rise and fall in mental and physical superiority in exact harmony with the fertility or otherwise of the territory over which they roamed. Some of them had scarcely reached the low stage of intelligence associated with the stone age, others rapidly acquired education under European teachers, and in the wilds had constructed the boomerang which, with its marvellous power of returning to the thrower, has long puzzled even the most profound scientific experimenters. Among the highest-class natives, too, the character of their spears and other weapons indicated the possession of no little constructive skill, as well as undoubted patience and perseverance on the part of the makers. Where an aboriginal population is divided into hundreds, and probably thousands, of tribes, all mutually independent and mutually hostile, and distinguished usually by arbitrarily marked rings of exclusiveness, and each tribe speaking a dialect of its own, it is impossible to write with exactitude concerning their customs. One must not, therefore, attempt to explain why the tribal boundaries should in some cases be defined by geometrical devices; why in tribal territories here and there circumcision should be practiced, and on adjoining areas not observed; why some natives should exchange salutes similar to Masonic signs, and others be unaware of the meaning of this interchange, but be familiar with a somewhat intricate code of smoke signals; why some should be cannibals and others should not be; why the superstitious ceremonies should vary so widely; and yet why the main idea of the native «corroboree» or dance should be apparently almost everywhere the same or closely similar.

What seems to be certain is that the wild aborigines have no religion properly so called—no impelling attraction towards or trust in a God of Love, but a wholesome fear of «Mooldarbie» or the devil, whom all tribes sedulously seek to propitiate — some even by periodical human sacrifices, and the dread of whom as a spirit walking in the darkness keeps them shrinking in their camps until the break of day. Very extensively diffused also is the belief that nobody can die a natural death, but must be the victim of a maleficent influence or the evil eye. Equally widespread is the aspiration among the aborigines that after death they may «jump up a white fellow» — a notion said, perhaps fancifully, to have originated in the general custom of smoking the corpses of the dead, with the result that the peeling outer cuticle revealed the white dermis or true skin. Some tribes are prudishly modest in their relations with their women others are as flagrantly immoral. The language of some seems to be little better than mere gibberish, while concerning that of others one of the Jesuit missionaries has written that in its construction it is most ingenious, and curious in its form, indicating high intelligence and suggestive of the Hebrew. Many of the natives are musical, but their musical instruments are of the crudest character, made chiefly of hollowed wood, or grasses, or bamboos. At the age of puberty youths of both sexes are formally initiated by peculiar, jealously preserved, and often indescribable ceremonies, into the respective secrets of manhood and womanhood, but even the old men and women of the tribes who perform these rites — which include the knocking out of some of the young men's teeth and certain genital mutilations — seem to have no clear and coherent idea of their import.

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William John Sowden,
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3. Australia—Discovery and Early History. The discovery and the early history of Australia have been the themes of much discussion, but one conclusion admitted by all disputants is that the really pioneer navigation which resulted in the finding of the great island continent of the Southern Seas was not conducted by the British who now occupy the territory that was originally called Terra Incognita, and then New Holland. British enterprise, however, built a structure of colonization upon the site disclosed by the investigations of the people of other nations; and nearly all the

definite surveying of the Australasian seas has been done by the sailors of Britain.

The later days of the time in which Australia was still unknown were the days when the Portuguese, the Spaniards, and the Dutch roamed the oceans as intrepid searchers for new sensations rather than in the hope of territorial aggrandisement. Though anything like the exact year in which Australia was first sighted is doubtful, records show that between 1531 and 1542 the Portuguese declared the existence of a land which they styled "Great Java," and which corresponded with the northern parts of what is now the Australian Commonwealth. The most authentic available data indicate that the first European who saw the land was a Portuguese named Manoel Godhino de Eredia, who sighted it in 1601. By common consent, however, it has been conceded, as a starting point for Australian history, that Luis Vaez de Torres, who had been second in command of the De Quiros (Spanish) expedition, saw and sailed close to the Australian coastline in 1606; and that he was navigating in the neighborhood of New Guinea to the east of Cape York Peninsula at about the same time when a Dutch mariner was similarly engaged to the west of the Peninsula. Yet centuries elapsed before any attempt was made to settle the newly found continent, though meanwhile it was more than once passed and even circumnavigated. After 1619, when the Dutch expedition under de Houtmann anchored off the Abrolhos Reef on Northwest Australia, that part of the continent was repeatedly visited during the former half of the 17th century, and well verified history shows that in 1656 a Dutch ship was wrecked in the vicinity of the Abrolhos Group—fragments of the cargo are even now washed up occasionally by the sea or found in the guano deposits. Towards the end of 1642 Abel Jansen Tasman, a Dutch navigator, discovered and landed on Tasmania, and named it Van Diemen's Land (a title which it continued to bear until 1854). In 1688, William Dampier, a freebooter, was the first Englishman to set foot on Australia—at King Sound on the northwest coast. This same Dampier on a subsequent voyage took Alexander Selkirk (Defoe's "Robinson Crusoe) off the island of Juan Fernandez, on which the man had disembarked some time before. Still, curiously enough, Australia was not annexed on behalf of any nation until the last third of the 18th century. In 1768 Lieut. James Cook set out from England in a crazy ship, the Endeavour, in charge of an expedition appointed to observe at Tahiti the transit of Venus. Steering thence westward, he made an examination of New Zealand, came on 19 April 1770, upon the east coast of Australia, and anchored in Botany Bay. Later he proceeded northerly along the coast; and, after the Endeavour had in June struck upon a coral reef and well-nigh foundered near to the present Queensland port of Cairns, he continued his journey until on 21 August 1770, he hoisted the colors of England on the north Australian peninsula of Cape York, and thus formally took possession of the whole eastern part of Australia.

But settlers did not follow closely upon the heels of the navigators, and 18 years had passed before, on 18 Jan. 1788, a British convict expedition with 1,030 persons, of whom 750 were under penal servitude and banishment, reached Botany Bay. On 26 Jan. (now celebrated as Australian Foundation Day) the expedition landed, displayed its national colors with due pomp and circumstance, and so inaugurated European settlement in the "Great Land of the Southern Cross," which was, however, even thus late imperfectly known even in outline, and was comprehended under the general title of New South Wales, now applied to one of the territorially smallest states of Australia. With the occupation of the country further exploration by land and by sea proceeded apace. In 1798 Dr. Bass and Captain Flinders (who afterwards achieved immortal renown as a great navigator in association with Sir John Franklin, the Arctic hero) demonstrated by sailing round Tasmania that that country was veritably an island, and not a portion of the Australian Continent, as had been supposed. In 1802, having been provided by the British Admiralty with a scarcely seaworthy vessel, the Investigator, Captain Flinders surveyed the larger part of the southern coast of Australia, from west to east, and forestalled a French expedition which had been sent out under Captain Baudin in the ship *Le Geographe,* for purposes similar to those Flinders had in view.

The course of further marine exploration need not be further pursued; for the initial work had been accomplished. In 1803 the first colonization settlement was begun in Van Diemen's Land (Tasmania). In 1804 an unsuccessful attempt was made by Colonel David Collins, first governor of Tasmania, to found another convict colony in the now prosperous state of Victoria, which, however, from that time remained for 30 years with only one white man in it—a deserted convict named William Buckley, who dwelt among the aborigines until the year 1834, when real occupation was started, 10 years subsequently to the founding of Queensland, five years after that of Western Australia, and two years before that of South Australia.

During all the intervening time the exploration of the interior of the continent, mainly from Sydney, had been steadily progressing. First the disclosing of a means of passing beyond the Blue Mountains in 1813 showed (by Blaxland) a way out of what had been regarded as an impasse preventing access from the coastal fringe to the expansive interior territories which represented the Mystery Land of the early colonists. In 1824 Hume discovered the Upper Murray, the head of the great Australian Mississippi. Following the course of that river in 1828, Captain Charles Sturt added to the geographics of the period the name of its tributary, the Darling; and in 1830 he made, with almost sensational intrepedity, a journey down the Murray to its junction with the sea not far from Adelaide (the present capital of South Australia). In many directions other explorers were contemporaneously (and subsequently) causing the wilderness of the Terra Incognita of the Portuguese to yield up its secrets but only two of the dauntless explorers who have laid mankind under obligation to them for all generations need be particularly mentioned here. One of these was Ludwig Leichhardt, who started out from the east in

1848, and (with all the members of his party) apparently disappeared mysteriously and absolutely from the face of the earth; for no sign or trace of the expedition has ever since been seen or heard of. The other was John McDouall Stuart, who, after having been repeatedly baffled, succeeded at last in crossing the continent from south to north, and on 24 July 1862, laved his hands in the waters of the Indian Ocean, and hoisted the British flag on the northern shores of Australia. And now in this year of 1906 practically all the blank spaces in the Commonwealth may have been filled in by the cartographer, and Australia has no further laurels of fame to offer as worthy guerdons to brave and daring explorers by land or by sea.

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4. Australia — Political History. *Beginnings of Colonial Self-Government.*— It was a maxim of the common law that, if an uninhabited country were discovered and peopled by British subjects, they were supposed to possess themselve of it for the benefit of their sovereign, and that such of the laws of England as were applicable and necessary to their situation and the conditions of an infant colony were immediately in force; that wherever an Englishman went he carried with him as much of English law and liberty as the nature of his circumstances required. It was recognized that Englishmen carried their political birthright with them over the broad surface of the earth; that the charters of freedom for which their ancestors fought were not left behind, but accompanied them to their new homes beyond the seas.

The Colonial Legislatures of Newfoundland and Jamaica were established not by British statutes, but by Royal Commissions under the Great Seal accompanied by Royal instructions. Local self-government in Australia did not, however, originate in the exercise of the prerogatives of the Crown, as it did in the case of some of the early North American and West Indian colonies. From the very first it was founded upon, as it was subsequently developed and built up, by statutory authority.

NEW SOUTH WALES THE FIRST ORIGINAL COLONY.

Foundation.—In 1784 the British Parliament passed the statute of 24 Geo. III., c. 56, intituled «An Act for the effectual transportation of felons and other offenders, and to authorize the removal of prisoners in certain cases, and for other purposes therein mentioned.» This law empowered the King, with the advice of the Privy Council, to appoint places to which felons might be transferred. By an order in Council bearing date 6 Dec. 1786, His Majesty's «territory of New South Wales, situated on the east part of New Holland,» was appointed a place for the reception of persons within the meaning of the Act.

By letters-patent and commission dated 2 April 1787, Captain Arthur Phillip was appointed Governor of the territory. The limits of his authority extended from Cape York on the north to the southern extremity of the coast of the continent and inland and westward as far as the 135th meridian, which was afterward extended to the 129th meridian east longtitude. The Governor was empowered to make orders for the good government of the settlement.

By the Act 27 Geo. III., c. 2, the King was authorized to establish a Court of Criminal Jurisdiction on the eastern coast of New South Wales. Such was the legal authority under which, on 26 Jan. 1788, a penal settlement was established at Sydney Cove. It was not at first intended to be a colony, or plantation, for the purposes of trade and cultivation, within the ordinary meaning of those terms.

The First Constitutional Charter.—The temporary Act 4 Geo. IV., c. 96. (1823), which became law during the governorship of Sir Thomas Brisbane, was the first legislation passed by the Imperial Parliament conferring anything like the rudiments of local self-government on the New South Wales community. A council of five persons was appointed having limited legislative powers. On 17 May 1824, a Charter of Justice, creating a Supreme Court was promulgated.

The Second Constitutional Charter.— The Act 9 Geo. IV., c. 83 (25 July 1828), passed during the governorship of Lieutenant-General Sir Ralph Darling, was the second Constitutional Charter of Australia. Courts of Criminal and Civil Jurisdiction, coupled with trial by jury, were organized. The laws and statutes in force within the realm of England, so far as applicable, were applied to the administration of justice in New South Wales and Van Diemen's Land. The Crown was authorized to constitute in New South Wales and Van Diemen's Land respectively, an Advisory Council to consist of such persons resident in the said colonies respectively, not exceeding 15, and not less than 10, as the King might be pleased to nominate.

The Third Constitutional Charter.—The third charter regulating the government of New South Wales was the Act 5 and 6 Vic., c. 76 (30 July 1842), passed during the governorship of Sir George Gipps. This Act established for the first time in Australia a legislature, partly, but not wholly, representative in its character. It enacted that, there should be within the colony of New South Wales a Legislative Council consisting of 36 members, 12 of whom were to be appointed by the Crown, and 24 were to be elected by the inhabitants of the colony having certain property qualifications.

The Governor, with the advice of the Council, was authorized to make laws for the peace, welfare and good government of the colony, provided that such laws were not repugnant to the laws of England; nor were they to interfere with the sale or occupation of the waste lands of the Crown. Bills imposing duties of customs had to be reserved for the Queen's assent. This Act did not grant to New South Wales the system known as "Responsible Government." The Governor presided over and managed all the public departments. It contained, however, the feeble germs whence has since sprung the splendid fabric of parliamentary institutions in Australia. It was the first concession made by enlightened British statesmen to the growing wealth and importance of the Australian colonies.

The new Council was opened by Sir George Gipps on 1 Aug. 1843.

The Fourth Constitutional Charter.—The next important charter granted to Australia was 13 and 14 Vic., c. 59 (5 Aug. 1850, intituled "An Act for the better government of Her Majesty's Australian Colonies," and commonly known as the Australian Colonies Government Act. The bill, of which this Act was the outcome, was first introduced into the House of Commons in June 1849. The two main objects of the Act were the separation of the Port Phillip District from New South Wales, and the establishment in all the colonies of an improved system of Provincial Government. The Legislative Council, erected in New South Wales by the Act of 1842, was not materially disturbed. Its powers were in some respects increased, and the franchise on which its representative members were elected was liberalized.

The New Constitution.—A new election of members of the Legislative Council of New South Wales on the liberalized franchise then took place. The new Council complained that the Act 13 and 14 Vic., c. 59, did not place the control of revenue taxation, and the waste lands of the Crown in the Colonial Legislature, and a full measure of local self-government in a Constitution similar in outline to that of Canada was applied for.

In 1852 gold was discovered in New South Wales and Victoria, which caused a great influx of immigrants into these colonies. In a despatch addressed to Governor Fitzroy, dated 15 Dec. 1852, Sir John Packington, Secretary of State for the Colonies, stated that Her Majesty's government had been greatly influenced by considerations arising from the extraordinary discoveries of gold in the Australian colonies, which had imparted new and unforeseen features to their political and social positions. It was the wish, therefore, of Her Majesty's Government that there should be established in each colony, a new Legislature consisting of a Legislative Council nominated by the Crown, and an elective House chosen by qualified inhabitants. To such Legislatures it was proposed to give general powers including that of dealing with the waste lands of the Crown.

Upon the receipt of this despatch the Legislative Council of New South Wales, under the authority conferred by 13 and 14 Vic., c. 59, s. 32, appointed a select committee to draw up a constitution establishing a bicameral Legislature, having increased powers and functions. A constitution was accordingly drawn up. It provided that, in place of the Legislative Council then existing there should be a Legislative Council and a Legislative Assembly, and that Her Majesty should have power by and with the advice and consent of the said Council and Assembly to make laws for the "peace, welfare, and good government of the said colony in all cases whatsoever." The members of the Council were to be nominated by the Governor with the advice of the Executive Council. The first nominees were to hold their seats for five years only. The members of the Assembly were to be chosen by male electors having certain residential and property qualifications. An Assembly once constituted was to continue for five years unless dissolved by the Governor. The new Legislature was endowed with full power to deal with the waste lands of the Crown and to impose duties of customs.

On 21 Dec. 1853, the new Constitution was adopted and transmitted to the Secretary of State for the Colonies. In an amended shape it was made a schedule to a bill introduced into the Imperial Parliament, intituled "A Bill to enable Her Majesty to assent to a bill as amended by the Legislature of New South Wales to confer a Constitution on New South Wales." The bill was passed by Parliament and received the Royal assent on 16 July 1855. Its number is 18 and 19 Vic., c. 54. The Act conferring a Constitution on Victoria was assented to on the same day. The Constitutions were then transmitted to the respective Colonies, accompanied by explanatory despatches from the Secretary of State, Lord John Russell, in which the Governors were instructed as to the introduction of responsible government.

Responsible Government.—That great change in the colonial system of administration known as "The Introduction of Responsible Government"—that is of Ministers appointed by and responsible to the Governor, but constitutionally and practically responsible to Parliament—is said by some authorities to have been effected solely by despatches from the Secretary of State to Colonial Governors. These despatches described the circumstances in which the Crown, through the Governor for the time being, would exercise its right of displacing one set of public servants and of appointing others in their places—that no change would be made so long as those public servants, being Ministers in charge of Departments, possessed the confidence of the local Legislature. In the body of the Constitution Act of New South Wales (and this remark applies equally to that of Victoria) the words "responsible ministers" do not occur. Were it not for a marginal note to one of the sections, not even a hint would have been given on its face of the important change it was intended to effect.

Other constitutional jurists, however, affirm that section 37 of the Constitution Act of New South Wales, and the corresponding section of that of Victoria, contains provisions which assume if they do not originate some plan of ministerial and responsible government. Both those sections declared that appointments of all public offices shall be vested in the Governor with the advice of the Executive Council, "except the appointment of officers liable to retire from office on political grounds which appointments

shall be vested in the Governor alone." The Constitution Acts of South Australia, Queensland and Western Australia, contain substantially similar sections. But section 18 of the Constitution Act of Victoria and section 32 of the Act of South Australia went much further in the direction of expressly recognizing and introducing responsible government. Those sections enacted that a certain number of officers of the Governments in those colonies for the time being should be members of the Legislature created by the new Constitutions. On 22 May 1856, the first Parliament of New South Wales under the new Constitution was opened by Sir William T. Denison. The first Responsible Ministry had Mr. Alexander Donaldson as Colonial Secretary and Premier.

Administration and Legislation.— With the establishment of responsible Government in New South Wales the initial pulsations of political life in Australia may fairly be said to date their beginnings. The Governor of the colony was the representative of the Crown, but he was no longer his own Prime Minister. In 1859 a new Parliament was elected under the provisions of an Act to Amend the Constitution, introduced and passed by the advice of the Cowper Administration, providing for increased electoral representation, vote by ballot and manhood suffrage which in later years was developed into "one man one vote," and finally into "one adult one vote."

In 1860 the Robertson Ministry introduced two Land Bills, one providing for the alienation and the other for the pastoral occupation of Crown lands. The main principles of these bills were free selection — before survey, which constituted the battle cry of the land reformers. In 1861 the bills were again introduced into the Assembly, Mr. Robertson resigned his seat in the Assembly and was appointed a member of the Council in order to pilot the bills through that Chamber. Both bills were again passed by the Assembly and sent to the Council. In order to counteract and overcome the opposition in the Council it was decided to swamp that Chamber by the appointment of 21 members. A parliamentary crisis was thus brought about. A majority of the old members withdrew from the Chamber, thus leaving it without a quorum and the fresh nominees could not be sworn in. The term of office of the first members of the Council was limited to five years which was then about to expire. The Council was reconstituted by the appointment of 27 life members on 24 June 1861; Wentworth being appointed the first President. In 1862 the Crown Land Alienation Bill and the Crown Land Occupation Bill were passed by both Houses. A Chinese Immigration Restriction Bill embodying the main provisions of Victorian legislation, was also passed.

In 1863 Messrs. Dalley and Parkes returned to the Colony from England where they had been sent on a mission to promote emigration to New South Wales. From this time on Mr. Parkes became a prominent figure in the political world of New South Wales. He was closely identified with the cause of free trade. In 1868 Mr. Parkes resigned, and temporarily withdrew from public life. The most notable public events of this period were the withdrawal of the British troops from New South Wales and Victoria, and the successful transmission of the first through cable message from Australia to England.

In 1872 the Martin-Robertson Ministry was defeated. Mr. Parkes having returned to the House was entrusted with the task of forming a ministry. He retained the premiership until 1875 when his government was defeated on the motion by Mr. Robertson. The Robertson Ministry remained in office until 17 Dec. 1877, when Mr. Parkes formed another ministry which had but a short reign. A political duel went on between Mr. Parkes and Mr. Robertson for a considerable time, but was at last terminated by a coalition of the two leaders who in December 1878, formed a Ministry which lasted until Jan. 1883. In 1881 a Chinese Immigration Restriction Act was passed imposing severe penalties on Chinese entering the Colony, without payment of a poll tax of £10. An Act was passed legalizing trade unions. The Federal Council of Australia was created on 28 Nov. 1883. A rich silver field was discovered at Broken Hill (1883).

The Land Bill of 1882 was the rock on which the Parkes-Robertson Ministry was wrecked. A general election resulted in Mr. (afterwards Sir) Alexander Stuart coming to power which he held until October, 1885. In 1888 another Chinese Restriction Act was passed. The Poll Tax was raised to £100 per head. Chinese were not permitted to engage in mining and they were not qualified to be naturalized. A tonnage limitation was imposed on vessels bringing Chinese to New South Wales; they were not allowed to bring more than one Chinese passenger to every 300 tons.

In February 1890, a Federal Conference, presided over by Sir Henry Parkes, was held in Melbourne, at which it was resolved that a National Australian Convention should be held to draft a Constitution for the federation of the Australian colonies. In March 1891, the Convention was held in Sydney and a draft Constitution was adopted. In October 1891, the last Parkes Ministry was defeated, being succeeded by that of Sir George Dibbs. In 1893 an Electoral Bill was passed embodying the principle of "one man one vote."

In August 1894, the Dibbs' Ministry, which had introduced protection in a modified form, gave way to a free trade Ministry formed by George H. Reid. A new tariff on free trade lines, a land tax, an income tax, and homestead bills were passed under his leadership. Early in 1895 Mr. Reid attended a conference of Premiers at Hobart at which the draft of an Enabling Bill to be introduced into the Legislature of each colony, providing for the election directly by the people of each colony of 10 representatives to attend a Federal Convention to frame a Constitution for the federation of the colonies, to be afterward submitted to a referendum of the people of each colony, was adopted. Subsequently the Parliament of New South Wales, as well as the Parliaments of the other colonies passed identical bills for the aforesaid purpose. It was under the authority of this legislation that the Commonwealth Constitution was afterward framed and adopted. In 1897 an Immigration Restriction Act, based on the Natal Act, imposing an education test in order to exclude colored aliens, was passed.

Legislation on similar lines was adopted in several other colonies.

On 13 Sept. 1899, the Reid Ministry was defeated and Sir William Lyne formed a Government which succeeded in passing the Early Closing Act, the Navigation Act, the Old Age Pension Act, and the Women's Franchise Act. In March 1901, Sir William Lyne retired in order to take office as a Commonwealth Minister. The Ministry formed by Mr. (afterwards Sir) John See succeeded it. One of the most important measures passed through its instrumentality was the Industrial Arbitration Act (1901); under which the principle of compulsory arbitration and settlement of industrial disputes was established. A short-lived Waddell Ministry was followed by one formed by Mr. Joseph Hector Carruthers, and it is still in office (September 1906).

VICTORIA AN OFF-SHOOT OF NEW SOUTH WALES.

Separation.— By Act 13 and 14 Vic., c. 59, (5 Aug. 1850), the district of Port Phillip, bounded on the north and northeast by a straight line drawn from Cape Howe to the nearest source of the river Murray, and thence by the course of that river to the eastern boundary of the colony of South Australia, was separated from the colony of New South Wales, ceased to return members to the Legislative Council of such colony, and was erected into and thenceforth formed a separate colony, "to be known and designated as the colony of Victoria." A Legislative Council was created in and for the new colony having powers and functions similar to those of the newly-organized Council of New South Wales. On 1 July 1851, writs for the election of 20 elective members for the Legislative Council of Victoria were issued; 10 were nominated by the Crown. Mr. La Trobe was appointed Lieutenant-Governor. In this manner the Colony of Victoria was called into existence and received the first impulse of an autonomous political life. The new Council was convened for the despatch of business in November 1851, at about the time when gold was being discovered in fabulous quantities in the famous goldfields of Ballarat and Bendigo. The official members were: Mr. W. Lonsdale, Colonial Secretary; Mr. (afterwards Sir) W. F. Stawell, Attorney-General; Mr. (afterwards Sir) Redmond Barry, Solicitor-General; C. H. Ebden, Auditor-General; and R. W. Pohlman, Chairman of the Court of Requests. J. F. Palmer was elected Speaker.

The New Constitution.— A new Constitution drawn on the same lines, and passed in the same manner as that of New South Wales, was assented to by Her Majesty on 16 July 1855. The only substantial difference between the two bicameral Legislatures was that whilst the Legislative Council of New South Wales was composed of members nominated by the Crown the members of the Legislative Council of Victoria were elected by residential inhabitants having high property qualifications.

Responsible Government.— The Premier of the first Responsible Government was W. C. Haines. The first election for the Legislative Assembly took place in the spring of 1856. The first Ministry resigned on the passing of an unfavorable resolution upon the subject of the Estimates, in March 1859. Sir John O'Shanassy, the mover of the resolution, then became Premier.

Administration and Legislation.— Among the problems which soon engaged the attention of the newly-created Parliament of Victoria were those of Constitutional Reform, Manhood Suffrage, Land and Mining Legislation, Agriculture, Protection, and Free Trade, Inter-Colonial Relations, Public Works, Railways, Telegraphs, Water Supply, Immigration, Chinese Immigration Restriction, Naval and Military Defence, and Education.

Among the first Administrations which held office in Victoria were those of which William Clark Haines was Premier in 1855–57; 1857–58; Mr. (afterwards Sir) John O'Shannassy, Premier, 1857; 1858–59; 1861–63; Wm. Nicholson, Premier, 1859–60; Richard Heales, Premier, 1860–61.

In the early days of the goldfields great discontent existed because of the heavy license fee of 30 shillings per month which every digger was required to pay. In November 1854, the tyrannical policy of the Government culminated in an open insurrection which broke out at Ballarat. A flag of revolt, having the emblem of the Southern Cross, was hoisted over a barricade known as the "Eureka Stockade." By command of Governor Sir Charles Hotham a force of British troops were sent to Ballarat to storm the stockade. Many lives were lost. After this tragic period,— the first and only bloodshed in Australia in the name and for the cause of political freedom,— the grievances of the diggers were redressed.

In 1855 the Legislative Council of the newly-created Colony of Victoria led the way in the passage of a number of laws intended to restrict Chinese immigration, which commenced in 1854, when the fame of the gold diggings of Victoria began to attract thousands of Chinamen to that Colony. The Victorian Council passed a bill, which was assented to by the Governor, "to make provision for certain immigrants." The substance of the law was that no ship should bring to a Victorian port more passengers, being Chinese immigrants, than in the proportion of one person to every 10 tons of the tonnage of such ship, under a penalty of £10 for each passenger in excess of such proportion. On the arrival of a ship in any port of Victoria with Chinese immigrants on board, the master was required to pay to the Collector of Customs a tax of £10 for every such immigrant. The money so collected was to be invested by the Government to form a fund for the relief, support and maintenance of such immigrants. Provision was made for the registration of such immigrants, on their arrival in any district or place to which they proceeded. This and other Immigration Acts were consolidated in 1865.

Another notable measure passed by the first Legislative Council of Victoria was a bill adopting "vote by ballot;" this was the first measure in the history of Parliamentary Government in which this method was made legal.

The first important bill was introduced by James Service as Commissioner of Crown Lands and Surveys in the Nicholson Government, on 30 Nov. 1859. The chief feature in this bill was that of free selection for settlement and agriculture over all the waste land of the Colony, subject to certain conditions with

respect to lands not yet surveyed. The bill was passed by the Assembly but was rejected by the Council.

The period from 1863 to 1866 was memorable in the history of Victoria. It began in a conflict between the parties representing Protection and Free Trade. It then developed into a struggle between the two Houses for financial supremacy, and in its third and last stage it became a contest between the Legislative Assembly and the Crown. The first McCulloch Ministry took office in June, 1863; it remained in power until 6 May 1868. One of its first proposals was a bill imposing numerous customs duties of a protective character. It was passed by the Lower House and rejected by the Council. It was then reintroduced tacked on to the Appropriation Bill. The Council again rejected it, and a deadlock ensued. The Government in the meantime collected duties on the authority of the Assembly alone. Funds not having been voted for payment of the Public Service the Government borrowed money to the amount of £40,000 from the London Chartered Bank which then sued the Government for money lent. The Government confessed judgment. The Supreme Court pronounced the collection of customs duties on the resolution of the Assembly to be illegal. It also held that confessed judgments against the Crown were illegal. A tariff, separated from the Appropriation Bill, was again passed by the Assembly and again thrown out by the Council. The Ministry resigned. Mr. Fellows formed a Government which, however, could not carry on. Mr. McCulloch returned to office and the Tariff Bill was again passed by the Assembly, and again sent up to the Council. The preamble of the bill asserting the exclusive right of the Assembly to grant money and taxes, was eventually withdrawn, and the bill was passed.

The second McCulloch Ministry was defeated on 20 Sept. 1869. It was followed by an Administration formed by John Alexander McPherson which remained in office for six months. It was displaced on 9 April 1870, by Sir James McCulloch, who, on 19 June 1871, was defeated on his Property Tax Proposals. Charles Gavan Duffy then formed a Ministry which successfully proposed and carried a Protectionist Tariff. The Duffy Ministry was defeated on 10 June 1872. The Governor refused a dissolution and James Goodall Francis became Premier. The first Mining on Private Property Bill, was carried in the Assembly by 43 votes to 3, but was rejected by the Upper House. A bill to regulate mines, in order to prevent mining accidents, and to protect miners, was passed.

In 1875 the Kerferd Government introduced a bill imposing certain duties on wines and spirits. The tariff proposals were carried by a majority of one. This the Government accepted as an adverse vote and applied for a dissolution, which the Governor refused. On 7 Aug. 1875, Graham Berry formed his first Ministry, but he was defeated on 20 Oct. 1875. Sir James McCulloch's fourth and last Government then came into power. Its accession marked the beginning of a stormy and momentous political period. The Berry party raised a "stonewall" of obstruction, and the McCulloch party retaliated by passing standing orders to restrict and limit debate, which became known as the "Ironhand" and the "Gag." The McCulloch Ministry became very unpopular throughout the country. At a general election held on 11 May 1877, an immense majority was returned against the Government. Mr. Berry then formed his second Ministry. The principal planks in its program were, a Land Tax to "burst up the large estates," and payment of members. A Land Tax Bill was introduced and passed. Provision for the payment of members, to the amount of £300 per year, was made in the Appropriation Bill. In that form it was sent to the Council where it was rejected on the ground that it was a "tack." Then ensued the historic deadlock of 1877–78. No money having been voted to pay the public servants the Government on 8 Jan. 1878, ordered the dismissal of all heads of departments, County Court Judges, Police Magistrates, and other public officers. This proceeding caused a great sensation, and by the opponents of the Ministry it was denounced as "revolutionary." Shortly afterwards a compromise was arrived at; payment of members was passed in a separate bill and the Appropriation Bill without the obnoxious "tack" was carried. The Berry party then devoted their attention to the question of Constitutional reform. A bill was passed through the Assembly providing for the adoption of a method of referendum to settle disputes between the two Houses. It was rejected by the Council. A deputation, or embassy, consisting of the Premier and Professor Pearson, was sent to England to interview the Secretary of State for the Colonies, who was asked to settle the Constitutional difficulty in Victoria. Sir Michael Hicks-Beach gave a very guarded reply stating that the Imperial Parliament would never alter the Constitution of the Colony at the instance of one House only.

In 1879 the Parliament of Victoria again resorted to legislation in order to arrest the influx of Chinese. Vessels were not allowed to introduce into any Victorian port more than one Chinaman per 100 tons of tonnage, and a poll tax of £10 was imposed on each immigrant on his landing. In April, 1888, a Chinaman, Chun Toy, arrived in the port of Melbourne on board the British ship *Afghan*. The Collector of Customs considered that the *Afghan* had brought a larger number of Chinese than was allowed by law; he refused to allow any of them to land, or to accept the poll tax of £10 each. Chun Toy brought an action against the Collector in the Supreme Court of Victoria, which decided that the action of the Government in preventing the landing of the Chinese prepared to pay the prescribed poll tax was illegal. The Victorian Government appealed from this decision to the Privy Council which reversed the judgment of the Victorian Court, and held (1) that the Collector of Customs was under no legal obligation to accept payment, whether tendered by the master on behalf of any such immigrant, or tendered by or for any individual immigrant; (2) that, apart from the Act, an alien has not a legal right, enforceable by action, to enter British territory.

After an appeal to the Constituencies in March, 1880, Berry resigned, and James Service then formed a Ministry. He introduced a measure to amend the Constitution, which upon a

division was lost by two votes. Parliament was dissolved and a general election was held in June, 1880, which resulted in the Berry party being returned to office with a substantial majority. The principal work done by the third Berry Ministry was the carrying of a bill to amend the Constitution of the Legislative Council by reducing the qualification of electors and of members. A bill was also passed making permanent provision for payment of members. In July 1881, the third Berry Ministry was succeeded by one formed by Sir Bryan O'Loughlin, The O'Loughlin Ministry lost office in March, 1883, when a Coalition Ministry under Service and Berry was formed. Under this Government, Acts were passed for the abolition of political control of the Government railways, by placing them under the management of three independent commissioners, and for the abolition of patronage in the public service. During his premiership, Service took great interest in the question of Australian Federation, and through his instrumentality a convention was held in Sydney at which a scheme for the establishment of a Federal Council was adopted.

The Service-Berry Ministry was followed in February, 1886, by the Gillies-Deakin combination. In 1888 another Chinese Immigration Restriction Act was passed providing that no vessel should enter any Victorian port having on board more than one Chinaman for every 500 tons of the tonnage of such vessel. Any Chinese who should enter Victoria by land, without first obtaining a permit in writing, from some person to be appointed by the Governor in Council, was declared guilty of an offence against the Act, and made liable on conviction to a penalty of not less than £5 nor more than £20 and also upon the warrant of the Commissioner of Trade and Customs, to be removed or deported to the colony from whence he came.

On 5 Nov. 1890, the Gillies-Deakin Ministry was succeeded by a Ministry formed by James Munro, who in his turn gave place in February, 1892, to one formed by William Shiels. The career of the Shiels Ministry, the Patterson Ministry, and the early part of that of the Turner Ministry, which came into office on 27 Sept. 1894, were comparatively uneventful. In February, 1895, Sir George Turner was associated with Reid and other Premiers in a conference held at Hobart at which a Federal Enabling Bill was drafted. The first Turner Ministry was defeated in December, 1899. Allen McLean's Ministry held office for a little over 11 months; during which time several contingents were sent from Victoria to assist the British army in South Africa. On 15 Nov. 1900, Sir George Turner again became Premier in time to make arrangements for the establishment of the Commonwealth. An Old Age Pension Act was passed, also bills protecting the rights and interests of Victorian public servants. In the beginning of 1901 Sir George Turner resigned the Premiership and accepted office as Treasurer in the first Federal Cabinet. Sir Alexander Peacock became head of the new Government. On 3 June 1902, the Peacock Ministry was displaced on a no-confidence motion by W. H. Irvine. During the career of the Irvine Ministry a railway strike occurred in Victoria which resulted in an Act being passed for the separate representation in Parliament of railway and other public servants. On the retirement of Irvine through ill-health he was succeeded by Thomas Bent as Premier, who still holds office (September 1906).

TASMANIA AN OFF-SHOOT OF NEW SOUTH WALES.

Separation.— By the Act 4 Geo. IV., c. 96 (19 July 1823), the Crown was empowered to separate Van Diemen's Land from New South Wales, and erect it into a separate colony which then received a Lieutenant-Governor, an Executive Council and a small Legislative Council, consisting of seven members. By Act 13 and 14 Vic., c. 59, s. 7, it was provided that the Legislature already existing in Van Diemen's Land might establish within the colony a Legislative Council to consist of not more than 24 members, of whom one-third should be nominated by Her Majesty and the remainder elected by qualified inhabitants of the colony. Under the authority of this law a new Legislative Council was called into existence having powers and functions similar to the Legislative Council of New South Wales.

The New Constitution.— During the Governorship of Sir William Denison the new Legislative Council of Van Diemen's Land under the powers conferred by 13 and 14 Vic., c. 59, s. 32, drafted a Constitution for the establishment of a bicameral Legislature in Van Diemen's Land composed of a Legislative Council of 15 members elected by the qualified inhabitants, and a House of Assembly of 30 members elected on a more popular franchise than that of the Council. The bill so drawn was passed by the Legislative Council and reserved by the Lieutenant-Governor for the Royal assent. It became law on 24 Oct. 1856; the first Parliament being opened on 2 Dec. 1856. Sir Henry E. F. Young was appointed the first Governor-in-Chief of the colony under the new system of Responsible Government. The first Premier was William T. N. Champ. In the year 1853, upon the cessation of transportation, the name of the island was changed from that of Van Diemen's Land to Tasmania.

Administration and Legislation.— Upon the cessation of transportation and the grant of Responsible Government to Tasmania a new life and destiny was imparted to the struggling community. Between 1855 and 1872 there was substantial improvement and progress in the position and prospects of the island, marked by the development of the interior, the construction of roads and tramways, the initiation of railway and telegraphic communication, the expansion of the agricultural and pastoral industries, the division of the colony into municipalities, the laying of a sub-marine cable between Tasmania and the mainland, the discovery of tin at Mount Bischoff and other places, gold in the quartz reefs at Brandy Creek, and subsequently of silver and lead at Zeehan, and gold and copper at Mount Lyell. The west coast became famous by the opening up of some of the richest silver lead mines in the world; coal seams were opened at Hastings, Langlock, and Ivanhoe.

In February 1894, whilst the Dobson Ministry was in office the necessity of financial reform became a burning question. Financial proposals were submitted by the Government. A bill to authorize a graduated Land Tax was submitted to the Assembly and rejected; conse-

quently Dobson and his colleagues resigned in April 1894, and Sir Edward Braddon formed a Ministry. An Income Tax was passed, together with a Land Tax imposing one penny per £ on the capital value of all land in the colony. This general tax was adopted as a sort of a compromise instead of the proposed tax on the unimproved capital value of the land which was at first submitted and rejected.

In February 1895, a conference of Premiers was held at Hobart at which the draft of a Federal Enabling Bill was adopted. At a general election held in 1897, a system of voting based upon Hare's preferential method was used for the first time. During the year a Federal Referendum was held at which a large majority of votes was given in favor of the Federal Constitution. In 1899 the Braddon Ministry was defeated and it was succeeded by one formed by Sir Neil Elliot Lewis on 12 Oct. 1899, who retained office until 8 April 1903. On 9 April 1903, William Bispham Propsting became Premier, and on 12 July 1904 he was succeeded by John William Evans, who still holds office (September 1906).

QUEENSLAND AN OFF-SHOOT OF NEW SOUTH WALES.

Separation.— On 6 June 1850, letters-patent were issued erecting the Moreton Bay district into a separate colony, under the name of Queensland, and appointing Sir George Ferguson Bowen to be Captain-General and Governor-in-Chief thereof. The boundary of the new colony was defined as a line commencing on the sea coast at Point Danger, in latitude about 28° 8′ south, running westward along the Macpherson and Dividing Ranges and the Dumaresq River, to the McIntyre River, thence by the 29th parallel of S. latitude to the 141st meridian of E. longitude; on the west the 141st meridian of E. longitude from the 29th to the 26th parallel, and thence the 138th meridian north to the Gulf of Carpentaria, together with all the adjacent islands, their members and appurtenances in the Pacific Ocean. The Governor was authorized to appoint an Executive Council to advise and assist him in the government of Queensland. The Constitution of Queensland was embodied in an Order in Council bearing the same date as the letters-patent.

The New Constitution.— The Order in Council provided that there should be within the Colony of Queensland a Legislative Council and a Legislative Assembly, with the advice and consent of which Her Majesty should have power to make laws for the peace, welfare, and good government of the colony in all cases whatsoever. In its main outlines the Constitution of Queensland was almost a replica of that of New South Wales. The first Parliament under the New Constitution was convened for the despatch of business on 29 May 1859.

Administration and Legislation.— Public events in Queensland became clustered around and associated with the following prominent men who held office as Premier between 1859 and 1899: Robert G. Herbert, Arthur MacAlister, Robert Mackenzie, Charles Lilley, Arthur Palmer, George Thorn, John Douglas, Thomas McIllwraith, Samuel Griffith, Boyd D. Morehead, Hugh Muir Nelson, Thomas J. Byrnes, and James R. Dickson.

From the date of separation Queensland began to advance with rapid strides, and it soon occupied a prominent position in the Australian group. Between 1861 and 1871, under a policy of assisted immigration the population largely increased and the resources of the country were developed in the direction of pastoral and agricultural pursuits, gold and silver mining, sugar and cotton growing. Cotton growing was stimulated by bounties. The pastoral industry was promoted; railway construction was commenced; state aid to religion was withdrawn and a system of primary and secondary education was initiated. Queensland was found to be particularly suitable for sugar growing and a demand for cheap labor quickly sprang up. In course of time shiploads of South Sea Islanders were introduced by the sugar planters and it was soon found necessary for the Legislature to interfere.

A financial crisis occurred in 1865, which in 1866 resulted in a change of Ministry. The first MacAlister Ministry had a short term of office. Herbert was again called to the helm of affairs but in a few months he was again displaced. The second MacAlister Ministry lasted for 12 months and eight days. It secured the passing of an important measure dealing with the cultivation and occupation of Crown lands. It was followed by the MacKenzie Ministry and the Lilley Ministry. The MacKenzie Ministry of 1867 introduced and passed a Crown Land Act which gave greater facilities for settlement. The Lilley Ministry of 1868 passed Acts relating to the Civil Service, Court procedure, and electoral laws. The Lilley Ministry was followed by the Palmer Ministry which lasted from 3 Jan. 1870 to 8 June 1874. In 1875 during the reign of the third MacAlister Administration a State Education Act was passed which embodied the principles of free, secular, and compulsory education. A complete measure of local government was passed in 1878, under the rule of the Douglas Administration. In the same year the first act to restrict Chinese immigration into Queensland became law.

In 1879, Mr. (afterward Sir) Thomas McIllwraith formed his first Government. On 4 April 1883, he made a dramatic and sensational attempt to annex New Guinea, directing H. M. Chester, at Thursday Island to cross Torres Straits and on behalf of Her Majesty's Government in Queensland to hoist the British flag and proclaim the annexation to that colony of that part of the island not claimed by the Dutch. This act was repudiated by Lord Derby, who, however, on 10 Oct. 1884 declared a British Protectorate over the southern part of the island; Germany seized the remainder.

In November, 1883, McIllwraith was defeated and Mr. (afterward Sir) Samuel Griffith succeeded him. During his term of office a convention of Australian representatives was held in Sydney, at which a scheme for the establishment of a Federal Council of Australasia, drafted by Griffith, was adopted and it afterward became law by Imperial legislation. A Crown Lands Act was passed by the Griffith Administration in 1884. It encouraged Crown Tenants to improve their holdings, facilitated *bona fide* settlement and discouraged the speculative acquisition of land. The first Griffith Ministry was succeeded (13 June 1888) by the

second McIllwraith Government, which had only a brief tenure of office, being on 20 Nov. 1888, supplanted by the Morehead Ministry which lasted until the 7 Aug. 1890. The second Griffith Ministry was then formed. In April 1891, Griffith took an active part in a Federal convention held in Sydney at which a draft Constitution for the union of the Australian Colonies was adopted.

The Kanaka labor question became important about this time and the Griffith Ministry advised the reintroduction of Polynesian laborers. On 14 April 1892, the Pacific Laborers' Extension Bill was passed, notwithstanding strong objections urged against the introduction of colored races into Queensland. On 11 Jan. 1893, Griffith was appointed Chief Justice. Mr. (afterward Sir) Hugh Muir Nelson occupied the post of Acting Chief Secretary pending the arrival from England of Sir Thomas McIllwraith who, on 27 March, became Premier of his third and last Administration. In October following he resigned the Premiership in which he was succeeded by Sir Hugh Muir Nelson. In 1894 the great strike of shearers occurred in Queensland, leading to a reign of lawlessness which resulted in the passage of the Peace Preservation Act. In 1896 a Meat and Dairy Produce Act was passed which gave a stimulus to the primary industries. Increased facilities for land settlement were offered.

On 13 April 1898, Sir Hugh Nelson resigned the Premiership and was appointed President of the Legislative Council. The task of forming a new Government was entrusted to T. J. Byrnes who gave promise of a brilliant political career which was cut short by his death, at the early age of 36, after five months of office. Mr. (afterwards Sir) James R. Dickson then became Premier. He was an ardent Federalist and exercised the whole of his influence in favor of Queensland joining the Commonwealth which was then on the eve of being established. He represented Queensland at a conference of Premiers at which the constitution, as adopted by the Convention, was slightly modified. In Sept. 1899 the constitution was submitted to the people of Queensland by a referendum and was approved by a large majority. In December 1899, a Labor Ministry was formed by Anderson Dawson; it lasted six days and R. Philp, a former colleague of Dickson, then formed a Ministry. Philp held office until 17 Sept. 1903. The Labor Party, having in the meantime increased in members and influence, became sufficiently strong to take a share in the Executive Government of the country, and accordingly Arthur Morgan vacated the Speaker's chair and formed a Liberal Labor Government in which the Liberals and Laborites were equally represented. In January 1906, Morgan resigned the Premiership and became Vice-president of the Executive Council, William Kidston, leader of the Labor Party becoming Premier.

WESTERN AUSTRALIA THE SECOND ORIGINAL COLONY.

Foundation.— The first Imperial Act applicable to Western Australia was 10 Geo. IV., c. 22. (1829). It was intituled «An Act to Provide Until the 31st Day of December 1834, For the Government of His Majesty's Settlements in Western Australia on the Western Coast of New Holland.» It will be noticed that the name «Australia» first suggested for the continent in 1814 by Matthew Flinders, is here used and for the first time mentioned by an Imperial Act. By that Act the King, with the advice of the Privy Council, was empowered to authorize any three or more persons resident within the settlements, to make, ordain, and constitute laws, institutions, and ordinances for the peace, order, and good government of His Majesty's subjects and others within the settlement.

A Representative Legislature.— Under the Act 13 and 14, Vic., c. 59 (5 Aug. 1850), Western Australia was granted a Legislative Council, consisting of 26 members, nine of whom were nominated by the Crown and 17 were elected by qualified inhabitants. Three years afterward an agitation was commenced in favor of Responsible Government as it existed in the eastern colonies. In 1874, a draft of a Constitutional Bill was sent to the Secretary of State, who, however, decided that the colony was not yet ripe for the change.

The New Constitution.— The movement was not successful until July, 1890, when a new Constitution was passed by the Imperial Parliament, being embodied in the Act 53 and 54 Vic., c. 26. It created a bicameral Legislature consisting of a nominee Council and an elective Assembly to make laws in and for Western Australia, and along with it Responsible Government was introduced. The first Premier was Sir John Forrest.

Administration and Legislation.— The discovery of goldfields, and a rapid influx of population were factors which largely contributed toward the success of the constitutional movement. The new Parliament was called upon to pass legislation relating to gold mining, land settlement, railway construction, and water supply. Under the old regime a railway 243 miles long had been constructed on the land grant system between Beverly and Albany. Under the terms of the contract, payment was made at the rate of 12,000 acres for every mile of completed road. The lands selected in payment were situated within a belt of 40 miles on each side of the line; half the frontage to the railway was reserved to the Government. In 1896 the Government acquired this private land-grant railway, the purchase price being £1,100,000. The Perth Water Works constructed by the Perth Water Supply Company, was taken over by the Government at a cost of £220,000. Among the lines of railways which greatly assisted in the development of the interior were the lines to Kalgoorlie, Menzies, and Kanowna, penetrating into the heart of the eastern gold-fields. A gigantic scheme of water supply for the conveyance of water through pipes by pumping from station to station, from the Mundaring Reservoir to Coolgardie and Kalgoorlie, a distance of 330 miles at a cost of £2,500,000, was inaugurated, and afterward successfully completed.

In 1897–99 the question of federation came into prominence. The attitude of the Forrest Government toward the new Constitution was not favorable whilst on the gold-fields there was a strong movement in favor of the bill backed up by threats of separation. This led to a change

of attitude on the part of the Government, and at the test referendum that followed a majority of electors voted in favor of Federal union.

In 1899 an Electoral Bill was passed which conferred the political franchise on adult woman; it was exercised for the first time on the occasion of the Federal referendum.

Sir John Forrest retired from state politics in February, 1901, and G. Throssell succeeded him as Premier. The Throssell Ministry was defeated at a general election held the same year. George Leake then formed a Ministry which was short-lived, as also was another formed by Alfred Edwards Morgans. On 23 Dec. 1901 Leake formed his second Ministry and held office until his death on 24 June 1902. He was succeeded in the Premiership by Walter H. James on 1 July 1902. The only notable piece of legislation passed in this period of short-lived Ministries, were the Arbitration and Conciliation Act, and the Workmen's Compensation Act. On 10 Aug. 1904 James was defeated and a Labor Ministry was formed by Henry Daglish. It remained in office until 25 Aug. 1905 when it was displaced — partly by dissension within the ranks of the Labor Party, and ostensibly on the question of purchasing and resuming possession of the Midland Railway. On 25 Aug. 1905 Cornthwaite Hector Rason became Premier of a Liberal Administration, pledged to oppose the extreme policy of the Labor Party. He secured a dissolution and went to the country from which he returned with a strong working majority. He resigned in May 1906, to accept the position of agent-general in London and Newton James Moore became Premier and is still in office (September 1906).

SOUTH AUSTRALIA THE THIRD ORIGINAL COLONY.

Foundation.— This province was originally carved out of that part of the colony of New South Wales lying between the meridians 132° and 141° E. longitude, bounded on the north by the 26° parallel of S. latitude and on the south by the Southern Ocean. This region was never occupied, or settled, by the New South Wales Government. On 15 Aug. 1834, the Act 4 and 5 Wm. IV., c. 95, intituled "An Act to empower His Majesty to erect South Australia into a British Possession or Province, and to provide for the Colonization Thereof" was passed. It did not purport to separate the territory from New South Wales; it seemed to contemplate the whole of that part of the continent as not being subject to any prior statutory authority. It empowered the King to appoint a Governor and Colonization Commissioners, who were to have the control of the Crown lands, with power to survey and sell the same, and to employ a portion of the money so derived in conducting the immigration of laborers from Great Britain. In the exercise of these powers the Province was erected; a Governor, a Judge, seven commissioners, and other officials were appointed. The Governor, with the concurrence of the Chief Justice, the Colonial Secretary, and Advocate-General, or two of them, was authorized to make laws and impose taxes. Captain (afterward Sir) John K. Hindmarsh was appointed the first Governor.

On 28 Dec. 1836, Governor Hindmarsh arrived at Glenelg and proclaimed the establishment of the Government. He was succeeded on 12 Oct. 1838, by Governor Gawler, during whose term of office the settlement became involved in debt to the extent of £281,842. Gawler was recalled (May 1841), and a radical change was made in the government of the colony; the office of Colonization Commission in London was abolished; South Australia was made a Crown colony, and the government was vested in the Secretary of States for the Colonies. Captain (afterward Sir) George Grey was appointed Governor, and almost absolute power was entrusted to him.

In 1842 the Act 5 and 6 Vic., c. 61, intituled "An Act to provide for the better government of South Australia" was passed. Under it a nominated Legislative Council, consisting of the Governor and seven other persons resident in the colony, was created, having power to make laws for its government. On 25 Oct. 1845, Captain Grey was transferred to New Zealand, and Lieutenant-Colonel Robe acted as Governor for a short time. His successor was Sir Henry Fox Young, to whom the colony was indebted for an extensive main road system, and the institution of local government in the shape of District Councils.

A Representative Council.— Under the Act 13 and 14 Vic., c. 59. (5 Aug. 1850) the Legislative Council then established in South Australia was authorized to establish another Legislative Council consisting of not more than 24 members, one third of whom were to be appointed by the Crown and the remainder were to be elected by the qualified inhabitants. This new Council was authorized to make laws for the peace, order, and good government of the province and to impose rates and taxes. On 21 July 1851, this Council consisting of 24 members was duly constituted.

The New Constitution.— In 1853 the Legislative Council of South Australia, in pursuance of powers conferred by section 32 of the Act 13 and 14 Vic., c. 59, passed a bill to establish a bicameral Legislature for South Australia, consisting of a Legislative Council and a House of Assembly. This bill was reserved for the Queen's assent but it was disallowed. Subsequently a second bill to create a bicameral Legislature was introduced in the Council and passed. It provided for the creation of two elective Houses to take the place of the Council created by the Act 13 and 14 Vic., c. 59. This bill eventually received the Royal assent, and is sometimes called the "Constitution Act" of South Australia. It contained provisions and machinery somewhat similar to the Constitution Act of Victoria. The suffrage for the Assembly was manhood coupled with registration and residence. Both Houses were chosen by ballot which was adopted on the motion of Francis S. Dutton, afterwards Premier.

Responsible Government.— The election of members of the two new Houses took place in March 1857. The first session of the new Parliament commenced on 22 April 1857, during the Governorship of Sir Richard Graves McDonnell. The first Premier was B. T. Finnis.

Administration and Legislation.—Among the public men of South Australia, who, in the early history of the Colony under Responsible Government, took an active and prominent part in the great business of administration and legis-

lation were the following who held office as Premiers from 1856 to 1870; Lieutenant-Colonel Boyl Travers Finniss, John Baker, Robert Richards Torrens, Richard Davies Hanson, Thomas Reynolds, George Marsden Waterhouse, Francis Stokes Dutton, Henry Ayers, John Hart, Arthur Blyth, and Henry Bull Templar Strangways.

Mr. (afterward Sir) R. R. Torrens took office in 1857. His name has become famous by association with an act simplifying the transfer, conveyance, and registration of land. Torrens was the originator of the plan; it was based on practical knowledge obtained by him as Collector of Customs, but he was assisted by the legal knowledge of Doctor Hubbe. The Torrens' Land Act system was afterward adopted by all the other Australian colonies. In 1861 a strip of territory lying between latitude 129° and 132° E. longitude and south of the 26° S. latitude known as «No Man's Land» was added to South Australia.

Sir Dominic Daly succeeded Sir Richard G. MacDonnell on 4 March 1862. In March 1863 an intercolonial conference was held in Melbourne at which the majority of the Australian colonies were represented. This conference was originated in a suggestion made by Sir Dominic Daly. It was resolved that it was desirable to settle the basis for a uniform tariff for the Australian colonies. No practical results followed the conference, but it foreshadowed the necessity of some form of Federal Union. In the same year the Northern Territory was added to South Australia by letters-patent.

In 1868–69, a Ministry, of which Henry B. Templar Strangways was Premier, held office. Its career was distinguished by the passing of a Land Act which was intended to promote settlement and prevent the monopolization of the large tracts of land by land sharks and dummies. Sale of land by auction was limited. Land was sold to *bona fide* selectors on credit, the payments being allowed to extend over a period of four years, and no selector was allowed to take up more than 640 acres.

The great overland telegraph line from Port Augusta to Port Darwin, the construction of which was prosecuted during the Premiership of Strangways, John Hart, and Sir Arthur Blyth, was completed on 2 Aug. 1872. In 1875–76 a strong administration formed by Mr. (afterward Sir) James Penn Boucaut, was in power; it introduced a policy of internal development, public works and railways. It was proposed that a loan of £3,000,000 should be raised, coupled with increased taxation, stamp tax, and probate duties. This scheme was passed by the Assembly and rejected by the Council. Mr. (afterward Sir) John Colton formed a Ministry which adopted Boucaut's policy and carried his scheme of public works and railways without the increased taxation. In 1877 Boucaut's second Ministry was in office, and during that year the overland telegraph line between Adelaide and Perth was completed.

The second Boucaut Ministry was succeeded by Administrations of which the following were Premiers from 1878 to 1905: William Morgan, John Cox Bray, John Colton, John W. Downer, Thomas Playford, John Alexander Cockburn, Frederick William Holder, C. C. Kingston, Vaibeu Louis Solomon, and J. G. Jenkins.

In 1886 the jubilee of South Australia was celebrated. C. C. Kingston came into power in 1893. A Crown Lands Consolidation Act was passed by his Ministry which restricted the sale of Crown lands by auction, introducing a system of leasing country lands, coupled with the right of purchase and provided perpetual leases for agricultural purposes. Small blocks not exceeding the unimproved value of £100, were thrown open for lease on the application of working men. Personal residence on a block was necessary, either by the lessee or by his wife or children. The rent of each lease was notified in the 'Gazette'. These lots were not subject to a revaluation, but were liable to land tax. In 1894 a bill was passed conferring the franchise on women. In order to give encouragement and to grant assistance to the farmers an Advance to Farmers' Act was passed in 1896, under which a State Bank has been established in South Australia with power to grant loans to farmers at a low rate of interest with extended time for repayment of the principal.

On 25 April 1896, a general election was held in South Australia at which women exercised their right to vote; about 66 per cent of the women whose names were enrolled recorded their vote. On 22 Jan. 1897, Sir Samuel J. Way, Chief Justice of South Australia, was appointed a member of the Judicial Committee of the Privy Council. On 22 March the Federal Convention held its first session at Adelaide, at which the first preliminary draft was prepared. Mr. Kingston being defeated 1 Dec. 1899, resigned, and V. L. Solomon formed a Ministry which was defeated on 7 December. F. W. Holder then became Premier. An Early Closing Act, and a Workmen's Compensation Act were passed. The gunboat Protector, belonging to South Australia, was despatched to the Chinese Sea to assist in a naval demonstration against the Boxers. In May 1901, Holder resigned in order to accept office in the Federal Parliament. He was succeeded in the Premiership by J. G. Jenkins, who held office in the Playford, Kingston, and Holder Cabinets. He undertook the difficult task of carrying constitutional amendments rendered necessary by the adoption of the Federal Constitution transferring certain powers, functions, and departments from the State to the Federal Government. He succeeded in carrying a measure reducing the number of responsible ministers, reducing the number of members of the Assembly from 54 to 42, and reducing the number of the Council from 24 to 18. He resigned on 1 March 1905, and accepted the appointment of Agent-General for South Australia in London. A Ministry of which Richard Butler was Premier then took office. A general election took place in May at which Butler's party was defeated and on 20 July he resigned, and was succeeded as Premier by Thomas Price who still holds office (September 1906).

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Sir John Quick,
Member of Commonwealth House of Representatives; Joint Author of 'Constitution of Australian Commonwealth'.

5. **Australia — The Commonwealth — Its Constitution, Government, and Administrative Departments.** *The Beginning of the Federal Movement Towards Political Union.*— Under the Acts of 63 and 64 Vic., c. 12, (1900) known as the "Commonwealth of Australia Constitution Act," the people of New South Wales, Victoria, South Australia, Queensland, Tasmania, and Western Australia were united in a Federal Commonwealth under the name of The Commonwealth of Australia; and the old colonies under the name of states, were declared to be parts of the Commonwealth. This great act marked the completion and consummation of a movement in favor of Australian federation, which extended over a period of nearly 60 years.

In 1847, Earl Grey, Secretary of State for the Colonies, proposed to create a separate Legislature in and for Australia in which all the colonies then in existence should be represented, and which should have power to make laws in matters of common concern. In 1849, the Privy Council proposed that there should be a General Assembly having power to deal with

customs duties, postal matters, and to create a Supreme Court of Appeal. In 1853, a Committee of the Legislative Council of New South Wales recommended the establishment of a General Assembly. All these proposals, however, were regarded as premature. The following is a summary of other unsuccessful efforts in the same direction: (1857) a select committee of the Victorian Legislative Assembly agreed that "the time for union had come;" in the same year a select committee of the New South Wales Parliament passed a similar resolution; (1860), a select committee of the Victorian Assembly recommended negotiation; (1862), the Colonial Secretary of South Australia commenced correspondence with other colonies urging that a uniform tariff was indispensable; (1863), Tariff conference in Melbourne; (1865), Inter-Colonial conference at Sydney resulting in agreement by which the Murray border was made free of fiscal restriction; (1867), Inter-Colonial conference in Melbourne in reference to ocean postal service to Australia, at which Sir Henry Parkes said "the time has arrived when the colonies should be united;" (1880), Inter-Colonial conference in Melbourne, at which a resolution was passed that "a Federal Council was needed to deal with the question of inter-colonial interest;" (1883), Inter-Colonial conference at Sydney, at which the necessity of a Federal Council was affirmed, and at which a Draft Bill was adopted which afterwards became law. (This Council, however, was not a success as only three of the colonies joined it;) (1890), Federal conference in Melbourne convened by Sir Henry Parkes at which resolutions were passed affirming the necessity for an early convention of the representatives of all the colonies to prepare a scheme for a Federal Constitution.

Convention of 1891.—On 22 March 1891, the first Federal convention was held in Sydney at which all the Australasian colonies, including New Zealand, were represented by seven delegates chosen by the Parliament of each colony. A constitution was draftd and adopted by the convention, but no practical action was taken to give it effect. In January, 1895, a conference of Premiers was held at Hobart, at which all the Australasian colonies were represented. It was resolved that "a convention, consisting of 10 representatives from each colony, directly chosen by the electors, be charged with the duty to frame a constitution; that the constitution so framed be submitted to the electors for acceptance or rejection by direct vote." Five of the six colonies, viz.: New South Wales, Victoria, South Australia, Tasmania, and Western Australia elected 10 representatives. Queensland did not take part in the convention which met in Adelaide in March 1897. C. C. Kingston, then Premier of South Australia, was elected president of the convention, which afterwards sat in Sydney and Melbourne. A constitution was drafted, subsequently submitted to the people of the various colonies, and ratified, Queensland coming in at the last moment. The constitution so drafted and ratified by the people of Australia was afterwards embodied in an Imperial Act, came into force and the Commonwealth was proclaimed.

The Federal Constitution.—The Federal constitution came into force and the Australian colonies were united on 1 Jan. 1901. By this constitutional instrument a new Parliament was called into existence, as well as a new executive, and a new judiciary. The union of people and states, so organized and constituted, in many respects resemble that of the United States of America. The new form of government has been created for special and limited purposes to deal with matters of common Australian interests. The power and authority of the Federal Parliament, and Federal Government, are limited and restricted to such powers and authorities as have been expressly taken from the states, or such new powers as are specified and particularized in the instrument. The Governments and Parliaments of the states have the same legislative and executive scope as before — save as to matters delegated to the Federal authority. In this respect the Australian Constitution differs from that of Canada, which limits and defines the powers of the provinces, and confers upon the Dominion Parliament all the residue of sovereign power.

Executive Department of the Commonwealth.—The executive power of the Commonwealth is vested in the King, and exercised by the Governor-General as the King's representative. It includes the maintenance of the constitution and the excution of the laws of the Commonwealth. There is an Executive Council to advise the Governor-General in regard to the government of the Commonwealth. The Governor-General can appoint ministers to preside over the several departments. No minister can hold office longer than three months, unless he be a member of the Senate or of the House of Representatives. There can be no more than seven ministers in office at the same time. The sum of £12,000 per annum is appropriated to be divided among ministers by themselves.

Immediately upon the establishment of the Commonwealth the departments of customs and excise in all states were by operation of law taken from the states and transferred to the Commonwealth. By proclamation later on, the departments of post offices, telegraphs, and telephones, naval and military defence were taken from the states and vested in the Commonwealth. Four new Federal departments were also created by proclamation, viz., the Department of External Affairs, the Department of Home Affairs, the Department of the Treasury, and the Department of the Attorney-General.

Legislative Department of the Commonwealth.— The legislative power of the Commonwealth is vested in a Federal Parliament consisting of the King, or Queen, of the United Kingdom, the Senate and the House of Representatives. The Senate consists of representatives from each of the six states directly chosen by the people of each state voting as one electorate; each state is entitled to six senators. Senators are chosen for six years, one-half retiring every three years. The House of Representatives is composed of members directly chosen by the electors of the Commonwealth; the total number of such members must be as nearly as practicable twice the number of the senators. The Senate is called the State House, the House of Representatives is called the National Chamber, in which the people of each state are represented according to popula-

tion, save and except that no state to have less than five members. In the first Parliament New South Wales sent 26 members to the House of Representatives, Victoria sent 23, Queensland sent nine, South Australia sent seven, Western Australia and Tasmania sent five each. The House of Representatives continues to exist for a period of three years from the first meeting, unless sooner dissolved by the Governor-General. In case of a deadlock between the two Houses extending over a certain time the Governor-General may under certain conditions and circumstances dissolve both Houses and send them to the people; after such a double dissolution a joint sitting of both Houses of the newly elected members must be held at which they deliberate and vote upon the proposed law in dispute.

The Federal Parliament can make laws respecting trade and commerce, taxation, bounties, borrowing, postal, and telegraphic matters, naval and military defence, light houses, fisheries, census, currency, inter-state insurance, weights and measures, negotiable instruments, bankruptcy, copyrights, patents, naturalization, foreign co-operations, marriage and divorce, old age pensions, service and execution of process, immigration, influx of criminals, external affairs, relations of the Commonwealth with the islands of the Pacific, acquisition of property for Federal purposes, control of railways for naval and military transport, acquisition of state railways with the consent of such state, construction of railways through a state with the consent of such state, conciliation and arbitration for the settlement of inter-state industrial dispues, seat of government of the Commonwealth, and departments of the public service.

Judicial Department of the Commonwealth.—The judicial power of the Commonwealth is vested in a High Court consisting of a Chief Justice, and not less than two other justices. The High Court has appellate and original jurisdiction. It has jurisdiction to hear appeals from all other Federal courts, or courts exercising Federal jurisdiction, and from the Supreme Courts of states in the exercise of jurisdiction conferred by state laws. The High Court must be regarded as a Federal Court of Appeal, and a National Court of Appeal, and as such it holds a wider jurisdictional area than its great exampler, the Supreme Court of the United States of America, which cannot entertain appeals from state courts in cases not involving Federal issues. The Act confers a new right of appeal from the Supreme Courts of States in state law cases, but it does not abolish the existing right of appeal in those cases to the Privy Council. The latter right still remains. The High Court, though a general Court of Appeal for Australia is not the sole or exclusive, but a concurrent Court of Appeal in state law cases. Parties to cases decided by the Supreme Courts of state on matters of state law here, therefore, an alternative right of appeal, either to the Privy Council direct or to the High Court.

The judgments of the High Court are declared by the constitution to be final and conclusive. This negatives the right of litigants in the High Court to appeal to the Privy Council as a matter of right. The appeal as a matter of right has been taken away, but the constitution has left unimpaired any right the King may be pleased to exercise by virtue of his prerogative to grant special leave of appeal from the High Court to His Majesty in Council. To this reservation of the prerogative to grant leave there is, however, a most important exception. No appeal can be permitted to the King in Council from a decision of the High Court upon any question as to the limits *inter se* of the constitutional powers of the Commonwealth and those of any state, or states, or as to the limits *inter se* of the constitutional powers of any two or more states unless the High Court shall certify that question is one which ought to be determined by His Majesty in Council.

The High Court has original jurisdiction to decide all matters arising under any treaty, all matters affecting Consuls, all matters in which the Commonwealth is a party, all matters between states or between residents of different states in any matters arising under the constitution or involving its interpretation.

The several courts of the states have been vested with Federal jurisdiction to deal with matters arising under the constitution, or involving its interpretation, and in matters of any laws made by the Federal jurisdiction.

Finance and Trade.—During the first 10 years after the establishment of the Commonwealth, the Federal Government has only a limited use of the revenue derived from customs and excise duties. It can only use for Federal purposes one fourth of the total of the net sum so collected. The remaining three-fourths must be paid to the several states according to the following method of distribution, viz., each state is credited with the whole of the revenue collected in it and each state is debited: (A.) with departmental expenditure actually incurred in such state; and (B.) with a proportion on a population basis of the other expenditure of the Commonwealth. The Commonwealth pays to each state monthly the balance in favor of each state. Upon the imposition of uniform customs duties in October, 1901, trade, commerce, and intercourse between the states, whether by land or by sea became absolutely free.

Relations of States to the Commonwealth and the Crown.—The relations of the Australian states to the Commonwealth and to the Crown were authoritively expounded by the Secretary of State, Mr. Chamberlain, in the despatch dated 15 April, 1903, directed to the Lieutenant-Governor of South Australia in reference to the case of the Dutch ship "Vondel." The owners of this ship complained to the British Government that the state government of South Australia had declined to arrest the crew of the ship while she was in South Australian waters. The Secretary of States brought the complaint under the notice of the Governor-General of Australia. The Federal government forwarded the papers to the state government desiring them to furnish a report on the case. The state government refused to report to the Federal government on the ground that the latter had no jurisdiction in the matter. The constitutional issues raised by the action of the South Australian government were dealt with at length in Mr. Chamberlain's

despatch: «So far as other communities in the Empire or foreign nations are concerned, the people of Australia form one political community for which the government of the Commonwealth alone can speak, and for everything affecting external states or communities which takes place within its boundaries, that government is responsible. The distribution of powers between Federal and state authorities is a matter or purely internal concern of which no external country or community can take cognizance. It is to the Commonwealth and to the Commonwealth alone that, through the Imperial government, they must look for remedy or relief for any action affecting them done within the bounds of the Commonwealth, whether it is the act of a private individual, of a state official, or of a state government. The Commonwealth is, through His Majesty's government, just as responsible for any action of South Australia affecting an external community as the United States of America are for the action of Louisiana or any other state of the Union. The Crown undoubtedly remains part of the constitution of the state of South Australia, and in matters affecting it in that capacity, the proper channel of communication is between the Secretary of State and the State Governor. But in matters affecting the Crown in its capacity as the central authority of the Empire, the Secretary of State can, since the people of Australia have become one political community, look only to the Governor-General as the representative of the Crown in that community. The view of your ministers would, if adopted, reduce the Commonwealth to the position of a Federal League, not a Federation, and appears to me to be entirely opposed not only to the spirit but to the letter of the Act.»

Administration and Legislation.—The first Federal government was formed by Mr. (afterward Sir) Edmund Barton. The principal measure passed by the first Parliament were as follows: A Uniform Tariff Act, an act to restrict immigration by the imposition of an educational test for the purpose of excluding colored races and to exclude laborers coming to Australia under contract of service; an act to abolish Kanaka labor in connection with sugar growing, and to encourage the use of white labor by granting a bonus of £2 per ton on sugar so produced; an act establishing a uniform suffrage for both the Senate and the House of Representatives; a naval agreement with the admirality under which the Commonwealth undertook to pay £200,000 per year for 10 years towards the maintenance of a navel force on the Australian station; an act to organize the High Court, of which Sir Samuel Griffith was appointed Chief Justice, Sir Edmund Barton, and R. E. O'Connor, Justices.

An administration formed by Alfred Deakin came into office on 24 Sept. 1903. The first Parliament was dissolved on 23 November, and the second Parliament was convened for business on 2 March 1904. The Deakin ministry was defeated on 26 April by an amendment to the Conciliation and Arbitration Bill proposed by the Labor Party extending it to state railway servants. J. C. Watson then formed a Labor ministry. On 17 August an adverse amendment to the Conciliation and Arbitration Bill, limiting the principle of preference to unionists was carried against the Labor ministry and they resigned. G. H. Reid, leader of the Free Trade Party, next formed a government in combination with a number of Protectionists, including Sir George Turner and A. McLean. They successfully wound up the business of the session. Parliament reassembled on 26 July, 1905, when the Reid ministry was defeated. Deakin formed his second ministry which received the support of the Labor party. Among the measures passed this session were a Commerce Act; Sugar Bonus Extension Act, and a Trade Marks Act — the latter containing clauses legalizing the «Union Label.» Acts were also passed modifying the educational test and the contract labor clauses of the Immigration Act.

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SIR JOHN QUICK,
Member of Commonwealth House of Representatives; Joint Author of 'Constitution of Australian Commonwealth.'

6. Australia — The States, Their Constitutions and Governmental Departments. *Colonies Transformed Into States.*—Under the Constitution of the Commonwealth Act, the colonies of New South Wales, Victoria, Tasmania, Queensland, Western Australia, and South Australia, have been converted into states of the Federal Union, and certain legislative, executive, and judicial powers formerly vested in colonial authorities have been transferred to the Commonwealth.

Executive Departments of States.— In each state there is a Governor representing the King, and he is the head of the executive as well as a branch of the legislature. In the administration of public affairs the Governor is assisted and advised by responsible ministers who preside over the public departments and generally have seats in the Legislature.

In New South Wales the Governor receives a salary of £5,000. There are six responsible ministers, among whom the public departments are distributed as follows, viz.: (1) Premier and Treasurer; (2) Colonial Secretary; (3) Attorney-General, and Minister of Justice; (4) Lands; (5) Instruction, Labor, and Industry; (6) Mines and Agriculture. The sum of £10,400 is appropriated for payment of ministers in such proportions as may be arranged among themselves.

The Governor of Victoria receives a salary of £5,000; the various public departments are presided over and distributed among ministers as follows, viz.: (1) Premier, Treasurer and Minister of Railways; (2) Chief Secretary and Minister of Labor; (3) Attorney-General and Minister of Justice; (4) Lands; (5) Public Instructions; (6) Works; (7) Mines and Forests; (8) Water Supply and Irrigation Two ministers must sit in the council. The aggregate amount of salary payable among ministers is £8,400 per year. A minister being a member of one House may attend the other House by its permission, and speak upon and explain bills relating to his department.

In Queensland the Governor's salary is £5,000. There are seven salaried ministers among whom the offices are distributed as follows, viz: (1) Premier, Chief Secretary and Secretary for Railways; (2) Treasurer; (3)

Home Secretary; (4) Secretary for Agriculture and Public Works; (5) Attorney-General, Secretary of Mines; (6) Secretary of Lands; (7) Public Instruction. The aggregate amount of salary payable among ministers is £7,300 per year.

The Governor of Tasmania receives a salary of £2,750. Ministerial offices are distributed as follows, viz.: (1) Premier and Chief Secretary; (2) Attorney-General; (3) Treasurer and Lands; (4) Mines and Works. The aggregate amount of salary payable among ministers is £3,000 per year.

In South Australia the Governor's salary is £4,000. There were formerly six responsible ministers, but by the Constitutional Amendment Act of South Australia, (1901), the number was reduced to four, and the aggregate salary divisable amongst them is £4,000 per year. The offices at present are distributed amongst them as follows, viz.: (1) Premier, Education and Works; (2) Treasurer and Attorney-General; (3) Chief Secretary; (4) Lands, Mines and Agriculture.

The Governor of Western Australia receives a salary of £4,000. There are five ministers holding offices as follows, viz.: (1) Premier and Treasurer; (2) Education; (3) Colonial Secretary; (4) Railways and Labor; (5) Mines and Justices. The aggregate amount of salary payable amongst ministers is £7,200 per year.

Legislative Departments of States.—The State Parliaments have no longer any control over customs, excise, post offices, telegraphs, telephones, navy, and military defences.

The Parliament of New South Wales, like that of every Australian state, consists of a Legislative Council and a Legislative Assembly. The council is still a nominated body as it was at the beginning of responsible government, being composed of about 65 life members. There were before Federation 125 members of the Assembly; in 1901 that number was reduced to 90 as one of the results of the transfer of certain powers and functions to the Commonwealth government. Plural voting was abolished in 1893. Manhood suffrage, established in 1858, was in 1903 superseded by adult suffrage; that is to say, "one adult person one vote." Since 1899, each member of the Assembly receives the sum of £300 per year in reimbursement of his expenses together with a free railway pass. Members of the council receive free railway passes but no payment. The Assembly is a triennial chamber, but it may be at any time dissolved by the Governor. Elections are conducted by ballot: this being the method of election of members in all the Australian states.

By the Constitutional Amendment Act, (1903), the Legislative Council of Victoria consists of 35 members, one of whom is directly elected by, and represents, the public and railway servants; the others are elected by qualified voters of whom there are three classes, viz.: (1) owners of freehold land of the annual value of £10; (2) rate-paying occupiers of land of the annual value of £15; (3) university and professional men. The property qualifications of a member of the council were formerly ownership of freehold land of the annual value of £100; that has been reduced to £50. The tenure of a seat in the council is six years; one-half the members retiring every three years. In the event of a deadlock between the two Houses on matters of ordinary legislation, (constitutional alterations being excepted), the Governor may, subject to certain conditions, dissolve both Houses. The council has power by message to the Assembly to suggest amendments in the Appropriation Bill. Manhood suffrage coupled with "no plural voting" is the franchise for the Assembly in addition to which, however, every owner of freehold land of the capital value of £100, and of the annual value of £5 is entitled to be registered for, and to record his vote in every electorial district in which such land is situated; the act abolishing plural voting prohibiting him, however, from voting more than once on the same day. There are 68 members of the Assembly. Public and railway officers are unable to vote in and for ordinary electorates; instead of which they are allowed to choose three special members to represent them in the Assembly. Members of this House receive £300 per year, and a free railway pass. Legislative councillors receive free railway passes but no payment. The Assembly is a triennial chamber, but it may be dissolved by the Governor at any time. Every elector is qualified to be chosen as a member.

In Tasmania the Legislative Council consists of 18 members elected by resident inhabitants possessed either of freehold land of the annual value of £20, leasehold of the annual value of £40, or having university or professional qualification (Constitutional Amendment Act, 1901). The Assembly consists of 35 members elected by adult suffrage coupled with residential qualification. Members of both chambers receive an honorarium of £100 each, subject to their attending a certain number of days per session. An act to confer the franchise on women was passed in 1904.

In Queensland the Legislative Council, like that of New South Wales, is a nominated body consisting of 37 members; they are appointed by the Governor in council, and subject to certain attendance each session they hold their seats for life; they receive no payment, but are entitled to free railway passes. The Assembly consists of 72 members elected practically by manhood suffrage; but owners of freehold land of the value of £100, and household occupiers of the annual value of £10 are entitled to vote in every electorial district in which they have that property qualification. The Assembly exists for three years unless previously dissolved, and its members receive a remuneration of £300 per year, and free railway passes, and allowances for traveling expenses. Every elector is qualived to be chosen a member.

In Western Australia the Legislative Council consists of 30 members elected by adult persons having as a qualification, either freehold lands of the capital value of £100, or leasehold of the annual value of £25, or being Crown lessees or licensees of land of the annual value of £10. The tenure of seats is six years: one-third retiring every two years. (Constitution Act, 1890). The Assembly consists of 50 members elected by adult persons being residents of an electorate, but persons having freehold land of the capital value of £50, or leasehold

land of the annual value of £10, are entitled to vote in any district in which they hold the property qualification. The Assembly, like other popular chambers of Australia, is a triennial House. A bill conferring the franchise on women was passed in the year 1899.

Under the provisions of the Constitutional Amendment Act (1901), the number of members of the Legislative Council of South Australia was reduced from 24 to 18. Under earlier acts the members are elected by adults of both sexes, having as a property qualification either a freehold estate of the capital value of £50, or a leasehold of the annual value of £20 with three years to run, or being the occupier of a dwelling house of the annual value of $25. Members of the council hold their seats for six years, one-half retiring every three years; unless the chamber is sooner dissolved by the Governor: which can be done in cases of disputes, or deadlocks between the two chambers extending over a certain time. By the Constitutional Amendment Act of (1901) the number of members of the Assembly was reduced from 54 to 42. The Assembly is a triennial chamber, unless previously dissolved. In the event of a deadlock between the two Houses in reference to a proposed law it is within the power of the Governor to dissolve them both, subject to the following limitations, viz.: (1) It must have been passed by the Assembly and rejected by the council in one session; (2) it must have been, after a general election, passed a second time by an absolute majority of the whole number of members of the Assembly and a second time rejected by the council. Members of both Houses are entitled to receive £200 per annum each and free passes over government railways.

Judicial Departments of States.—The Supreme Court of New South Wales is constituted under Act 4, Geo. IV., c. 96, and 9, Geo. IV., c. 83. It consists of a Chief Justice and six other justices. It has unlimited civil and criminal jurisdiction. Circuit districts and circuit courts are established to try civil actions and determine crimes and misdemeanors. The Supreme Court has appellate jurisdiction to hear appeals from all inferior courts. There are seven district courts having jurisdiction in personal actions not exceeding £200 and a limited criminal jurisdiction. Courts of Petty Sessions having summary jurisdiction to deal with minor offences and a limited civil jurisdiction presided over by a Stipendary Magistrate, or by two or more justices, exist in all cities, towns and centers of population.

There is a Supreme Court in and for Victoria, constituted under the authority of the constitution. It consists of a Chief Justice and four justices. It is unlimited in civil jurisdiction as well as jurisdiction to try crimes and misdemeanors; as a full court it has appellate jurisdiction from all inferior tribunals. Courts of General Sessions of the Peace having jurisdiction to inquire into a limited class of indictable offences and to hear appeals from Courts of Petty Sessions, exist in certain proclaimed districts. Wardens Courts and Courts of Mines exist for hearing mining disputes. County Courts having authority to decide all personal actions up to the amount of £500. Courts of Petty Sessions having summary jurisdiction in minor criminal matters and civil jurisdiction up to the amount of £50.

The Supreme Court of Tasmania consists of a Chief Justice and two puisne judges; it has both original and appellate jurisdiction in common law, equity, ecclesiastical, and criminal matters. Local courts can deal with civil matters, some up to £100, and others up to £50. Justices in Petty Sessions can make convictions and orders in minor or criminal matters.

The Supreme Court of Queensland may be composed of not less than four, and not more than five judges. It has the same jurisdiction as the Superior Courts of Common Law, and the High Court of Chancery, in England; it also possesses ecclesiastical and criminal jurisdiction. An appeal lies to the full court from all inferior courts. District courts are vested with a limited civil and criminal jurisdiction. Courts of Petty Sessions and Small Debt Courts exercise a limited authority in specified civil and criminal matters. Wardens Courts are constituted to deal with mining disputes.

The Supreme Court of Western Australia was established by Royal Charter in 1861, and the main provisions relating to its constitution and jurisdiction are contained in the Supreme Court Act, (1880.) It has jurisdiction in common law, equity, ecclesiastical and criminal matters. Local courts similar to those in some of the other Australian states can decide small debt cases. Justices in Courts of Petty Session can summarily convict, imprison, or fine persons guilty of minor offences. Warden Courts have authority to deal with mining cases.

The Supreme Court of South Australia is composed of a Chief Justice and two other puisne judges. Its jurisdiction extends to all matters of law and equity. It has also jurisdiction in crimes and misdemeanors. It is the court of appeal from the decisions of all inferior courts. South Australian local courts are to some extent analogous to the district courts and county courts of other states. Some of these courts have jurisdiction in civil matters up to the amount of £490; other local courts are limited to actions where the debt or damage claimed is no more than £20.

Bibliography. See article AUSTRALIA — POLITICAL HISTORY.

SIR JOHN QUICK,
Member of Commonwealth House of Representatives; Joint Author of 'Constitution of Australian Commonwealth.'

7. Australia — Municipal and Local Government. *Introductory and General.*— The organization of municipal government in Australia is modeled largely on the English system and is composed of mayors, aldermen and councilors in the chief cities and larger towns, with district or shire councils, local or divisional boards (the nomenclature varies in the different States) presided over by elected chairmen or presidents in the small towns or villages, and outlying districts where settlement is sparse. All of these are creations of statute deriving their authority, power, and duties from the Parliaments of the various States. No salaries are paid to the mayors who in the capital and most of the larger towns are voted an annual allowance by the councils for entertaining and keeping up the traditional dignities of the office. In

Melbourne the vote is £1,500, in Sydney and Adelaide £1,000. The mayor has no direct power of veto over the council's actions. He represents the city as a whole and presides over the council and undertakes only those duties which devolve naturally on the leading officer of a city. The paid officials are non-partisan appointed by the councils and form a permanent staff holding their positions during good behavior; the head of which (as in England) in the cities is the town clerk. The terms municipal and local government are interchangeable as applying to (a) the cities and the larger towns of the Commonwealth, of which the capitals are types, and (b) to the smaller towns and outlying districts which are simply microcosms like unto the larger bodies but with functions of a more prosaic and limited character conditioned mostly by population. In fact it may be taken as axiomatic that when the government of the cities is understood everything of importance to the student is known about municipal and local government in the Commonwealth of the newest of the nations.

Nominations for municipal offices usually require the signatures of proposer, seconder, and candidate. In Melbourne 10 ratepayers' signatures are required together with a deposit of £10. Secret voting, or voting by ballot as it is styled, is the universal system, which had its origin many years ago in Australia and has since found world-wide acceptance.

Generally speaking adult owners and occupiers of real estate assessed for taxation who have paid their rates, whether residents or non-residents, are entitled to vote in the cities of Australia. Aliens are barred in some cities and women are not yet universally welcomed to the council chambers although they may vote.

The councils of the capital cities are single chambers, aldermen and councilors sitting together, presided over by the Mayor. Except in the Federal Government, and in the State Parliaments where it is universal, the bicameral system of government as it exists in some American cities is unknown in Australia.

The Origin of Local Government.— The beginning of municipal government in Australia dates back to 1839 when the first municipal law (based on the English Statute of 1835) was passed in the State of South Australia and put into operation in 1840 in the city of Adelaide whose virgin soil was surveyed in 1836. The parent city of Sydney, the capital of New South Wales, established in 1788, was incorporated in 1842. Melbourne, the chief city of the State of Victoria originated as a small settlement in 1835 and was incorporated in 1842 by the legislature of New South Wales of which State it then formed an integral portion. The other capital cities are: Brisbane (Queensland), founded 1826, incorporated 1859; Perth (West Australia), founded 1829, incorporated 1871; Hobart (Tasmania), founded 1804, incorporated 1857.

Local Government in New South Wales.— The city council of Sydney is composed of 24 aldermen, one of whom is elected by the council annually to be Lord Mayor. Two aldermen for each of the 12 wards are elected by ballot by the ratepayers every two years. Plural voting obtains, based on assessment values up to four votes. Owners, leaseholders, occupiers and lodgers are entitled to vote. Accounts are audited by State Government inspectors. Assessments are based on rental values of improved property.

The condition of local government in this State is admittedly unsatisfactory. In the metropolitan area the agitation for a "Greater Sydney" is still proceeding by which its advocates hope that the city council will absorb the small surrounding suburban local governing bodies, of whom there are no less than 41 each with its own separate mayor, council, officered staff, and administration.

The number of municipalities in New South Wales is only 192, covering an area of 1,810,912 acres with an annual value for assessment purposes of £8,351,420 and a very large area still remains under the control of the State Government which is now considering proposals to extend the system of local government by the creation of shire councils and new municipalities allowing such bodies to levy their rates on the unimproved capital value of the land instead of on the annual value of improved property.

Besides the municipalities there are boards and trusts composed of members appointed by the State Government and members appointed by various municipal bodies, which are established for the benefit of districts covering areas of two or more ordinary municipalities and are empowered to construct and supervise water works, drainage works and similar undertakings with power to raise money by the sale of debenture stock and levy rates on the assessed value of benefited properties. In New South Wales there are the Metropolitan Board of Water Supply and Sewerage, various Harbor Trusts, Country Water Trusts, and the Metropolitan Fire Brigades Board, on which latter representatives of the fire insurance companies sit who contribute to the upkeep of the brigades.

Local Government in Victoria.— The city council of Melbourne consists of 28 members (seven aldermen and 21 councilors) presided over by the Lord Mayor who is elected annually by the council. Three councilors are elected for each of the seven wards of the city, one being chosen annually by plural voting for a period of three years. The aldermen are appointed by the council and hold office for four years. Residence within seven miles of the city and minimum rating of £10 qualifies for a vote which slides upward to three votes on a £150 assessment.

This State has had a comprehensive system of local government in force for many years which divides it into cities, towns, boroughs, and shires; the councilors are elected by the ratepayers, and the mayors of cities, towns, and boroughs, and presidents of shires by the councilors. The total area under local control being 87,302 square miles, only 582 square miles remaining outside of local government.

Melbourne and 22 suburban municipalities constitute the metropolitan area, and thoughtful students of local government look forward to the time when all or most of these will be amalgamated with the city. A Royal Commission has taken most exhaustive evidence pro and con during the past three years but so far has not submitted its report.

Other governing bodies outside, yet dovetailing in with the municipal councils and the

State Government in Victoria, are the Metropolitan Fire Brigades Board, the Melbourne Harbor Trust, the Tramway Trust consisting of representatives of the Melbourne City Council and 11 other suburban municipalities, the Metropolitan Board of Works controlling water supplies, sewerage and drainage and various other Water Works, Irrigation, and Water Supply Trusts under quasi-local and quasi-State Government control.

Local Government in South Australia.— The council of the city of Adelaide consists of the mayor, six aldermen, and 12 councilors. All of them including the mayor are elected by the ratepayers. The mayor and aldermen hold office for one and three years respectively; the councilors (two for each of the six wards) hold office for two years. At each annual election the mayor, two aldermen and six councilors are balloted for. Plural voting obtains for mayor and aldermen, the system allowing a citizen one vote in each ward where he has property assessed. The State is divided for local government purposes into municipal and district councils. Aldermen may be elected to surburban councils in addition to councilors after a poll of the ratepayers has been taken approving such a proposition, followed by a proclamation by the State Governor, and it is worthy of note that the chairmen of the district councils are elected not by the ratepayers but by the members of the councils. The annual assessed value of property in municipalities is £2,661,238. There are no boards or trusts (other than the Fire Brigades Board) of any importance, but very extensive powers are vested in corporate bodies who may raise loans for the construction and working of tramways, ferries, jetties, water-works, gasworks, electric-light works, baths and washhouses, abattoirs, markets; and make and provide pleasure grounds, libraries, museums, hospitals, and asylums.

Local Government in Queensland.— The city council of Brisbane comprises 14 members who are styled aldermen, one of whom is elected annually to be mayor. The capital value of land is assessed here and not the rental value. The owner or occupier has from one to three votes according to valuation. If, however, the property is valued at less than £120, only the occupier has a vote.

A general system of local government was started in 1878 and revised in 1902. Local areas are divided into cities, towns, and shires. Members of councils are styled aldermen in cities and towns and councilors in the shires. Aldermen and councilors are elected by ratepayers in each area, but all mayors of cities and towns and chairmen of shires are chosen by the members of the councils. The total area controlled by local bodies is 668,252 square miles, leaving only 245 square miles unincorporated.

In Queensland the water supply construction work is undertaken by the State Government and when complete is handed over to the local authorities with attendant liabilities, which become a debt due from the local authority to the State Government which must be repaid in instalments. There are a few bridge boards and harbor boards in various districts.

Local Government in West Australia and Tasmania.— The city of Perth — the capital of West Australia — is governed by a mayor and 15 councilors, all of whom are elected by the ratepayers. For ward elections there are two classes of voters and for general municipal elections four. The local governing bodies in West Australia are termed Municipalities, Water Boards, Road Boards, and Health Boards; the latter may be established within or without municipal boundaries. Members of boards are elected by ratepayers and the chairmen by the members.

In Hobart — the capital city of the island State of Tasmania — the council consists of nine aldermen, one of whom is elected by the members to be mayor. The aldermen are elected by plural voting with a minimum qualification of £8 annual value, the scale being from one to seven votes according to assessed value of property.

Tasmania has its outlying districts governed by Town Boards and Road Trusts. The ratepayers in these districts elect their representatives who are termed "councilors" and these councilors elect their chairman who is styled "Warden."

Powers and Duties of the City Councils.— The functions of the city councils are legislative as well as administrative. They are empowered under statutes granted by the State Parliaments to make by-laws for the suppression of nuisances for all matters of minutiæ relating to good rule and government, and affecting the comfort, convenience, and welfare of their inhabitants. They may levy rates to cover the cost of general administration and raise loans (under certain restrictions) when necessary for public works. Properties exempted from payment of rates are Federal and State Government buildings (including State schools), charitable and benevolent institutions, churches, chapels, and buildings used exclusively for public worship, and buildings privately owned which are used exclusively as schools. They are charged with the control of traffic, the testing of weights and measures, the construction and maintenance of roads, bridges, and footways, the care and management of parks and recreation grounds, public baths, street lighting sheep and cattle markets, meat, produce, and fish markets, abattoirs, the collection and disposal of garbage, trade refuse, and they may and do hold large properties in real estate. They supervise the erection and construction of buildings and in some cities have jurisdiction over theatres, music halls, and places of public entertainment as to fire-proof materials and means of exit. They regulate sky signs and scaffolding and in most cities license cars, cabs, and conveyances plying for hire.

Public Health and Sanitary Functions.— The city councils are constituted as Boards of Health and are responsible in their areas for the proper administration of the various public health acts to the State Boards of Health or Government Commissioners as the case may be. They inspect and license private hospitals and maternity homes and employ medical officers of health and staffs of inspectors (male and female) whose duties are to look after the adulteration of food and to have the oversight of food supplies (particularly meat, milk, and bread), inspection of common lodging houses, dairies, milkshops and dairy cattle; noxious trades and businesses,

abatement of common nuisances and smoke nuisances; to prevent spitting in the streets and in public vehicles; to inspect restaurants, fishshops, butcher shops and all premises where food is prepared or consumed; to prevent overcrowding of premises; and to attend to matters of isolation, disinfection, and hospital accommodation for infectious diseases and fevers.

Notification of disease is generally compulsory under penalty. Medical practitioners, heads of families, and relatives are all liable for neglect. In compulsory notification of pulmonary tuberculosis (consumption) the State of South Australia has led the way, and the difficulties and dangers feared by some medical men have been found to be mythical and non-existent.

Budget Items and Flotation of Loans.— The chief sources of municipal revenue are income from rates, rents from real estate, market dues, fines, penalties, and license fees.

The rates levied in the city of Adelaide may be taken as typical of Australia and are as follows: General purposes, rate, one shilling in the pound; street lighting, rate, three pence; parks and gardens, rate, one halfpenny; rate for sinking funds (loans), one halfpenny; rate for police purposes, two pence; and a sanitary rate of three pence. To which must be added a water and sewerage rate of one shilling and sixpence in the pound (levied by the State Government), making a total of three shillings and three pence to be paid by the citizens, which in comparison with the rates charged in London and most of the large populous cities of Great Britain is an exceedingly light impost.

The expenditure budgets of the cities contain as principal items: road and footway maintenance, upkeep of parks and gardens, baths, markets and kindred establishments, salaries and wages. Day labor invariably obtains except on new construction work. The wage of the ordinary unskilled municipal laborer is on an average seven shillings per day — in some cities slightly higher.

Loans are mostly raised by the sale of debenture stock, redeemable at due dates, although in some instances the State Government advances money and becomes the creditor of the local authority. In Sydney and Melbourne, bills are passed by the State Parliaments authorizing those cities to float loans for street construction work, establishment of electric light, erection of markets, etc. In Victoria, outside the capital, the limit of indebtedness for municipalities is fixed at 10 times the amount of annual income; the establishment of a sinking fund is obligatory with an annual appropriation of not less than two per cent of the amount of the debt. A law similar in many respects exists in West Australia. A referendum of any proposed loan may be demanded in Victoria and the consent of the State Governor is required in West Australia.

In New South Wales municipalities may borrow on debentures, with the sanction of the State Governor, any sum not exceeding the total estimated amount of revenue for an ensuing five years.

In South Australia the consent of the ratepayers is required preparatory to floating any loan, the maximum indebtedness of a municipality is fixed, sinking funds are compulsory, and where the loan is to be applied to works of a non-revenue producing character, a rate must be struck to provide sinking fund and interest.

Statistics of the Metropolitan Cities.— In any survey of the progress of modern civilization the concentration of population in cities is the most startling fact. It is a world-wide movement and is nowhere more strikingly exemplified than in the cities of Australia. The progress of the chief cities has been remarkable and has no parallel among the cities of the old world. Even in the United States the rise of the great cities has been accompanied by a corresponding increase in the rural population, but in Australia (perhaps for the first time in history) is presented the spectacle of magnificent cities growing with marvelous rapidity and embracing within their limits one third or more of the population of the States of which they are the seat of government.

The population and annual assessment value for rating purposes of the metropolitan areas are illustrated in the following table:

	Population.	Annual Value.
Sydney	511,030	£5,669,670
Melbourne	501,460	4,489,181
Adelaide	168,066	1,201,996
Brisbane	124,463	1,167,135
Perth	46,400	378,266
Hobart	34,917	175,194

City Functions Controlled by the States.— The police, although supervising traffic and administering city by-laws and regulations are controlled and paid by the State governments with the one exception of South Australia where the city and all other municipal corporations are compelled to contribute a moiety of the cost in each district. Education is invariably State controlled although private schools exist. The care of the poor is attended to by the States side by side with religious and philanthropic institutions. Prisons, asylums, and hospitals are under the charge of the central governments, although the local authorities are compelled to pay for the accommodation in some States of indigent cases of infectious disease. The cities generally take no share in the management of public libraries, museums, technical schools, and art galleries which exist in every capital. Telegraphs and telephones are entirely controlled by the Federal Government. Tramways (street railways) are in the hands of the State Government in New South Wales and in the other capitals are owned and operated by private companies, under charters granted by the State Parliament. Provision is, however, made in some States, notably in Melbourne and Perth, for the metropolitan municipalities eventually taking them over. Gasworks and supplies are mostly owned and operated by private companies. Electric lighting is owned and operated municipally in Melbourne and Sydney. In Adelaide the private company's existing rights expire in 1908. Fire brigades are managed by boards, with municipal representation upon them. Water and sewerage are managed either by State Government departments or quasi-government boards.

The Municipal Outlook for the Future.— The municipal limits of the capital cities of Australia by no means correspond to their social, industrial, and economic boundaries; as municipal centres they are the «pulses» which contain only a fraction of the population of the metropolitan areas and are only just now waking up to the necessity of bringing into being comprehensive Greater Sydneys, Greater Bris-

banes, Greater Melbournes, and Greater Adelaides. The same sociological forces are at work in Australia as in America, Great Britain, and the continent of Europe, where enlargement of areas and greater cities have been dominant planks in municipal platforms for years. We may therefore expect similar results to follow in Australia as have been achieved elsewhere in the course of the next decade.

Some small effort in this direction has already been accomplished, notably in Brisbane and Melbourne, by the recent absorption of one or two adjacent suburbs, but the movement generally can hardly be said to have yet passed much beyond the embryonic stage.

In the metropolitan areas of Sydney, Melbourne, and Adelaide there are respectively 41, 22, and 19 municipal governing bodies with bewildering codes of by-laws and methods of administration, and it has been well said that on the score of economy alone the arrangement is an absurdity which tolerates within a 10-mile radius of the centres such an enormous number of local governing bodies — each separate, distinct, and independent of the other — to manage the affairs of from 160,000 to half a million of people with, of course, as many staffs of municipal officers, all working in isolation, and often unable to agree about matters of vital concern to all. Experience has shown that occasional conferences are at best but an inadequate substitute for a permanent body with a fair representation of all interests and smoothly working machinery. Whether reform takes the shape of federation or unification, whether it comes with a rush or gradually, as the dwellers outside the city bounds awaken to the advantages of co-operative effort — come it must, in order to permit the carrying out of works at present impracticable, such as the control and working of tramways, gas and electric light concerns and kindred undertakings. With the example of the London County Council before us it is obvious that it pays to concentrate as much as possible the municipal work of cities in one central body. Lord Roseberry has said that "the larger the sense of municipal responsibility which prevails the more it reacts on the community itself. And men outside the municipality, or who have hitherto held aloof from municipal government when they see the higher aims of which the municipality is capable, when they see the wider work that lies before it, when they see the incomparable practical purposes to which the municipality may lend its great power, are not inclined any longer to hold aloof." The broad policy of the London County Council is proof of this where the finest intellects in England take their share of the work in common with those who are attracted to the Council of the Nation at Westminster.

Notwithstanding its shortcomings the development of municipal government in Australia exhibits an upward and progressive tendency. The cities have always been free from that gross corruption which has been such a marked feature and has wrought such pernicious results in some other countries. Municipal government in Australia stands for probity and purity and as a recent Australian writer in 'The Annals' of the American Academy has put it: "We are undoubtedly further advanced to-day than we were 20 years ago, and we may reasonably hope that the silent evolution which is working out its eternal purposes in the social, as truly as in the physical world, will equip us for the achievement of higher things in the future."

T. G. Ellery,
Town Clerk of Adelaide, South Australia.

8. Australia — Education. Formed, like the United States, by the union of previously autonomous communities, the Commonwealth of Australia has followed the example of the United States in the distribution of powers between the Federal and State authority. That is to say none but enumerated powers have been conferred upon the Commonwealth, and all unenumerated powers remain in the hands of the originating states. Thus education, not being among the enumerated powers, is retained, as in the case of America, by the individual States. Every man, and in recent years, every woman, possesses, after registration, a parliamentary franchise, and it is customary to subject knotty public questions to a direct referendum of the people of a State. Such a degree of democracy could exist only in a highly enlightened community. Elementary education, therefore, being essential for the exercise of the duties of citizenship which are imposed upon all, is compulsory, and the corollary follows that it is in almost every case free; otherwise the school fees would amount to a poll tax on children, which in a country crying out for population is the most undesirable of imposts. Being for the benefit of all and not of any sect, state education is secular; and this not from any disregard for religion, but because experience has proved that when the state concerns itself, with dogma strife rather than religious amity is produced. Education was in the early days of each colony left to private enterprise. Before long, however, it was recognized, consciously by some and instinctively by the majority, that a function so essential to the general welfare must be regarded as a duty of the state. So it came to pass that education was one of the first matters of public concern to be included in the ever widening of the sphere of state activity which is the most characteristic movement of the present age. Primary education is accordingly throughout Australia undertaken by the several governments.

There is a general resemblance in the conditions which those who settle in new countries are called upon to face. The problems of education in Australia are very similar to those in America. The circulars of information issued by the bureau in Washington have been of the greatest assistance to the educational departments in Australia, and several useful reforms have derived their inspiration from this source. The laws relating to education in the Australian states, as might naturally be expected in adjacent communities springing from the same stock, bear a strong family likeness; but as considerable intervals intervened between the dates of colonization, and as the science of education was steadily progressive, the system adopted by each state was colored with the views which obtained at the date of its foundation. The older colonies had, therefore, a more difficult task in bringing the laws into conformity with improved methods than those which at a later period were established on ground unencumbered. All have, however, now

come into a fairly uniform line. The sequence of evolution has been the same, although the successive steps taken were independent and not simultaneous. In the beginning of each colony the first schools were established by the churches, aided by government grants. Soon, however, state non-sectarian schools were established and the subsidies to private schools ceased. The state schools were in the first instance placed under the control of a Board of Education appointed by the government; but the basic British idea of responsibility to Parliament asserted itself, and a cabinet minister was vested with the powers previously exercised by the board. The Minister of Education or of Public Instruction, as he is sometimes termed, appoints and dismisses teachers and officers, arranges the curriculum and controls the whole department. Regulations framed by him and approved by the Governor in Council acquire the force of law after they have been laid before Parliament. This centralized administration is mitigated, and to some extent, assimilated to local conditions, through the agency of district inspectors and local boards of advice. The funds necessary for education are derived from the general revenue. From time to time attempts have been made to place a portion, at least of the burden upon the local rates, but it is felt that the cost of a system designed for the benefit of the public at large should be met from a source to which, either directly or through the customs, all contribute. In New South Wales and Tasmania fees are still levied, but in the former these amount to only a fraction of the whole expenditure, and are about to be abolished; and in the latter there are free schools in the large towns. The net yearly cost to the State of primary instruction per scholar in average attendance, excluding the cost of school premises, varies from £3.9.1 to £4.17.3. The average of all six States being £4.4.9.

The statutory school age is in New South Wales and Western Australia from 6 to 14 years; in Victoria from 6 to 13; in Queensland from 6 to 12; in South Australia and Tasmania from 7 to 13. Pupils under the maximum age are exempted from further attendance if on examination they pass a prescribed standard. Attendance is required in New South Wales on 70 days, and in Queensland on 60 days in each half year; in South Australia on 35 days in each quarter, and in central districts on 8 out of 10 school sessions in each week; in Victoria on 75 per cent of the days in each quarter; in Western Australia and in Tasmania on every day on which the school is open. As a rule, children under the age of nine, living within a radius of two miles by road from a state school, and those between nine and the maximum age living within a radius of three miles, come under the laws relating to compulsory attendance. Truant officers and in some cases the police are employed to enforce the law. Prosecution and punishment of the parents of defaulting children is when necessary resorted to without hesitation.

State schools in Australia come under the category of Public, Provisional, Half-time, and Special. In most of the States a public school may be established if an average attendance of 20 can be maintained. The buildings are provided by the department. In Queensland an average attendance of 30 is required, and the locality has to contribute one-fifth of the cost of erection and maintenance of the building. Where the average attendance is under 20, but over 12, the school is termed provisional. In sparsely populated districts half-time and special schools or itinerant teachers are provided. The policy of concentration of attendance has been largely carried out, children are carried free to and from school over the state railways in New South Wales and in Tasmania. In Victoria they are carried at reduced rates. It is not unusual to see a passenger train stop at cross roads to pick up a group of children on their way to or from school. In many cases it is found to be more economical to make an allowance to parents for the conveyance of children to a school than to bring a school to the children. Moreover, better schools can be provided and higher standards maintained under the «conveyance» system which there is a disposition to extend. The schools will then still better serve the purpose of central or consolidated schools. The average attendance of pupils at the state schools is at the rate of about 62 per school, 30 per teacher, and 11.51 per cent of the population; the average enrolment being 15.59 per cent.

Normal schools are provided for the training of teachers, and are usually recruited from those who have served for four years as pupil teachers. In South Australia a six-year course has been arranged for the training of teachers; two years are spent in study combined with a certain amount of practical work; two years in teaching in the schools, and the final two years at the University. During the term of training the students receive a maintenance allowance of from £30 to £80. The schools are classified according to the number of the children in average attendance, and progressive grades of certificates are awarded to teachers which qualify them for appointments in the public schools. Uncertificated teachers are frequently employed in the provisional schools. In all the states with the exception of New South Wales, there is a preponderance of female teachers. The salaries of male head teachers range upwards to £450, and of female head teachers to £360. Male assistants receive from £60 to £262, and female assistants from £50 to £216. The salaries of provisional teachers run from £66 to £140. Payment by results has proved unsatisfactory in operation and has been practically abandoned. The system of inspection is less mechanical than formerly and several of the States exempt schools of recognized excellence from detailed examination, leaving the promotion of the scholars in the hands of the head teacher. Boards of Advice visit, inspect and report upon the schools in their district, are authorized to expend small sums on the school buildings, arrange for the use of the buildings out of school hours, and take part in the administration of the compulsory clauses of the Education Acts. The Boards of Advice are honorary. In some cases they are nominated by the Executive, in others they are wholly or partly elective. In Queensland there is usually a committee for each school. In no case, however, has the theoretically desirable association of the official with a public body on each plane

been achieved; viz., a school committee acting with the teacher, correlated with a Board of Advice co-operating with the District Inspector, and a Central Council stimulating, assisting, aid, if need be, acting as a check upon the Minister. Education falls short of its object if the Department does not carry parents and the locality along with it. The schools, when the public sympathizes with their work, exercise a vitalizing and elevating influence on the whole neighborhood. There is no caste system in Australia. The state schools are intended to meet the requirements of rich and poor alike; it is not uncommon to see the child of a cabinet minister, or of a wealthy citizen imbibing the elements of knowledge by the side of the child of an artisan or laborer.

The education in the state schools is practical and is now designed as a preparation for the actual requirements of modern life rather than for the conditions that obtained in the Middle Ages. The pupil is led by carefully graded steps from the known to the unknown; from the particular to the general; from the concrete to the abstract; «from the microcosm of the school to the macrocosm of the Universe.»

The tendency is to subordinate theory to practice. Language is taught before grammar; religious conduct precedes dogma. Kindergarten methods, local geography, nature study, drawing, clay modelling, and manual training are taking the place of purely literary studies. History as now taught in Australia is less concerned than formerly with the character of mediæval kings, it is studied more with the view of inculcating patriotism, civic duties and responsibilities. Since the contingents from Australia bore arms with comrades from the mother country and the cementing power of kindred blood shed in common cause has been realized, the Union Jack is saluted in the schools of the Commonwealth as is the Star Spangled Banner in those of the United States. Arbor Day was instituted in the schools of South Australia in 1887, and the celebration has become general throughout the States. On this day the ordinary school work is suspended. The children assemble in the morning, and, in the presence of the Mayor, or Chairman of the Board of Advice and other visitors, plant trees with some ceremony. After a few speeches and some words as to the care of trees and their usefulness, the school is dismissed and the rest of the day is enjoyed as a holiday. All new country schools in South Australia are surrounded by a reserve of several acres. Some of the schools adopt practical agriculture as a form of manual training, and in all the States, teachers are encouraged to make, with the aid of the children, gardens around their schools.

In some of the States there are Manual Training Centres at which pupils drawn from the surrounding schools receive instruction from special teachers. In South Australia the ordinary teachers are encouraged to qualify themselves in this branch of education. The greatest latitude is given as to the form of the instruction; for that subject is taught best in which the teacher feels the deepest interest. Chip carving, joinery, brush making, book binding, and wire work are among the subjects taken up in the various schools. Domestic economy and cookery are taught to girls in most of the States. Calisthenic class exercises to a musical accompaniment are commonly adopted as an attractive form of physical training. The pupils are taught by drill to move in masses and the order is occasionally given for fire parade. The Cadet Corps are under military supervision. Rifles are supplied to the boys, but they have to provide themselves with an inexpensive uniform. Swimming is taught in some of the schools. The teaching of singing by the tonic solfa method is a prominent feature. The principles of morality are sedulously instilled, and good manners cultivated. Special attention is given to temperance lessons in almost all the States.

The average minimum time devoted to secular instruction is four and one-half hours each day. This stipulated condition being fulfilled certain facilties are provided for imparting religious instruction. In New South Wales and Western Australia the word «secular» is held to include religious teaching of a general as distinguished from that of a dogmatic character; and the teachers in the performance of the ordinary day's duty give Scripture lessons based on those issued by the Commissioners for National Education in Ireland. In South Australia, if the parents at any school so desire, teachers may be required to read without note or comment a portion of Scripture for a quarter of an hour before the ordinary work begins. In Victoria and Queensland no teacher is allowed to give other than secular instruction in a school building. In Victoria, Queensland, and South Australia the buildings may be used for any approved purpose out of school hours. The regulation in Victoria states that half an hour may be set apart in one or two school days in each week for religious instruction by persons other than State school teachers. Such classes must, however, be held either from 9.15 to 9.45 A. M., or from 3.30 to 4 P. M. No substituted secular instruction is to be given to the children who do not attend these classes. In New South Wales and Tasmania one hour a day may be set apart for the use of visiting clergymen or teachers of religion. The time, if not used for this purpose, is devoted to ordinary instruction. In Western Australia half an hour at any time in each day is available for special teachers of religion, subject to as little interference as possible with the ordinary work of the school. In none of the States is a child required to attend any religious lessons without the parents' consent. In South Australia the desire to arrive at a settlement of the vexed question of religious teaching in State schools led to the following resolution being carried in the House of Assembly 16 Dec. 1895: «That in the opinion of this House a poll of electors should be taken on the following questions: Do you favor (1) The continuance of the present system of education in State schools? (2) The introduction of Scriptural instruction in State schools during school hours? (3) The payment of a capitation grant to denominational schools for secular results?»

The poll was taken at the general election in April 1896, and resulted in the following answers: Question No. 1: Yes, 51,681; no, 17,819. Question No. 2: Yes, 19,280; no, 34,834. Question No. 3: Yes, 13,349; no, 42,007. Informal, 12,830. The referendum

thus initiated has since been adopted for the solution of various questions in Australia.

Secular education does not satisfy the requirements of the Roman Catholic Church, which, therefore, in populous centres, maintains separate schools. In some of the States private schools are officially inspected. There are but few evening schools; little public requirement in this direction has so far been manifest. But continuation schools have been fairly successful in Western Australia.

Although as has been seen above Primary education is chiefly a State function, this is not the case with secondary education. With few exceptions the secondary and high schools for both sexes are private or denominational establishments. The higher classes, however, in the State schools include subjects usually regarded as secondary. Provision is made by means of exhibitions, scholarships, etc., to enable bright and successful pupils from the State schools to continue their ascent, free of charge, up the educational ladder, through the high schools and at the universities. In New South Wales children who reach the highest class in the public schools may receive advanced instruction including Latin and French for 3d. a week, and the Department maintains four high schools, two for girls and two for boys. The Sydney Grammar school receives an annual grant from the State, as does also the high school in Perth. Queensland liberally subsidizes secondary schools. In South Australia there is an Advanced school for girls which, although a State institution, is largely supported by fees. There is also in Adelaide a secondary State school for boys which is preparatory for the School of Mines and Industries, and the Agricultural College. The distinctive feature of this school is that only half of each day is spent in the class rooms, during the other half the pupils receive practical instruction in the garden, the laboratory, and the workshop. In Victoria extra and advanced subjects are taught in many of the public schools for a small fee. The Chambers of Commerce, the Bankers' Institute, and the Incorporated Institute of Accountants hold periodic examinations in commercial and allied subjects which have a stimulating effect on this branch of education. There are private schools in each of the capitals which provide a commercial curriculum. Technical education, being a special need in a new country whose resources are only partially developed, is largely undertaken by the State. In the cities and in many of the towns, schools of design, schools of mines and industries, technological museums, and workingmen's colleges abound. There are also numerous agricultural colleges. In several of the States technical schools have been built and equipped by private munificence.

In the capitals are art galleries containing many works by famous modern artists and sculptors. In connection with these are fine art schools where instruction in painting, sculpture, art needlework, and allied subjects reaches a high standard. These are as a rule controlled by Boards, in some cases partly appointed by the Government and partly elected. The University of Sydney was established in 1852, and that of Melbourne in 1855. South Australia followed in 1874 the example thus set and Tasmania founded a university in 1890. These universities are supported by grants from the public chest, by public and private endowments, and by fees. The Australian universities do not confer degrees in divinity; otherwise they resemble and are in no way inferior to those of the old world. The universities in Adelaide and Melbourne grant degrees in music, and each has a fully equipped conservatorium of music. In all the universities women are admitted to degrees and to the full privileges of graduates. The universities of Sydney, Melbourne, and Adelaide grant degrees in medicine to both sexes.

JOHN ALEXANDER COCKBURN,
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9. Australia — Religion. There is no established Church in Australia. All religions are now on an equal footing so far as the Governments are concerned; grants in aid were formerly given to the leading religious bodies, but one by one the States relinquished the practice. South Australia led the way in this abolition in 1851, a few years after the foundation of the Colony. Queensland, in 1860, shortly after the assembling of its first parliament, limited future payments to the clergy actually in receipt of grants; New South Wales followed suit in 1862 and Victoria in 1875. Western Australia voted periodical subsidies until 1895, when future annual payments were commuted by the distribution of two grants of £17,715 each in that and the following year among the Anglican, Roman Catholics, Wesleyans, and Presbyterians, which are the only denominations that have received state aid in recognition of their religious work. The members of these four churches constitute the great bulk of the population and their relative numerical strength has remained almost constant for the last 30 years. The Commonwealth is debarred from legislating in respect to religion. Clause 116 of the Constitution Act provides that: "The Commonwealth shall not make any law for establishing any religion, or for imposing any religious observance, or for prohibiting the free exercise of any religion, and no religious test shall be required as a qualification for any office or public trust under the Commonwealth". In the convention which framed the Federal instrument after long and earnest debate the words "humbly relying on the blessing of Almighty God" were inserted in the Preamble to the Act in recognition of the deeply religious sentiment of the people. At the census of 1901 the numbers of adherents of the various denominations in each State of the Australian Commonwealth were given as follows:

Church of England	1,497,570
Roman Catholic	855,709
Presbyterian	426,105
Methodist	504,139
Baptist	92,670
Congregational	73,561
Lutheran	75,021
Salvation Army	31,100
Unitarian	2,629
Other Christian	66,968
Jew, Hebrew	15,239
Mahometan	3,206
Buddhist, Confucian	16,105
Hindoo, Brahmin	846
Other Non-Christian	18,894
Freethinker, Agnostic, etc	10,402
Indefinite	479
Others	80,673
Total	3,771,715

Australia was originally included for ecclesiastical purposes in the province of Canterbury and up to the year 1836 was attached as an Archdeaconry to the diocese of Calcutta. For 15 years after the foundation of New South Wales the only denomination recognized by the Government or possessing a Minister was the Church of England. There is now a general Synod of this church which meets every five years under the presidency of the Archbishop of Sydney, who has the title of Primate of Australia, although each State preserves its autonomy in church affairs. Melbourne and Brisbane also have Archbishops. There are six dioceses in New South Wales; five in Victoria; four in Queensland, together with that of New Guinea; and two in Western Australia. There is also the diocese of Adelaide in South Australia and of Tasmania. The Roman Catholic Church occupies, so far as numbers are concerned, the second place in each of the States, with the exception of South Australia, where the Methodists are numerically stronger. Its organization in Australia as elsewhere is superb. At the head of the Church stands the Cardinal Archbishop of Sydney. There are Archbishops in Melbourne, Brisbane, Adelaide, and Hobart; and 14 Bishops in the six States. Until 1834 Australia, so far as the Roman Catholic Church is concerned, was under the Bishop of Mauritius. Sydney was in that year constituted a see; eight years later the prelate was invested with the title of "Archbishop of Sydney and Vicar Apostolic of New Holland." In 1885 the Archbishop of Sydney was created a Cardinal and placed at the head of the Roman Catholic Church throughout Australasia. In 1876 Melbourne was made an Archdiocese as were also Adelaide and Brisbane in 1887, and Hobart a year later. The Cathedrals of Saint Mary in Sydney and Saint Patrick in Melbourne are especially magnificent structures. The Roman Catholic Church takes a prominent part in furthering social and industrial legislation and in temperance work. The Wesleyan Methodist Church was established in New South Wales in 1812, at a class meeting attended by 12 persons. Up to 1855 this Church was regarded as a Mission, but in that year it was constituted an affiliated Conference. In 1873 the Australasian Wesleyan Church was raised to the rank of an independent conference. On 1 Jan. 1902, the Wesleyan Methodist, the Primitive Methodist, and the United Methodist Free Churches of Australia and New Zealand were united under the name of the Methodist Church of Australasia. In South Australia this Church includes 25 per cent of the whole population and throughout Australia its members form a compact, enlightened, and progressive body, which has exercised a preponderating influence in promoting temperance legislation and measures tending toward a high plane of morality. The Presbyterians erected in 1810 one of the first places of worship in New South Wales. The Presbyterian Churches in all the States are united under the title of the Presbyterian Church of Australia in a General Assembly which meets every year in the capital cities in rotation. The Church in each State, however, acts independently in local administration and is autonomous so far as property is concerned. There is a Union of the Congregational Churches in each State federalized in the Congregational Union of Australasia. Thus pervading the Churches and leading to interstate Unions, is witnessed the same synthetic spirit which was materialized in Australian Federation. By this means strength is acquired without the sacrifice of local liberty, for a Federal union combines firmness with flexibility.

The youngest and one of the most active religious bodies in Australia is the Salvation Army. It started in South Australia in 1880 and two years later officers were sent from Adelaide to organize forces in Victoria, New South Wales, and Tasmania, and in 1886 to Queensland; operations in Western Australia were commenced in 1891. At first the officers of the Army met with much ridicule and some ill-treatment but the earnest and effective manner in which they grappled with the problems of social reform soon reconciled the public to their methods. Persecution gave way to popularity, and the work of the Army is now applauded by all classes. The Prison Gate Brigade reclaims many criminals, and does such good service in diminishing crime that several of the State Governments give a grant in aid of its operations. The headquarters of the Army are in Melbourne and the officer commanding in Australia has the rank of a Commissioner. There are Colonels or Brigadiers in each State.

The several churches in Australia are animated by those friendly and tolerant sentiments which are the natural offspring of freedom. An interchange of pulpits is not infrequent. On Empire day in 1906 a special service was arranged at Saint Paul's Cathedral, Melbourne, in which the president of the Methodist Conference and the minister of the principal Presbyterian Church took part.

John Alexander Cockburn,
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10. Australia — Industries and Commerce. *Manufactories.*— For many years Australia relied chiefly on its raw products for its wealth, but recently steady progress has been made with its manufacturing industries, and at the present time 152,260 men and 50,638 women find employment in what are ordinarily termed factories, as well as a large number of others in smaller establishments.

The most rapid increase in the manufacturing industry has taken place during the past 10 years—in fact between 1894 and 1904 the hands employed increased from 133,631 to 202,898, an increase of 69,267, as compared with an increase of only 28,366 during the previous 10 years, the growth of the factory employees being proportionately far greater than that of the population.

As regards the manufacturing industry generally, the population of the continent is at present hardly sufficient to maintain a large manufacturing population, while its distance from other market places is at some disadvantage as regards the export of manufactured products. The total horse-power of machinery used in the factories amounts to 160,000, the increased use of electricity in recent years being accountable for a rapid addition in such power.

The following table shows the number of establishments and the hands employed in each state of the Commonwealth in factories and works employing four hands and over:

Class of Industry.	Hands employed
Leatherware, not elsewhere included	566
Minor wares, not elsewhere included	1,884
Total	202,898

	New South Wales.	Victoria.	Queensland.	South Australia.	West Australia.	Tasmania.
Establishments	3,632	4,208	1,909	1,339	607	431
Employees	68,036	76,287	20,058	18,044	12,159	7,714

It will be seen from the above table that Victoria, which was the first state to display activity in the manufacturing industry, employs the greatest number of persons, and of these 25,429 are employed in establishments employing from four to 20 hands, 25,042 in establishments employing from 21 to 100 hands, and 25,816 in factories employing over 100 hands.

The capital invested in Victorian factories amounts to a little over £20,000,000 sterling, including the value of the land, buildings, machinery, plant and sundries. The capital invested in New South Wales factories amounts to £21,000,000. The capital invested in the manufacturing industries in Queensland amounts to £9,000,000. According to the census of 1901, the capital invested in the manufacturing industries of the Commonwealth aggregates £65,000,000, of which £20,000,000 is represented by land and buildings, £21,000,000 by machinery and plant, and £24,000,000 by stock, material, etc.

New South Wales comes next to Victoria in the employment given in the manufacturing industries, and its total of 68,036 is made up of 53,457 males and 14,579 females. Establishments employing from four to 20 hands employ 19,879; from 21 to 100 hands, 24,797 persons, and over 100 hands, 23,360 hands.

In Queensland the two principal manufacturing industries are sugar refining and meat preserving, and of the total number of people employed, about 12 per cent find employment in these two industries.

The total output of all factories in Australia, exclusive of those engaged in the production of butter, cheese and bacon, figures of which are included in the pastoral industry, amounts to £71,000,000, of which £43,000,000 represents the value of material and fuel used, and £28,000,000 the value added in the process of treatment. Of the latter sum £13,500,000 accrues to the proprietors to pay rent, depreciation, insurance, etc., and profits of the business, and £14,500,000 represents wages paid to the employees.

The following table gives the class of industries which give employment to people in the Commonwealth:

Class of Industry.	Hands employed.
Treating raw material the product of pastoral pursuits	7,122
Oils and fats, animal, vegetable, etc	1,709
Processes in stone, clay, glass, etc	7,904
Working in wood	15,709
Metal works, machinery, etc	37,317
Connected with food and drink, etc	32,754
Clothing and textile fabrics and materials	56,599
Books, paper, printing and engraving	18,019
Musical instruments	282
Arms and explosives	302
Vehicles and fittings, saddlery and harness, etc.	7,959
Ship and boat building, etc	1,826
Furniture, bedding and upholstery	5,396
Drugs, chemicals and by-products	2,110
Surgical and other scientific instruments	134
Jewelry, timepieces and plated ware	1,286
Heat, light and power	4,020

Tanning, fell-mongering and wool scouring afford the largest amount of employment among the industries in class 1, and this can be readily understood, seeing that the pastoral industry is still the greatest in the Commonwealth.

In class 2 the manufacture of soap and candles is increasing rapidly.

In class 3 the manufacture of bricks and tiles is the most important, about 65 per cent of those engaged in this class being employed in that industry.

In class 4 it can be readily understood that with the immense forests of valuable timber, the saw mill is the most important of wood-working establishments, and about 70 per cent of those employed in that section are in saw mills.

Class 5 included a great number of persons employed in the engineering works of the respective state government railway and tramway workshops. Also workers in smelting establishments for the extraction of ore, though these employed in quartz batteries are not classified as factory hands in Australia. There are several important establishments for the manufacture of agricultural implements, and at Gawler, in South Australia, and in Melbourne, the capital of Victoria, important agricultural implement works have been founded. To an Australian firm is due the credit of inventing that great labor-saving appliance, the "Complete Harvester."

In industries connected with food and drink butter, cheese, meat preserving, sugar mills, and breweries employ a great number of hands, while flour mills, ærated water factories, biscuits and other articles required for local consumption also employ a great number of persons.

Factories connected with clothing and textile fabrics offer more employment than any other section, and here the females employed largely outnumber the males. Victoria shows the greatest development in this industry, and during the last few years the manufacture of wool has made considerable progress in the various states.

Perhaps a more interesting comparison will be found in arranging the industries into three natural classes: (1) Those which come into competition with imported goods; (2) those dependent upon the natural resources of the Commonwealth, and (3) those treating perishable products for domestic consumption. We find that the first section employs 88,866 people, the second 102,206, and the third 11,826.

Speaking of wages generally, Australia pays its employees high wages compared to other countries, while the genial climate and general healthy conditions of life makes living cheap compared to other countries of the world.

During the last few years a system of in-

dustrial legislation has come into force in most of the states, which brings about better conditions of work, cleanliness, air space, sanitation, etc. Australian factories, as a rule, are well built and roomy. The day's work is generally limited to eight hours, with extra payment for overtime in cases of need. Wages boards have also been appointed for many of the principal industries, and to prevent strikes and lock-outs, courts of conciliation and arbitration have been established.

Taking the chief manufacturing state of Victoria as a basis, the latest records show that in industries controlled by wages boards, the average earnings of male workers, 21 years old and upwards, is £2 4s. 3d. per week, and of females, 19s. 9d. per week. The average wage in industries not so regulated, being £2 1s. 11d. and 17s. 5d., respectively.

Pastoral Industry.—The pastoral industry plays the most important part in the resources and wealth of Australia. At the close of 1904 Australia had 65,822,918 sheep, 7,868,520 cattle, 1,595,256 horses, and 1,062,253 pigs. The 1905-06 figures are not at present available for all the states, but judging from those available it may be safely estimated that the sheep show an increase of about 14 per cent on the figures given and now number 75,000,000; cattle show an increase of 8 per cent, now numbering 8,500,000, and horses an increase of 5 per cent, numbering 1,675,000. In swine, the figures are probably about the same.

Nothing is more marvelous than the progress of the pastoral industry. In the year 1800 there were only 6,124 sheep, 1,044 head of cattle, 203 horses, and 4,017 pigs in the whole of Australia, but it is since 1850 that the greatest progress has been made, and from that date the value of the wool alone which has been exported has amounted to £650,000,000 sterling.

The first sheep imported were from the Cape of Good Hope, and in 1823 and 1825 further lots of Spanish sheep were introduced. In some respects the climate of Australia changed and improved the character of the Spanish fleece. The wool became softer and more elastic and increased considerably in length. The average weight of a fleece has increased remarkably, and while in 1861 the average weight of a New South Wales fleece was only 3.28 pound per sheep, the present average weight is 7.3 pound.

In recent years there has been a tendency to divide the sheep into smaller flocks. In New South Wales for instance there are 17,361 sheep owners as compared with 14,033 ten years previous, while the average size of a flock is now 1,650 as against 4,050 at a former period. Of the total number of the sheep in Australia about 95 per cent are merinos. On the coastal districts, however, where merino sheep do not do so well, the rearing of cross-bred and long wool sheep is increasing and these are specially valuable for the meat they produce. It is interesting to note that at the present time Australia carries one-fifth of the total sheep in the world.

The export of wool brings an immense amount of money to the Commonwealth and the 1904 return for each state was as follows:

New South Wales	£9,328,270
Victoria	3,376,015
Queensland	2,280,909
South Australia	£1,306,238
West Australia	419,395
Tasmania	401,512
Total	£17,112,339

Cattle.—Owing to the more profitable character of sheep farming, cattle breeding in the Australian states is, with the exception of Queensland, second to that of sheep. The following table shows the number of cattle in the various states at the end of 1904:

New South Wales	2,167,129
Victoria	1,694,976
Queensland	2,722,340
South Australia	520,379
West Australia	561,490
Tasmania	202,206
Total	7,868,520

For the year ending 1905 the cattle in the states for which there are returns had increased by eight per cent and as the season generally in Australia was a favorable one it is safe to assume that in all the states an increase occurred on the returns of the previous year and the present numbers are not less than 8,500,000.

No form of production in Australia has made such rapid strides of late years as dairying and included in the above figures for cattle are the following numbers of dairy cows and heifers:

New South Wales	591,936
Victoria	632,493
Queensland	160,000
South Australia	88,826
West Australia	27,721
Tasmania	50,230
Total	1,551,206

Horses.—Considerable attention has been paid to the breeding of horses and at an early period the stock of colonial-bred horses was improved by the importation of Arabian and other breeds. The following table shows the number of horses in the different colonies:

New South Wales	482,663
Victoria	372,397
Queensland	413,165
South Australia	200,241
West Australia	90,225
Tasmania	36,565
Total	1,595,256

There is a considerable demand in India for Australian horses and as a rule between 6,000 and 7,000 are exported annually to India, valued at from £80,000 to £85,000.

Angora Goats.—Considerable attention has been given during the last few years especially in Queensland and New South Wales, to the production of mohair and considerable numbers of pure bred angoras have been imported from the United States. The goat thrives admirably in the warm dry climate of Australia and it seems likely that in the near future, the export of mohair will show considerable increase. At the present time there are about 65,000 goats depastured in Australia.

Camels.—In some of the states camels are employed for the carriage of wool and other produce. In West Australia camels number 2,150 in New South Wales 850, and in the Commonwealth as a whole the number is not less than 4,200.

Pastoral Returns.—The annual return from the pastoral pursuits in 1904 was about £36,000,000, to which total sheep contributed about £26,000,000; cattle £7,000,000; horses £3,000,000. The greater part of the sheep industry is, of course, the return from wool and skins which amounts to £20,250,000. The value of wool consumed locally is not more than £250,000.

Frozen Meats.—A rapid increase in live stock in Australia in favorable seasons makes the question of disposing of the surplus material of serious consequence. In 1882 the first shipment of frozen mutton from Australia to Great Britain was tried. In 1905 £441,018 worth of frozen beef, £1,081,151 worth of frozen mutton and £338,823 worth of hares and rabbits were exported from Australia over sea.

Queensland exports large quantities of chilled and frozen beef, the total amounting to about £1,000,000 worth annually. Much of this is sent to the other states and is not included in the oversea exports. New South Wales exports chiefly frozen mutton, which varies in value from about £200,000 to £500,000 annually. Victoria also exports large quantities of frozen mutton and beef, while South Australian lambs are highly prized in the British markets. The export of canned meat was valued at £264,000.

Dairy Farming.—The introduction of the factories system at convenient centres in Australia has caused rapid extension in this industry. Immense quantities of butter are now exported to Great Britain, in 1905 the export amounting to £2,307,835 sterling or 11 per cent of the total imports into Great Britain. The total value of the dairying industry of Australia is shown in the following table:

Total Value of Dairy and Swine Produce.	
New South Wales	£2,426,000
Victoria	2,912,000
Queensland	646,000
South Australia	568,000
West Australia	240,000
Tasmania	338,000
Total	£7,130,000

Forestry.—Australia is chiefly famous for its hardwood timbers, the export of which is now a considerable industry. In 1904 the total exports from Australia amounted to £839,518 of which West Australia exported £584,422. The present annual value of the timber industry of the Commonwealth, that is of the rough timber as it leaves the forest saw mills, is about £2,250,000 sterling. In West Australia alone the forests of marketable timbers are estimated to cover about 21,000,000 acres. The Governments of all the States have a number of reserves where the young timber is conserved so that the source of supply can be maintained.

Jarrah is the chief timber exported, its principal use being for wood-blocks, piles, railway sleepers, etc. The wattle tree grows well in most parts of Australia, from the bark of which large quantities of tanning material are produced. There are various species of eucalyptus from which is distilled the famous eucalyptus oil which has a considerable value for medicinal purposes. Some of the fine grained woods are also very beautiful and much used for decorative purposes. The karri is probably the finest tree of the Australian forests and sometimes run to over 30 feet in circumference at three feet from the ground and up to 150 feet from the ground to the first branch. Other prime timbers are ironbark, tallow wood, jarrah, spotted gum, grey box, mahogany, blackbutt, etc. Besides hard woods there are beautiful cabinet woods, viz.: cedar, rosewood, redbean, silky oak, blackwood, etc.

Agriculture.—Judging by the experience of the past 30 years, Australia appears to be on the threshold of vast agricultural developments. Up to 1871 only 2,345,922 acres were under crop in the Commonwealth but in 1904 this had increased to 9,365,022 acres. Of the cultivated land 90 per cent lies within the borders of New South Wales, Victoria and South Australia. The following table shows the area cultivated in the various States:

State.	Acres.
New South Wales	2,674,896
Victoria	3,321,785
Queensland	539,216
South Australia	2,275,506
West Australia	327,391
Tasmania	226,228
Total	9,365,022

As in most new countries where the pioneer farmer needs a quick return from his land, wheat is the principal crop and nearly 67 per cent of the cultivated land is sown to wheat. The area under wheat for grain in the various states in 1904 was as follows:

State.	Acres.
New South Wales	1,775,955
Victoria	2,277,537
Queensland	150,958
South Australia	1,840,157
West Australia	182,080
Tasmania	43,091
Total	6,269,778

In 1905 the yield of wheat for the Commonwealth amounted to 68,000,000 bushels, but the figures showing areas under crop in 1905 for the various states are not at present available. The other crops of most importance are hay, oats and maize, 1/6 of the cultivated area being under hay, 5.2 under oats and 3.5 under maize.

The Commonwealth requires about 30,000,000 bushels of wheat annually for home consumption and seed and a production of 65,000,000 leaves about 35,000,000 bushels annually for export.

The average yield of wheat in Australia may be taken at about 10 bushels per acre. This appears low judging by the standard of many other countries, but a bare statement of averages is misleading, as in Australia the cost of production is relatively very low. In ordinary districts the expenses of ploughing seed and sowing and harvesting the wheat amounts to only about 12/-per acre, so that a yield of 10 bushels at 3/- a bushel means a return of about 18/ an acre out of which to pay the other expenses.

In South Australia the conditions of cultivation are even more favorable than the above indicates, and with a smaller yield, wheat growing is bound to be very profitable. The present comparatively low yields are largely due to the fact that immense areas are put under crop by individual farmers. In consequence, the cultivation and harvesting methods are not carried out so thoroughly as in older countries of the world. With smaller areas and better farming, far higher averages will, it is believed, be ob-

tained in the future. The following tables show the average area and yield of some of the other principal crops:

AREA UNDER OTHER PRINCIPAL CROPS.

State.	Maize.	Oats.	Other grain crops.	Hay.	Potatoes.	Sugar cane.	Vines.	Other crops.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
New South Wales	193,614	40,471	23,120	435,704	23,855	21,525	8,840	151,812
Victoria	11,394	344,019	59,879	452,459	45,912	.....	28,016	101,569
Queensland	119,171	643	17,746	48,740	12,754	120,317	2,194	66,693
South Australia	.....	50,630	30,982	269,626	8,315	.....	23,210	52,586
West Australia	86	13,864	4,377	105,247	1,906	.....	3,413	16,418
Tasmania	149	43,690	24,077	55,545	25,948	.....	.....	33,728
Total	324,414	493,317	160,181	1,367,321	119,690	141,842	65,673	422,806

AGRICULTURAL PRODUCTION.

State.	Maize.	Oats.	Other grain crops.	Hay.	Potatoes.	Sugar cane.	Wine.
	Bushels.	Bushels.	Bushels.	Tons.	Tons.	Tons.	Gallons.
New South Wales	4,951,132	652,646	334,205	366,293	48,754	199,640	928,160
Victoria	623,736	6,158,929	1,105,822	514,316	92,872	.....	1,832,386
Queensland	2,542,766	15,137	347,738	80,662	33,257	1,326,989	60,433
South Australia	.....	555,696	440,536	294,252	19,521	.....	2,625,430
West Australia	896	226,318	50,396	113,794	5,614	.....	185,070
Tasmania	.....	1,178,819	502,818	73,457	110,547	.....	.....
Total	8,118,530	8,787,545	2,781,515	1,442,774	310,565	1,526,629	5,631,479

Large areas are also under orchards in the various states of the Commonwealth, the total being about 155,000 acres. Victoria heads the list with 51,000; New South Wales 50,000 and South Australia 20,000. The export of apples, oranges and dried fruits to Great Britain has been commenced and promises to develop into an important industry.

All the Governments give considerable attention to agricultural education and have established agricultural colleges and experimental farms where practical and scientific agriculture is taught.

In most of the States also arrangements are made by the Government to advance money to assist farmers at low rates of interest.

Irrigation.—The necessity for providing water for stock and irrigation in the dry parts of Australia induced the respective Governments to spend a good deal of money on water conservation and artesian boring. Cretaceous beds extend over large areas of New South Wales, West Australia and South Australia. By sinking artesian bores supplies of water are brought to the surface from underground sources which exists in the tertiary drifts and the cretaceous beds.

In New South Wales one of these wells has a daily flow of 1,750,000 gallons, the depth of the bore being 2,029 feet. Over 50 artesian bores have been successfully sunk in South Australia, the greatest daily flow amounting to 1,200,000 gallons. These bores give excellent water for stock purposes and are also used in many cases for irrigating crops.

Mineral Resources.—Most metals of economic value are found in Australia. Gold is found in all the states and in 1823 the first discovery of the precious metal was made. In 1851 and 1852 important discoveries were made in New South Wales, Victoria, South Australia and Tasmania and attracted a rush of population. A little later gold was found in Queensland and the last of the states in which extensive deposits were found was Western Australia. So important did these deposits prove that in 1905 the output of Western Australia was more than equal to all the other Australian states together.

The following table shows the gold won in each State up to the end of 1905 and the return for the individual year of 1905:

	Total Yield, £	1905. Ounces.
New South Wales	53,235,286	274,267
Victoria	272,801,158	732,603
Queensland	61,618,291	578,364
South Australia	2,778,392	20,447
West Australia	62,686,475	1,955,304
Tasmania	6,026,845	74,316
Total	459,146,447	3,635,301

Silver.—Australia is rich in silver and it is found in all the states either alone or in the form of sulphides, chloride, bromide, iodide, chloro-bromide of silver and antimonial and arsenical ores and argentiferous lead ores. In the latter the largest deposits of metal are found.

Prior to 1882 the output of silver in Australia was small, but with the opening up of the Barrier Mines at Broken Hill, close to the boundary of New South Wales and South Australia, rapid advances took place. The following table shows the output of silver and silver lead in the respective state up to the close of 1904:

State.	Silver and silver-lead.
New South Wales	£37,348,699
Victoria	198,793
Queensland	995,583
South Australia	141,848
West Australia	85,887
Tasmania	3,436,546
Total	£42,207,356

Of the above about £29,000,000 worth is the product of the Broken Hill mines.

Copper.—The following table shows the pro-

duction of copper in Australia up to the end of 1904 with the output for 1904:

State.	Total.	1904.
New South Wales	£7,017,166	£406,001
Victoria	206,895	.....
Queensland	2,981,910	257,896
South Australia	24,116,098	432,063
West Australia	461,447	25,180
Tasmania	5,602,184	507,066
Total	£40,385,700	£1,628,206

It will be seen that South Australia has produced the greatest quantity of copper, but of late years Tasmania has had the largest output.

Tin is also found in payable quantities in many parts of Australia, the production to 1906 amounting to £21,549,000. Iron is distributed throughout the Commonwealth and at Lithgow, in New South Wales, where iron and coal deposits lie alongside each other, a commencement has been made to smelt the ore. Tasmania has enormous deposits situated near the Blyth river. Other minerals widely diffused throughout Australia are antimony, bismuth, manganese, platinum, tellurium, lead, wolfram and a number of earth colors. The annual production of such other minerals amounts to about £800,000.

Coal.—Coal was first discovered in New South Wales in 1797. Since that time it has been proved that nature has bountifully supplied Australia with mineral fuel. Black coal forms one of the principal mineral resources of New South Wales and it is estimated that the known areas of coal fields of this class contain over 85,000 million tons. The following table shows the value of the total output of coal in the respective States and also the output for 1904:

State.	Total output.	Output in 1904.
New South Wales	£46,016,054	£1,994,952
Victoria	1,331,877	70,208
Queensland	3,325,609	166,536
South Australia	.....	.....
West Australia	373,598	67,174
Tasmania	524,859	29,878
Total	£51,571,997	£2,328,748

Brown coal or lignite occurs principally in Victoria but it is much inferior to the black coal. Good coal has been found in Western Australia, while in Queensland the extent of the coal fields is practically unlimited — over 24,000 square miles of coal measures having already been explored. Tasmania also has important carboniferous formations.

Marble of high quality is found in many parts of Australia, while the finest opal known is obtained in the Upper Cretaceous formation near Wilcannia, New South Wales. The output of opals from this district amounts to about £125,000. Other gemstones, including emeralds, sapphires, rubies, etc., are found in various parts, while diamonds are found in New South Wales, Victoria, Queensland and South Australia, though only in the first named are the diamond drifts worked commercially.

Commerce.—The external trade of Australia is increasing rapidly as the following table shows:

Year.	Imports.	Exports.	Total trade.
1861	£17,562,960	£17,399,656	£34,962,616
1881	29,031,131	27,528,583	56,559,714
1901	42,433,811	49,696,172	92,129,983
1905	38,407,579	56,750,347	95,157,926

If the interstate trade be included the figures will be greatly increased. Taking, for instance, the returns for 1905 and including the interstate figures the trade of each state was as follows:

Imports.	1905.
New South Wales	£29,433,078
Victoria	22,317,195
Queensland	6,504,919
South Australia	8,431,594
Western Australia	6,481,309
Tasmania	2,652,777
Total	£75,820,872

The following figures show the distinction between oversea and Australian goods:

	Goods Imported.	Interstate Trade.
New South Wales	£14,573,819	£14,859,259
Victoria	12,937,932	9,379,263
Queensland	3,164,487	3,340,432
South Australia	3,224,589	5,207,005
West Australia	3,768,830	2,712,479
Tasmania	737,922	1,914,855
Totals	£38,407,579	£37,413,293

The total exports for the same year were as follows:

Exports.	1905
New South Wales	£36,645,451
Victoria	22,706,658
Queensland	11,862,367
South Australia	9,455,991
West Australia	9,789,354
Tasmania	3,703,819
Total	94,163,640

These are distinguished as follows:

	Oversea Direct.	Interstate Trade.
New South Wales	£24,484,740	£12,160,711
Victoria	14,028,641	8,678,017
Queensland	3,384,856	8,477,511
South Australia	5,402,638	4,053,353
West Australia	8,977,297	812,057
Tasmania	472,175	3,231,644
Totals	£56,750,347	£37,413,293

The external trade of the Commonwealth amounts to £23.10.0d per head of population, which is nearly four times that of the United States and considerably greater than that of the United Kingdom.

Of the total trade 49 per cent in 1905 was with Great Britain, 23 per cent with other parts of the British Empire and 30 per cent with foreign countries. The trade of Australia shows a considerable diversion in recent years from Britain to foreign countries. In fact one-third of imported goods are now of non-British origin as compared to one-fourth 10 years ago, and of the exports over one-fourth are sent to non-British countries compared with one-tenth in 1885. The chief cause of this is the establishment of direct and rapid communication between Germany, France, Belgium, Japan and the United States with Australia.

In the exports the same tendency is noticeable, in 20 years the percentage to Great Britain having fallen from 74.91 per cent to 46.11, while exports to foreign countries have increased from 9.26 per cent to 25.89 per cent.

The following are some of the chief articles of export during 1905:

Butter	£2,447,133
Copper, ingots, and matte	2,103,694
Coal	910,518
Wheat	4,140,676
Flour	1,211,351
Lead, pig, and matte	772,079
Leather	418,681
Beef	441,018
Mutton and lamb	1,081,151

Rabbits and hares	£338,823
Silver, bar, ingot, etc	818,341
Silver lead	757,460
Hides	176,030
Rabbits and hares (skins)	231,627
Sheep skins	1,396,849
Tallow	774,646
Timber	1,036,183
Tin, ingots	714,074
Wine, fermented	106,789
Wool, greasy, washed and scoured	19,822,216
Gold	10,965,612

Shipping.—In 1904–5 the total number of vessels, in the interstate, coastal and oversea trade, exclusive of river traders, entering and clearing Commonwealth ports was 17,691, of 29,150,962 tons. This shows an increase of 813 vessels and 4,450,847 tons on the figures of the previous year.

The number of vessels and tonnage of same entering Australian waters from foreign parts and those clearing for same is shown in the following table:

	1905.		
Description of Vessel.	Vessels.	Tons.	Crew.
Entered:			
Steam	1,038	2,639,708	75,845
Sailing	938	1,085,378	16,744
Total	1,976	3,725,086	92,589
Cleared:			
Steam	1,050	2,629,677	76,285
Sailing	1,062	1,089,654	17,067
Total	2,112	3,719,331	93,352

TIMOTHY AUGUSTINE COGHLAN,
Agent-General for New South Wales.

11. Australia — Government Undertakings. The manifold activities of the State — which is the striking feature of Australian polity — originated from the obvious inability of a sparse population to develop an enormous territory by individual effort. Australia is nearly as large as the United States, if we exclude the northern part of Alaska, and even now it only contains 4,000,000 people. Roads, railways and means of communication in this vast territory were necessarily the care of the State in a country where neither individuals nor townships possessed sufficient capital or labor to undertake these works. Consequently posts, telegraphs, and railways in every State of the Commonwealth are under government control. The posts and telegraphs are since 1900 under the Federal Government but the railways continue to belong to the several States. The impulse given to State energies by the necessity for means of locomotion and intercourse soon led to the provision by the same authority of facilities for shipping produce. The control of harbors and rivers thus passed naturally to the State Governments and the State of New South Wales in 1902 compulsorily purchased all the sea frontages of the business portion of Sydney Harbor in order to exercise a more effective control of the wharves and prevent the charges being raised to shippers by any combination of private owners. The States have in many instances delegated the management of State property to boards. But the wisdom of vigorous and ever-watchful State activity is the accepted creed of the Australian democracy, which dreads nothing more than the industrial anarchy of unregulated individualism.

Railways.— Railways have always been regarded in Australia as a means of opening up new country. Naturally, therefore, they run through sparsely settled areas. Nevertheless, and in spite of the fact that new lines are being continuously added, the 13,500 miles of railway in the Commonwealth give a net return of 3.38 per cent. In all the States — and in New South Wales the tramways also — they are under government control. In Western Australia there are also 277 miles of private lines; in New South Wales, 81¼ miles; in Tasmania, 160 miles; in South Australia, 20 miles, and in Queensland, 102 miles. Until 1897 Western Australia favored the construction of lines of private enterprise on the Land Grant system; but the results as compared with governmental control were found to be so unsatisfactory, that, following the example of New Zealand which had had the same experience, the State acquired the Great Southern Railway (243 miles) by compulsory purchase. In order to minimize the dangers and political interference the management and maintenance of the railways in all the States is under the control of commissioners who are appointed for terms of not less than seven years and are independent of Parliament. In New South Wales and Victoria proposals for new lines are submitted to committees composed of members of both Houses of Parliament whose duty after taking evidence is to advise Parliament as to the expediency of their construction.

The following table shows the amount expended on construction and equipment up to 30 June 1905:

State.	£
New South Wales	43,062,550
Victoria	41,279,045
Queensland	21,610,980
South Australia	13,587,406
West Australia	9,808,458
Tasmania	3,920,508
Commonwealth	133,268,947

The greater part of the public debt of Australia has been expended on railway construction.

In 1850 the first railway was commenced but it was not until 1855 that the line was opened. It ran for 14 miles from Sydney to Paramatta. At the end of 1871 just over 1,000 miles of railway lines had been built. After that the work of construction was carried on rapidly and the following table shows the total number of miles open for traffic in the various States at the end of June 1905:

State.	Miles.
New South Wales	3,280 3-4
Victoria	3,394
Queensland	3,692 1-2
South Australia	1,745 3-4
West Australia	1,605
Tasmania	462 1-2
Commonwealth	13,580 1-2

The following tables show the net profit after paying working expenses, and the percentage of profit to capital invested:

State.	Net profit.	Percentage in capital.
New South Wales	£ 1,491,869	£ 3/ 9/3
Victoria	1,462,643	3/10/9 1-2
Queensland	598,695	2/15/5
South Australia	536,530	3/19/
West Australia	354,126	3/12/2
Tasmania	71,926	1/16/7
Commonwealth	£ 4,515,789	£ 3/ 7/9

The freight charges are low, as the main object of railway construction has been to open up and develop the country Railway construction in Australia has not proceeded with uniformity of gauge. In New South Wales a gauge of 4 ft. 8½ in. has been adopted. In Victoria 5 ft. 3 in., in South Australia partly 5 ft. 3 in. and partly 3 ft. 6 in., while in the other States 3 ft. 6 in. in gauge is universal.

Speaking generally the agricultural districts are excellently served with railways. The total number of passengers carried annually amounts to about 115,000,000, the receipts from coaching traffic being about 41 per cent of the whole and those from goods traffic 59 per cent.

Other Public Works.— The early settlement of Australia, unlike that of America, was centralized in the capital cities of each State; consequently municipal institutions and local government are as yet imperfectly developed. Thus many of the functions of municipalities are performed by the Central Government although there is a growing tendency to transfer these to local bodies as the country population gathers round townships. At present the State Governments maintain all main roads and bridges. They also construct the harbor works and provide dredgers for their maintenance. In Melbourne and Sydney this work has been delegated to Boards. Punts and ferries on rivers are also under the control of the State Governments; which is also charged with the construction of all school buildings, prisons, and hospitals. Water conservation is another very important function of the State Governments, and large sums have been spent in sinking for water and maintaining artesian wells along the stock routes of the dry interior.

Activities of Federal Government.— The Federal Government of the Commonwealth has not yet assumed all the powers which by the Constitution are permitted to it. At present it only controls public works in so far as these are connected with the postal, telephonic, and telegraphic services, with military and naval defence, and with the customs houses. It will soon also take over from the States the lighting of the coasts, the quarantine grounds, and the observatories.

The Commonwealth Parliament has recently passed an act providing for the compulsory reference of industrial disputes extending beyond the limits of one State to a judicial tribunal; but it is questionable whether this act is not unconstitutional, and in its present form it is not likely to be effective. The Commonwealth has also, in the exercise of its powers to «make laws with respect to trade and commerce,» passed a stringent law against fraudulent marks on goods whether these are imported or made in Australia, and also to provide for the marking with a government stamp on all goods intended for export. The same measure permits goods which are made under trade union conditions to be marked with a special union label. The Parliament has now before it a measure to prevent trusts and combines within the Commonwealth and to prohibit the importation of «dumped» goods (i.e. goods sold for export at below cost).

In military matters the Parliament, under the influence of the Labor party, have adopted the principle that if a country is worth living in it is worth defending; and that therefore it is the duty of every citizen in a democracy to be able to bear arms. The Defence Acts empower the calling out of every citizen under the age of 40, and provision is made for universal instruction in military matters by the formation of cadet corps in all the State schools. A movement is now on foot for providing for the coastal defences of Australia by means of locally owned warships. The Federal Government administers as a dependency the British portion of New Guinea which is now known as Papua. It is also proposed that the Federal Government shall provide old age pensions.

The Federal Government has control of immigration but its activities in that direction are at present hampered by the jealousies of the States which own the available land and are willing to co-operate with the Commonwealth. The law as to the immigration of undesirables is practically the same as that of the United States, and Canada; but its administration is less strict. No white person has ever been excluded under its provisions.

State Activities.— All the States, except Tasmania and Western Australia, have from time to time attempted to deal with the problem of the unemployed by means of labor settlements. None of these, however, have been permanently successful and they have not been adopted on any large scale.

Co-operative and village settlements have, however, been more successful in Victoria and South Australia. Areas of land are set apart in both these States for village communities. The government makes advances for improvements and on the performance of the required conditions the occupier may obtain a perpetual lease on the freehold of his block. Up to 30 June 1904, a total of 1,891 settlers, making with their families a community of 8,556 souls, were residing in these settlements in Victoria on an area of 57,588 acres on which improvements had been effected to the value of £254,955. In South Australia at the same date, the number of settlers was 84, to whom £102,116 had been advanced, while the improvements effected were valued at £41,869. The unoccupied lands in every State belong to the State and not to the Commonwealth.

Agricultural Activities.— Every State has tried by legislation to improve and develop its agricultural resources. Until the establishment of the Commonwealth the States gave bonuses on the export of butter, cheese, and fruit, but these have now ceased. There are, however, in New South Wales, Victoria, and South Australia depots under State management for the storage and freezing of perishable products. Exports of poultry, butter and cheese are graded and marked by government brands, and South Australia for some years maintained in London a depot for the sale of her wines. Most of the States have appointed boards which are empowered to lend money to farmers to effect improvements. Every State maintains agricultural colleges or lecturers, and in some there are experimental farms. New South Wales maintains State nurseries for fruit and forest trees.

Charities.—The administration of charity is an important function of the States in a country

which has no poor law; hospitals, asylums for the insane, asylums for the aged, orphanages, and industrial schools are all established and maintained by the State governments. A system of boarding out of State children is also in operation in New South Wales, Victoria, and South Australia. Old age pensions of 10/ a week are given in New South Wales to all above the age of 65 who have not an income of £26 a year.

Industrial Activities.—In New South Wales and Victoria the States have adopted the view that an industrial dispute between capital and labor is as much a concern of the State as a quarrel in the street between two citizens. Each State deals with the matter in a different way. In New South Wales a tribunal has been established to which all industrial disputes must be referred. A workman striking or a master locking out before making such a reference is guilty of a misdemeanor. The court has power to enforce its awards by fine or imprisonment: it can direct a minimum wage and may order that preference be given to unionists in any industry. It has power to declare an order made in any case to be the «common rule» of the industry in question within a given area. It is claimed for this act, which has been in force since 1902, that it has given a new security to capital by preventing strikes and that it has abolished «sweating.» In Victoria, Wages Boards have been established for every industry, consisting of an equal number of representatives of workmen and employers with an umpire. All questions relating to the trade may be referred. The decisions of the board may be enforced by action in the courts as upon the award of an arbitrator.

The Factory Acts of Great Britain have been partially adopted by all the States, but in none is there the same strictness of supervision nor the same restraint upon the manufacturer as in England. The government of New South Wales makes the clothes of the railway employees and police in a State factory. Most of the States have State workshops for manufacturing rolling stock and railway engines. The State of New South Wales also owns a dry dock and a ship repairing plant.

All the States publish Year Books giving full details of the progress of the State, and the working of all government departments. These can be obtained gratis on application to the Agent-General of the State in London.

Bernhard Ringrose Wise,
Formerly Attorney-General, New South Wales.

12. **Australia — Finance.** In matters of finance, as well as in many other things, Australia presents a most interesting field for study. Sprung from a splendid body of pioneers, who had been brave and enterprising enough to quit the old home-land, with all its tender associations, and well ascertained conditions of life, and to cross the ocean, in a voyage lasting, in those days, three or four months, in order to the beginning of a new life under unaccustomed conditions, in a new and undeveloped land, the colonists have wrought wonders. Untrammeled by any undue preference for the old ways and with ample scope for bold, not to say audacious, experimenting, the spirit of enterprise, inherited from their fathers strong in them, the second generation of the settlers, who are the Australians of to-day, have striven to put into practice, and by no means without success, some theories which have elsewhere remained merely theories. In their systems of land settlement, their State ownership of such undertakings are railways, tramways, water-works, etc., and in schemes of taxation, to say nothing of other matters of finance, they have sometimes discarded precedent and have no reason to be ashamed of the results which they have to show for their enterprise and fearlessness. Complicated as are, in some respects, Australian questions, through the existence, at one and the same time, of a dual citizenship, every person owing allegiance to his own individual State and also to the broader Commonwealth government, a very little care will enable a complete view to be taken of Australian finance, including both those figures relating to the Commonwealth, or National, and to the State, or Provincial Governments. The 4,000,000 people of the Commonwealth occupying the great island continent of Australia and the adjacent small one of Tasmania, with an area, in all, of as nearly as possible 3,000,000 square miles, having, for national purposes, united under the Commonwealth Constitution Act, are still, in respect of all but certain specified matters, citizens of one or other of the six States of New South Wales, Victoria, Queensland, South Australia, Western Australia, and Tasmania. So far as their finances are concerned it is necessary to remember that to the Commonwealth are assigned very large powers of taxation, which, however, are, so far, only exercised in respect of customs and excise, the whole revenue from which is collected by the Commonwealth, the balance, after meeting its own necessities, being handed over to the States, in proportion to the amount of the duties derived in each State. The Commonwealth controls all posts, telegraphs, and telephones, as well as all military and naval defences, and also several other important departments of State, but the finances and statistics are unaffected by these matters, as in the case of all of them, where there is Commonwealth control State control ceases. In taxation, however, if it were attempted to show the total for Australia by adding to the total for the Commonwealth those for the States, the result would be wrong; just as would be any attempt to get the total revenue or expenditure for Australia by adding Commonwealth totals to those for all the States, because of the portion of the customs and excise revenue which, being first collected by the Commonwealth, is afterward paid over to the States and so would appear twice in the totals. In this statement care will be taken to show all the figures once, without any duplication whatever. The figures given will, unless otherwise stated, be from the unchallengeable authority of the latest volume published by the government statistician of New South Wales, Mr. Coghlan, now Agent-General for that State in London. We shall, however, begin with the totals of revenue and expenditure of the Commonwealth for the financial year ending 30 June 1905, as given to Parliament by the treasurer of the Commonwealth, the Rt. Hon. Sir John Forrest, in his budget speech in August 1905.

The figures show the sum collected in each State:

State	Customs and Excise	Posts and Telegraph	Other Revenue	Totals
N. S. Wales.	£3,033,617	£980,141	£6,968	£4,020,727
Victoria	2,488,842	682,565	7,800	3,179,207
Queensland.	1,095,476	331,096	3,288	1,429,860
S. Australia.	678,880	266,691	7,838	953,409
W. Australia	1,029,515	257,489	1,938	1,288,942
Tasmania...	330,651	112,923	2,047	445,621
Totals	£8,656,981	£2,630,905	£29,880	£11,317,766

Beside the totals given the Commonwealth collected in Western Australia, and paid over to that State, temporary duties amounting to £142,549. The expenditure was:

Customs and excise department.....	£256,060
Military and naval defences.....	706,279
Posts, telegraphs and telephones.....	2,560,756
Other expenditures	461,497
Total	£3,984'592

The customs and excise revenue for the year ending 30 June 1905, was collected under the following heads:

CUSTOMS.

Stimulants	£2,050,648
Narcotics	922,248
Sugar	192,391
Agricultural products and groceries.....	684,746
Apparel and textiles.....	1,348,848
Metals and machinery.....	454,325
Oils, paint and varnish.....	121,466
Earthenware, etc.	138,122
Drugs and chemicals.....	56,646
Wood, wicker and cane.....	202,719
Jewelry and fancy goods.....	166,906
Leather and rubber.....	154,588
Paper and stationery.....	106,488
Vehicles	80,813
Musical instruments.....	47,062
Miscellaneous	122,025
Total customs	£6,850,041

EXCISE.

Stimulants	£753,529
Tobacco	516,761
Sugar	503,627
Miscellaneous	33,023
Total excise	£1,806,940
Total customs and excise.....	£8,656,981

The amount per head in each State was as follows: New South Wales, 41/7 1-2; Victoria, 41/1 1-2; Queensland, 42/.; South Australia, 36/5 1-4; West Australia, 85/.; Tasmania, 36/8 1-4. Total, £2 3 5 1-2. The free list in the tariff covers 10,000,000 sterling value of imports out of a total of £36,244,000 per annum.

The Commonwealth, it will be noticed, has no revenue from any other form of taxation beside customs and excise, neither has it any territorial revenue, having no control over the huge areas of unalienated lands, which still remain in the hands of the several States. It is to a large extent a tax-gatherer for the States, the constitution requiring it, for the first 10 years at least, to return to the States, or to pay on their behalf as interest or principal on State loans, not less than three-fourths of the total income from customs and excise. This provision was adopted in order to avoid dislocation of the State finances through the transfer of this revenue from the States to the Commonwealth, and also to restrain the Commonwealth Parliament from mopping up all the revenue from customs and excise by launching out on new and costly enterprises, which might leave the States in an awkward financial position. The Commonwealth Parliament as it is has set its face sternly against borrowing, even for public works, pays for all that are necessary out of surplus revenue. It is proposed in influential circles to federalize the State loans to such an extent as would finally absorb the revenue now returned year by year to the States, so as to remove the present interdependence of Commonwealth and State finance. The expenditure of the Commonwealth is narrowed down to a very few items. We have the cost of the departments transferred from the States to the Commonwealth and now controlled by it, such as the customs and excise, posts, telegraphs, and telephones, military and naval defenses, etc. To these are added the cost of the Commonwealth machinery of government, including the departments of the Governor-General, the Ministers of State, and the Legislature, together with the Judiciary. The outlay on public works and buildings was for the year under review £333,725, and the total expenditure was therefore £4,318,435. The balance of revenue over expenditure was returned to the States as follows: New South Wales, £2,529,069; Victoria, £2,071,378; Queensland, £752,532; South Australia, £555,692; Western Australia, £885,349, and Tasmania, £259,099. Total, £6,999,119; beside £142,549 collected for Western Australia and paid to that State. This was in excess of the minimum laid down by the constitution. The payments to the States must tend to diminish as the Commonwealth extends its functions, but, in many cases, the new departments will be taken over from the States, which will in that way obtain relief. The expenditure quoted includes the imperial naval subsidy and £20,000 for British New Guinea.

The revenue and expenditure of the several States forming the Commonwealth will be seen by the following tables compiled from the budget speeches delivered by the State treasurers shortly after the close of the financial year ending 30 June 1905:

State.	Returned by Commonwealth	Taxation	Land Sales and Rents	Public Works	Miscellaneous	Totals
New South Wales.....	£2,529,069	£1,114,408	£1,757,902	£5,055,353	£880,186	£11,336,918
Victoria.....	2,017,378	713,227	388,170	3,609,120	781,762	7,509,657
Queensland.....	752,532	454,574	623,416	1,409,414	355,462	3,595,398
South Australia.....	555,692	439,048	182,247	1,382,749	165,988	2,725,724
West Australia.....	1,027,898	221,735	315,613	1,797,433	252,661	3,615,340
Tasmania.....	259,999	216,953	82,811	220,632	3,199	852,694
Totals.....	£7,141,668	£3,159,945	£3,350,159	£13,544,701	£2,439,258	£29,635,731

The expenditure was as follows:

New South Wales.....	£11,195,075
Victoria	6,982,673
Queensland	3,581,403
South Australia	2,693,495

Western Australia	£3,745,224
Tasmania	842,469

The grand total was therefore £29,040,339, leaving a surplus of £595,392.

It will be seen that nearly one half of the total revenue of the States is derived from "public works." This represents the earnings of the railways, tramways, harbor works, and water-works, together with other lesser undertakings, the construction of which has been the main factor in building up what at first sight appears to be the huge debt of Australia. It may, however, be noted that the public works not only aid very greatly in the development of the vast areas of the unoccupied Crown lands in Australia, but they also produce a large annual revenue, which may well be set off against the annual interest charge, as the value of these permanent assets are set off against the debts themselves. The works include between 13 and 14 thousand miles of railways, which cost just over £132,930,764, up to the end of 1904, the latest year for which the details are obtainable, and for that year they earned, over and above working expenses and upkeep, the sum of £4,065,631 toward interest on the loans raised to pay for them. As the country through which they pass develops their earnings must increase. The item land sales and rents is much lower than in past years as the present policy of all the States is to encourage settlement, by leasing land on very long leases, with or without right of purchase, so as to assist people with little capital, rather than to sell land for cash. In many cases the purchase money is spread over as much as 20 years, all payments going off the purchase money, so as to aid would-be cultivators, who art short of funds, to make a start. The provision of such conveniences as roads, bridges and schoolhouses, absorb practically all the proceeds from the land for several years after it is first leased, so that the States are by no means living on their capital. The lands which once returned no revenue at all are, by these means, being gradually developed and made to produce loading for the railways and business for the harbors as well as assets and income taxable by the treasurers. The taxation differs in the several States, though most of them now levy on the estates of deceased persons in proportion to the size of the bequests left and to the degree of relationship between the testator and the legatee, the larger bequest and the more distant relative paying the higher rate. There are also, in most States, taxes on income and on "unimproved land values," that is to say on the capital value of land less the value of improvements thereon. The direct taxation including all these came for the whole Commonwealth, in the latest year for which figures are available, to 14 shillings and 4 pence per head. The extremes in different States were South Australia highest at 18 shillings and 1 penny per head, and Victoria lowest at 12 shillings and 4 pence. The principle of progression in taxation is recognized in some States, not only in succession duties, but in income and also in land values taxation. The usual distinction is observed between income derived from personal exertion, and therefore dependent upon the life and health of the earner, and that derived from investments or property, which is independent of personal effort. The rate of tax is higher on the income from property than upon the produce of personal exertion. There is, too, the further graduation according to the amount of the income. In Victoria, for example, the rate is on incomes derived from personal exertion 3d. in the £ up to £300, on every £ in excess of £300 up to £800 4d., over £800 to £1,300 5d., over £1,300 to £1,800 6d., and over £1,800 7d. in the £. Double these rates is charged on income from property. The land values taxation levied in certain States is on the value of the land after deducting the value of improvements thereon. It is, therefore, much heavier on city and suburban than on country land, area for area. Taking South Australia the rate is one halfpenny in the £ capital value up to £5,000 value, and one penny in the £ if the value be over £5,000, and there is also an extra tax of 20 per cent. on the first tax if the owner of the land be not resident in the State. The miscellaneous receipts call for no special remark. The total revenue looks very large, but it needs to be remembered that altogether apart from the postal and telegraphic receipts, which appear not in the State, but in the Commonwealth accounts, as do also all figures relating to military and naval defences, nearly one half of the total is for services rendered to the people by means of public works, and altogether outside the ordinary functions of government, as commonly understood. On this account it cannot be said that Australians are burdened by the contributions they make to revenue, even though they pay in all, to Commonwealth and States, £7, 8 per head per annum. The further taxation levied by local governing bodies for purely local expenditure, such as road maintenance and sanitation, is not large. The figures for Western Australia are abnormal on account of the rapid development of the gold-fields and the resulting preponderance of highly paid adult males in the population, consuming highly dutiable goods. The expenditure of the States would be absurdly high were it not for the fact that it includes, to the extent of 50 six per cent of the whole, provision for the working of the railways and the payment of interest and repayments of debt. These charges are not in any true sense "costs of government." They must be considered in relation to special income appearing on the other side of the account. That seven per cent of the expenditure is for education is indicative of the general trend of affairs in Australia, and of the high ideals cherished. Of course it needs to be remembered that at the present stage settlement is sparsely spread over a huge territory, and that the costs of administration would be slightly increased, if at all, if there were three or four times the number of people on the land that there are to-day, while the revenue would be largely multiplied. It is area rather than population which, under certain circumstances, determines expenditure, and these circumstances exist in many parts of Australia to-day. The Australian of the present is fully determined not to allow extravagance in public expenditure, and no blunder in public life is more speedily punished by the electors. The expenditure of the States of course includes all the cost of the legislative machinery, with the salary of the State governors, and the members of the State parliaments, and also all the charges connected with the administration of all the departments, such as police, public health, and educa-

tion, together with the oversight of an elaborate system of local government in each State, which in its turn deals with a wide area of purely local concerns. Australia indeed possesses all the concomitants of a highly organized political and social organism, and believes that it gets a full return for its public expenditure. The exceedingly close approximation of expenditure to revenue results from a disposition, whenever any considerable surplus appears in the accounts for any year, to devise further public conveniences which may be provided for the future, and so the surplus is absorbed. There is no general desire to show large surpluses nor is there much effort to reduce taxation, which is not felt to be burdensome, but rather to add to the facilities afforded for trade, and for the occupation and development of the country and of its industries. These ends are being achieved, and the cost of them is not grudged by those who have to find the money, and who reap the gain.

The debts of Australia have all been incurred by the States, and the Commonwealth has, as yet, carefully avoided any line of policy which would involve it in any necessity for embarking on a borrowing policy, on its own account. Indeed, as has already been suggested, the Commonwealth Parliament has determined to construct all such public works as post offices, fortifications, etc., out of revenue. It has taken over from the States all the customs houses, post offices, military and naval defences, stores, etc., which were the property of the States, prior to the establishment of the Commonwealth, and will ultimately have to recoup the States for them, either by taking over State debts to an amount equivalent to their value, or in some other way, which must almost of necessity involve the Commonwealth in a debt, and it is probable that the final settlement between the Commonwealth and the States, as to the annual surplus now paid over to the States out of the proceeds of the customs and excise duties, may result in the assumption by the Commonwealth of the responsibility for a certain portion of their public debt. There are further schemes in contemplation for the transfer of State obligations on certain terms to the Commonwealth, beside which there are proposals under consideration, in Commonwealth circles, for the construction of trunk lines of railway across the continent of Australia, east and west, as well as north and south, and also for naval defence which, when carried out, will require the raising of Commonwealth loans. For the present, however, we have only the debts of the States to treat of. Mr. Coghlan's 'Statistical Account of Australia and New Zealand,' published early in 1905, gives the debts of all the States of the Commonwealth as follows:

State	Debt	Per head	Annual interest
New South Wales...	£80,033,581	£55 7 2	£2,841,368
Victoria.....	51,819,962	42 19 4	1,885,983
Queensland	41,781,287	79 11 5	1,547,470
South Australia.....	28,593,645	77 9 1	1,069,325
Western Australia..	16,090,288	67 12 1	547,160
Tasmania	9,318,400	51 18 4	341,627
Total debt	£227,637,163	£57 8 8	£8,232,933

These figures practically represent the position as it is to-day. All the States have some provision of the nature of a sinking fund for the ultimate extinction of the debts and in several cases stock is from time to time purchased and canceled out of funds set apart for purposes of redemption. None of these funds have, however, as yet, assumed proportions sufficiently large to modify materially the facts as to the total debts just quoted. The debt of Australia in no case represents the cost of war. The whole of it has been incurred with a view to the development of the vast resources of the continent and for practically the whole of it there are very valuable permanent assets. Of the total debt of £227,637,163, £136,600,855 was spent on railways and tramways; £29,245,167 on water supplies and sewerage; £17,373,507 on harbors, rivers, and navigation; and £17,188,178 for public works and buildings, beside other sums for telegraphs, telephones, defence, and other items. The net revenue produced by these works aggregated, in the year under review, over and above working expenses and maintenance, 2.30 per cent. on their cost. It should be also remarked that the year for which the figures are given was not a normal year, the effects of the previous year's drought having by no means passed away. The revenue from this source could be increased to an amount sufficient to meet in full the interest charge, if it were desired to do so, but the charges for railage and harbor dues and water supplies, etc., are all kept down with a view to the encouragement of settlement and of production, it being recognized that the direct return received from the enterprises is by no means the sum of their earnings, as they produce through the resulting prosperity of the people, a very large indirect return through the customs house, and in many other ways. It is the general prosperity rather than the direct revenue which is the primary objective for the time being. Meantime the works are permanent assets of constantly increasing value, and revenue earning power. As has often been pointed out, Australia could, by the sale of her railways, harbor works and water services, immensely reduce her public indebtedness, for the undertakings would sell readily for what they cost, but she would be poorer, rather than richer, by the transaction at once, to say nothing of the folly of such a policy from the point of view of the future. There is, further, one great asset of Australia which cannot be overlooked in any consideration of her financial position, and that is her unalienated land. In four out of the six States the areas are very large and, although the values vary very widely according to climate and other conditions, they call for tabulation, and the following statement shows the area of each State, and the unalienated land in each, etc.:

It is necessary to bear in mind that the public indebtedness of the Australian States was not contracted against any specific security, but against the public credit of each generally, so that there is behind it, not only the public estate in the shape of land and works of every kind, but also the whole taxing power of the respective governments. In view of this it must

be manifest that the securities are absolutely «gilt edged.» The following table shows the figures given by Mr. Coghlan as to the values of the alienated land and the improvements thereon, and also the value of the private property in Australia:

State	Area in Acres	Area alienated or in process of alienation	Area leased	Area neither alienated nor leased
New South Wales	198,848,000	48,851,524	127,901,840	22,094,636
Victoria	56,245,760	24,526,255	9,516,372	22,203,133
Queensland	427,838,080	16,991,127	277,569,396	133,277,557
South Australia	578,361,600	14,149,171	189,531,955	374,680,474
Western Australia	624,588,800	10,548,057	135,678,028	478,362,715
Tasmania	16,778,000	5,040,413	1,581,937	19,155,650
Total Commonwealth	1,902,660,240	120,106,547	741,779,528	1,040,774,165

The volume of business done in the Commonwealth by the various life assurance offices is very large as the figures quoted below will show, and there are also a number of friendly benefit societies, whose roll of membership is indicative of the widespread practice of habits of thrift and self-help. Industrial life assurance is also widely availed of by persons who are not able to afford large premiums for life assurance of other types. The receipts and expenditure of the 17 life assurance institutions for the year were: Receipts, £5,186,062; expenditure, £3,483,532. The average amount of life assurance per head of the population was £25. There are 300,453 members of friendly societies, and their funds amount to £3,190,322. It will thus appear that as regards the public wealth, the private wealth, and the annual product of labor and capital in Australia there are abundant evidences of soundness and of progress, and that Australia may fearlessly challenge comparison with any other part of the world. At the same time the magnitude of her undeveloped resources points unerringly to a future which shall outshine both the past and the present.

State	Land without improvements	Land and improvements	Total value of property	Per head
New South Wales	£136,417,000	£264,492,000	£368,778,000	£258
Victoria	126,078,000	234,057,000	310,074,000	256
Queensland	41,400,000	72,040,000	119,454,000	229
South Australia	35,957,000	59,176,000	86,320,000	234
Western Australia	21,832,000	19,272,000	49,065,000	216
Tasmania	21,832,000	34,907,000	48,288,000	269
Total Commonwealth	£373,679,000	£683,944,000	£981,979,000	£249

Of course, the figures in the last two columns are subject to adjustment on account of absentee ownership, persons in one State often owning properties in other States. Mr. Coghlan also furnishes elaborate calculations to show the amount of the private incomes of the people, excepting interest paid by Australian governments, that is to say money paid by themselves to themselves, and his result is a total of private annual incomes of £179,563,000 or £45 per inhabitant of Australia, including men, women, and children.

The extent of the financial operations conducted within the Commonwealth will appear from the sworn returns of the banks doing business there for the year 1904. The totals were: Notes in circulation not bearing interest, £3,133,268; bills in circulation not bearing interest, £521,267; deposits not bearing interest, £34,968,383; deposits bearing interest, £56,579,719; balances due to other banks, £290,439; total liabilities, £95,493,076. The assets are shown as follows: Coin, £17,910,771; bullion, £1,447,698; landed property, £5,245,311; debts due to banks from other banks, including notes and bills discounted, £87,052,471; balances due from other banks, including notes and bills of other banks, £2,126,809; total assets, £113,783,060. Beside the joint stock banks, whose returns have just been quoted, there are numerous investment companies carrying on business in the Commonwealth such as savings banks, land, building, and investment, trading and commercial companies, complete returns of whose business are not available. For the savings banks, which are under government supervision, the following figures will be suggestive: Number of depositors, 1,072,853, or 27 per cent of the whole population. Amount on deposit at the close of the year, £34,180,055 or £8 13s. 8d. per head of the whole population, and £31 17s. 2d. per depositor.

Sir F. W. Holder,
Speaker House of Representatives, Commonwealth Parliament, 1901–1907.

13. Australia — The Labor Party. The Australian Labor Party has its genesis in the great maritime strike of 1890. It is true that spasmodic attempts had been made during earlier years to procure direct Parliamentary representation for working-class interests, and in two or three isolated instances men had been returned to one or other of the Colonial Parliaments. Nothing, however, in the nature of an extended or sustained effort had been attempted prior to the great strike. For some years before 1890 the trades unions generally had been gaining in strength and influence, and had won many concessions from the employers in regard to wages and working conditions; but the seafaring classes had not participated in these advantages in anything like equal degree. A

crisis was reached when the marine officers, who had been for years overworked and underpaid, decided to form a union and affiliate with the other labor orgnizations. The shipowners demanded, as a preliminary to the discussion of grievances, that the officers should dissociate themselves from the labor unions; but, fearing this would leave them at the mercy of the employers, the officers refused to acquiesce, and a strike was precipitated. In sympathy with the officers, the seamen and longshoremen around the coast ceased work, and as the employers continued obdurate the trouble extended until the strike included many unions wholly unconnected with shipping. «Freedom of Contract»—an equivalent of the American «open shop»—became the war-cry of the employers, and practically the whole community took sides with one party or the other. After a struggle lasting some three months, during which trade was paralyzed, much bad blood created, and both sides financially injured, the men acknowledged defeat. Apart from the cost to the combatants themselves, the public had suffered severely, and when the smoke of battle had cleared away there was a general desire expressed to find some way of avoiding similar conflicts in the future. A Royal Commission was appointed by the government of New South Wales, and served some good purpose in ascertaining clearly the grievances of the men; but it achieved little of a practical nature beyond suggesting the creation of an Arbitration Court to which disputes could be voluntarily referred. The press, while mostly taking the employers' view upon the points at issue, concurred in advising the unions to rely upon legislation to remedy their legitimate grievances, and this advice was taken seriously by the men when they emerged from the conflict—defeated, but grimly determined to retrieve their lost influence.

While the effects of the strike had been felt all through Australia, the battle had raged most fiercely along the eastern seaboard, where population is greatest, and therefore the colonies mostly affected were those of New South Wales, Victoria, Queensland, and South Australia. It was in these colonies, then, where the cry arose for a more equitable distribution of political power and a greater consideration of labor interests. This demand was accentuated by the political conditions existing at the time. From the granting of self-government the Parliaments of the various colonies had included many men who fought strenuously for the people's interests, and who deserve the wholehearted gratitude of the reformers of to-day; but in spite of their efforts matters political were so backward in 1890 that there was an urgent need of a fresh impulse. While manhood suffrage had been nominally secured, plural voting obtained in all the colonies except South Australia; factory legislation was either nonexistent or so inefficient as to be practically useless; except in Victoria, nothing had been done to protect those working in dangerous occupations, such as mining; the question of employers' liability was in a very unsatisfactory state; hours of employment were unregulated, and sweating was rampant; and many other social questions were carefully avoided. In addition, and perhaps most important, there was no method by which public opinion could find expression in an authoritative manner with regard to the merits of labor disputes. Briefly, the complaint of the unionists and their sympathizers was that working-class interests had been neglected, as should perhaps have been expected from Parliaments made up for the most part of the wealthier classes or their representatives.

With a view to altering this state of affairs for the better, the unions decided upon political organization; but, recognizing that no purely class effort could be permanently successful, they called upon radicals generally to assist them in the work of reform. On this wider basis leagues connected with, but independent of the unions were formed, and programmes embracing the legislation immediately desired were speedily adopted. Necessarily these differed with the circumstances existing in the various colonies, but in the main they were markedly similar. In all, the central idea was to form a new party, working independently of those already existing, and prepared, until strong enough to take office, to accept installments from either of the older parties. Taking the platform adopted in New South Wales as typical, the aims of the new party were stated as being: «(1) To secure for the wealth-producers of this colony such legislation as will advance their interests, by the return to Parliament of candidates pledged to uphold the platform of this league: (2) to secure the due enrollment of all members of the league who may be entitled to a vote in any electorate: (3) to bring all electors who are in favor of democratic and progressive legislation under one common banner, and to organize thoroughly such voters with a view to concerted and effective action at all Parliamentary elections in the future.»

The platform adopted ran as follows:

1. Electoral reform — to provide for the abolition of plural voting; the abolition of money deposits in Parliamentary elections; the extension of the franchise to seamen, shearers, and general laborers by the registration of votes; the extension of the franchise to policemen and soldiers; the abolition of the six months' residence clause as a qualification for the exercise of the franchise; the establishment of single member electorates and equal electoral districts on an adult population basis; the holding of all Parliamentary elections on one day — that a public holiday; and that all public houses shall be closed during the hours of polling.
2. Free, compulsory, and technical education — higher as well as elementary — to be extended to all.
3. Eight hours to be the legal maximum working day in all occupations.
4. A Workshops and Factories Act to provide for the prohibition of the sweating system; the supervision of land, boilers, and machinery; and the appointment of representative working men as inspectors.
5. An amendment of the Mining Act — to provide for all applications for mineral leases being summarily dealt with by the local wardens; the strict enforcement of labor conditions on such leases; the abolition of the leasing system on all new gold fields; the right to mine on private property; the greater protection of persons engaged in the mining industry; and that all inspectors shall hold certificates of competency.
6. The extension to seamen of the benefits of the Employers' Liability Act.
7. The repeal of the Masters and Servants Act and the Agreements Validating Act.
8. The amendment of the Master and Apprentices Act and the Trades Union Act.
9. The establishment of a Department of Labor; a National Bank; and a national system of water conservation and irrigation.
10. Election of magistrates.

11. Local government and decentralization; the extension of principle of the Government acting as an employer, through the medium of local self-governing bodies; and the abolition of our present unjust method of raising municipal revenue by the taxation of improvements effected by labor.
12. The federation of the Australian colonies on a national as opposed to an imperial basis; the abolition of the present Defence Force, and the establishment of our military system upon a purely voluntary basis.
13. The recognition in our legislative enactments of the natural and inalienable rights of the whole community to the land — upon which all must live and from which by labor all wealth is produced — by the taxation of that value which accrues to land from the presence and needs of the community, irrespective of improvements effected by human exertion; and the absolute and indefeasible right of property on the part of all Crown tenants in improvements effected on their holdings.
14. The execution of all Government contracts in the colony.
15. The stamping of all Chinese-made furniture.
16. Any measure which will secure to the wage-earner a fair and equitable return for his or her labor.

On these lines the Labor Party entered the political arena in the four eastern colonies. The first skirmish occurred in South Australia, when the new party succeeded in returning three workingmen to the Legislative Council (the Second Chamber) in spite of a restricted franchise. This happened early in 1891, and in the middle of that year the first real trial of strength for control of the popular chamber took place. This was in New South Wales, where, notwithstanding the existence of plural voting, the Laborites captured some 36 seats out of 141. In 1892, Victoria followed the example of the older colony by returning a small contingent of labor members, and in 1893, both Queensland and South Australia elected parties of greater proportionate strength on the labor ticket.

With the first labor successes the wildest views were expressed by critics on both side— the Conservatives prophesying utter ruin for the community, and many Labor supporters expecting that the millenium would arrive in short order. Needless to say, both proved wrong. In the first place it was soon found that a proportion of those returned as Laborites were so only in name, and had no conception of the sentiment responsible for the movement. These quickly dropped out or were pushed aside. Then, as might have been expected in a party hurriedly organized, there arose internal dissensions of such a character as to seriously threaten, in one or two of the colonies, the future of the movement. As matters settled down, however, the need for cohesion was emphasized, and with the recognition of that fact better work resulted. Looked at broadly, the first Labor contingents did excellent work, which served to encourage the party's supporters to renewed efforts, and as a result the parties in the various colonies have been increasingly strengthened at each successive election. This steady growth has not been confined to those colonies where political organization was first entered upon, but has extended also to West Australia and Tasmania. At the present time (1906) Labor Premiers are at the head of coalition governments in Queensland and South Australia, while in New South Wales, Victoria, and West Australia, the Labor parties constitute the direct opposition, with the reversion of office. At the recent Tasmanian elections the party secured a material increase of strength.

The Labor party has not, during its 15 years of existence, succeeded in gaining a majority in any of the Australian Parliaments; but its influence is not to be gauged solely by its numerical strength. In most of the colonies its appearance galvanized the older parties into some appreciation of the need for social legislation. Old-time politicians suddenly manifested a tender regard for the interests of the working-classes, and vied with each other in propounding schemes for the amelioration of their condition. The democratization of those outside its ranks is among the most noticeable gains of the Labor party, and has resulted in many useful reforms being brought about.

In New South Wales there has thus been secured during the party's existence a liberal Electoral Act, abolishing plural voting; an act to allow mining on private property; land and income taxes, adjusting taxation more equitably; a Coal Mines Regulation Act; a Workshops and Factories Act; an Amending Land Act to permit of perpetual leasing in lieu of outright sale; an act to restrict the admission of colored immigrants; an important Navigation Act; an Early Closing Act, applying to shops; an Old-Age Pensions Act; an act to nationalize the private wharves of Sydney; the Miners' Accident Relief Act, designed for the relief and maintenance of injured miners and their dependents; the much-discussed Industrial Arbitration Act, prohibiting strikes and insisting upon the reference of disputes to the decision of a judicial body, and the Women's Franchise Act.

In South Australia education has been made free; the State has established a successful Produce Export Department; the nucleus of a State Bank has been formed, providing cheap loans to settlers; workmen have been assisted to take up land; adult suffrage has been passed; factory legislation and early closing of shops secured; wages have been protected against liens; private estates have been resumed and cut up for settlement, and other practical measures made law.

In Victoria the party's influence has secured, among other things, improved factory legislation, providing for boards to fix minimum wages; compulsory early closing of shops; abolition of plural voting; resumption of land for closer settlement, and cheap money for farmers on the *credit foncier* system; minimum wage on government contracts; State supervision of dairies; prohibition of secret trade commissions; pure food laws; exemption of tools of trade and furniture to the value of £20 from distraint for rent.

In Queensland legislation has been passed providing for the early closing of shops; adult suffrage and equal voting power; workers' compensation; State supervision of exports; cheap advances to settlers, and the readjustment of taxation in favor of the poorer classes.

In West Australia, although the party is only a few years in existence, the record includes adult suffrage, with electorates approaching equality; factory laws and early closing of shops; compulsory arbitration in industrial disputes; prohibition of secret commissions in trade, and minimum wages on government contracts.

With the inauguration of Federation in 1901 a new phase was entered upon, as a number of the most important governmental functions were

transferred from State to Federal control; and the Labor political organizations throughout Australia agreed to a common platform upon which to contest the first Commonwealth elections. It ran as follows:

1. Electoral Law, providing for one adult one vote.
2. Total exclusion of colored and other undesirable races.
3. Old-Age Pensions.
4. The Constitution to be amended to provide for: (a) The Initiative and Referendum for the alteration of the Constitution; (b) the substitution of the National Referendum for the double dissolution in the settlement of deadlocks between the two Houses.

At the first Federal elections, held in 1901, the Labor party returned 8 members out of 36 in the Senate and 16 out of 75 in the House of Representatives. Three years later, at the elections of 1903, the numbers were increased to 14 in the Senate and 22 in the House of Representatives. Since then the number in the latter House has been increased to 25. Though in a minority in both Federal Houses, the party has exercised a considerable influence on Commonwealth legislation. In the first Parliament it found a fairly progressive government in office, with a programme including several planks of the Labor platform, and some of these found expression in legislation. Naturally much time was occupied in passing necessary machinery measures, and the tariff discussion alone took up nearly 18 months. But time was found to pass adult suffrage and a liberal electoral law. The restriction, amounting practically to exclusion, of colored immigration was secured, and provision made for the cessation of the traffic in Kanaka labor. In the Public Service Act a clause was inserted providing for a minimum wage of £110 yearly for adults of three years' service. When the Tariff was being considered, the Labor party, though assuming no party attitude on Protection or Free Trade, led the way in abolishing or reducing revenue taxes through the Customs, and later it headed a successful resistance to the proposal to enter upon a borrowing policy.

At the second general election the Labor party increased its strength at the expense of both the Protectionists and Free Traders, with the result that when the Parliament met it contained three parties nearly equal in numbers. The Protectionist Government resigned through suffering defeat on an important phase of the Industrial Arbitration Bill, and a Labor Government took office. After a few months it was also defeated on one of the principles of the same measure, and was succeeded by a Coalition Ministry representing Free Traders and Protectionists. This government passed the Arbitration Bill through its remaining stages, but on again meeting Parliament was in turn defeated by a combination of Protectionists with the Labor party. Since then measures have been passed to prohibit false trade descriptions; to render illegal the acceptance of secret trade commisssions; to allow of the protection of union trade-marks in common with those of the trading community; and dealing with other matters of importance.

In touching thus sketchily upon the work of the various Parliaments of Australia since the Labor party has arisen, the writer attempts to do no more than indicate the trend of legislation as affecting the working classes and bearing upon social problems generally. In both the State and Federal Parliaments, during the time covered, many other important laws have been passed, and in regard to these the Laborites have borne their share of the work involved. It is, however, to the Labor party that credit is mainly due for the quickening of the public conscience which has resulted in so many ameliorative measures being passed in a comparatively short period.

The Labor party has been accused of concerning itself only with the interests of the working classes; but gradually it is being recognized that the term "Labor" includes brain as well as hand workers, and all sympathizers are welcomed as members of the political organizations. The Labor parties in Parliament include a fair sprinkling of professional and business men, who in any narrow interpretation would be excluded. There is no doubt that much of the success so far achieved is due to the recognition of the fact that the interests of all producers are identical and that justice must be extended to all equally.

Much has been said about the socialism of the Australian Labor Party, and it is alluded to by some as a recent development. That is not so, as there has been no change, except perhaps in form, in the aims and programme as first put forward. Leaving aside the fact that nearly every plank of the original platform was broadly socialistic in its interference with individualism, distinct aspirations toward collectivism were voiced in the first declarations of the party. In Queensland this took the most pronounced form, where as early as 1890 the council of the Australian Labor Federation, having decided upon political action, put forward as its aim "The nationalization of all sources of wealth and all means of producing and exchanging wealth." This was a declaration for complete socialism, but the organizations in the other colonies refused to go that distance. The New South Wales League in 1890 adopted a proposal for "the extension of the principle of the Government acting as an employer, through the medium of local self-governing bodies," and thus committed itself to socialistic ideals. In some of the other colonies declarations of principle were considered unnecessary, and the platforms contained no direct mention of socialism, though many of the detailed proposals were of a socialistic character. Later on, the Queensland organization dropped for a time any direct reference to socialism, but continued its propaganda on collective lines. In 1897 New South Wales adopted as a plank of its platform "the nationalization of the means of production, distribution, and exchange," and that remained on the programme until 1905, when it was struck out. At the same conference a statement of the local party's objective was agreed to, which has since been adopted by an Australian conference as the objective of the Federal Labor party, and may be here quoted: "(1) The cultivation of an Australian sentiment, based upon the maintenance of racial purity and the development in Australia of an enlightened and self-reliant community. (2) The securing of the full results of their industry to all producers by the collective ownership of monopolies and the extension of the industrial and economic functions of the State and Municipality."

The dropping of the «whole hog» plank in favor of this statement of aims was looked upon as a retrograde step by the more ardent socialists in the movement; but it appears to have been dictated by common sense. The platform is theoretically a programme for realization when the party gets a majority, and it is clearly impracticable to attempt to carry out any complete scheme of socialism to-day. Recognizing this, the party declares its belief in socialistic principles, and adjusts its programme so that every step taken will be in consonance with that ideal. This is shown in the platform for the next Federal elections, due at the end of 1906, which is as follows:

1. Maintenance of a white Australia.
2. Nationalization of monopolies.
3. Old-age pensions.
4. Tariff referendum.
5. Progressive tax on unimproved land values.
6. Restriction of public borrowing.
7. Navigation laws (provision for manning, etc.)
8. Citizen defence force.
9. Arbitration act amendment (ensuring effectiveness).
10. Commonwealth of deposit and issue and life and fire insurance department.
11. Uniform industrial legislation; amendment of constitution to provide for same.
12. Civil equality of men and women.

This platform insists that monopolies shall be nationalized, as constituting a public danger, and the Labor party expresses its disbelief in the efficacy of measures designed to merely regulate modern trusts. Under its objective the party will embrace every opportunity of extending the functions of collective authority where it is shown to be practicable and of value to the community. From this statement of the position it will be seen that the Labor party is undoubtedly socialistic, but it does not propose to plunge Australia suddenly into any experiment of a wholesale character. The people have control in respect of each successive step, and may be relied upon to call a halt if at any stage failure is experienced.

On the whole, the Labor party throughout Australia has given a much-needed impetus to social legislation; and, in reply to those who urge that its objects and methods are opposed to the welfare of the community, it points to the fact that since its appearance in Australian politics wealth has found a wider distribution; hours have been shortened and wages raised in many occupations; sweating has been minimized; and that, though much remains to be done, the people enjoy greater prosperity than before the advent of the new political force.

J. C. Watson,
Premier of Australia 1904.

14. Australia — Social Conditions. The social conditions of a country may be considered from different points of view. They might be considered from the general welfare of the people, or from what is known as social distinction in society. This last aspect of the question could be disposed of in a few words so far as Australia is concerned. The people mostly belong to the great class of honest industry in one form or another. The large majority are, if necessity requires, willing to undertake almost any kind of work, while those who are wealthy, with but few exceptions, prefer useful or philanthropic employment to a life of idle dissipation.

The common weal of the people is indicated by the fact that in no country is there less real poverty than in Australia, or better and more systematic organization for dealing with those few persons who are in need of temporary assistance. No one is ever knowingly allowed to suffer for want of food. The State does not consider it to be its duty to find employment for those who may be out of work, but in the interest of humanity it always provides food for those in want of it.

It has been said that the happiest people are those who can live upon the products of their own country. Australia offers greater possibilities for such happiness than almost any other land. Cattle and sheep, pigs, and poultry, all kinds of grain, vegetables of every variety, and nearly all known fruits are easily produced by properly applied industry.

Primary Productions.— Sir George Sydenham Clarke, G. C. M. G., who was Governor of Victoria for some years, recently said: «It may be taken as certain that where the averages from primary production stand high the country is a good one.» This dictum has such a direct bearing upon the condition of the people that the comparisons become important. According to population the primary production in Australia is about 40 per cent greater than in Canada, 57 per cent greater than in the United States, twice as great as in France, three times as great as in England, and over four times as great as in Russia.

The productive nature of the soil and climate has a great deal to do with the fact that a greater number of people in Australia, in proportion to its population, enjoy more of the comforts and pleasures of life than is the case in many other parts of the world. The people as a whole are better housed, fed, and clothed than the residents of most other countries. Cheap houses and discomforts are to be found in Australia as elsewhere, but even in the cities there is a lack of the poor shanties and tenements which are so noticeable in many large cities in Europe, Asia, and America.

Educational Advantages.— No one question has a more important or direct bearing upon the social conditions of the people than that of education. No country has better facilities, and but few as good, and with the exception of some parts of America, Australia affords as good an opportunity for secondary and advanced education at a moderate cost as any other country.

Generally speaking, the system of public education is free, compulsory, and secular, the whole expense being met out of the general revenue. The greatest care is taken to provide schools in every part of the country as well as in the thickly populated cities, and in some of the thinly settled districts, schools of from 10 to 15 children are established. Fortunately, Australia's educational advancement has not been delayed by sectarian interference. There it is generally considered that a country's advancement rests on the education of its people, and that as national education is a national gain, the nation's treasury should meet the bill. Efforts have been made from time to time by zealous propounders of sectarian beliefs, to incorporate religious instruction with the Education Acts of the different States, but the majority of the people are strongly opposed to any form of State aid to religion. They feel that in the bitter strife for sectarian supremacy the efficiency of the schools

would become impaired and the practical education of the children neglected. A large majority of parents take advantage of the public schools for their children, but for those who object, either from class prejudice or religious scruples, good private schools are available.

The technical schools, colleges and universities afford ample facilities for higher education. The Australian universities stand high in the educational world. By bequests, endowments, and grants of land they have been enabled to provide splendid buildings and appliances, and to procure able and learned professors. The degrees conferred are recognized and respected in other lands. No one need leave Australia to become well versed in music, medicine, literature, law, or science. The technical schools have been especially valuable from a mining point of view, and many of those who have received their instruction there are now holding important positions on mining fields in Australia and other countries. Nearly 1,300 public libraries with 2,000,000 volumes of valuable literature are a great help to those who have passed on beyond school life. In all the principal cities there are public museums and art galleries, which are largely patronized, and have an elevating and refining influence. See AUSTRALIA — EDUCATION; EDUCATION — NATIONAL SYSTEMS OF.

Religious Instruction.— The secular and nonsectarian nature of the public schools does not imply that the religious instruction of the people is neglected. Churches of every known denomination are well supported. Sunday schools, Christian endeavor societies, and young men's and young women's Christian Associations are well attended, and all doing good work, while the Salvation Army has its branches stretching over every part of the land, and is to be commended for its tireless endeavors to reclaim the drunkard, lift up the oppressed, and to bring back to the paths of virtue and truth those who have strayed or fallen by the wayside. Temperance organizations of various kinds have many members, and are a powerful factor in preserving the better, simpler, and purer life of the community. See AUSTRALIA — RELIGION.

Government Institutions.— The Governments of the different States look after the poor, the sick, and the afflicted. They have destitute homes where the aged are properly housed, fed, and cared for. They have hospitals for the sick, where those who cannot afford to pay are nursed, and attended equally with those who can. Asylums for the insane, sanatoriums for the consumptive, while homes for incurables, and schools for the blind, deaf and dumb are either supported or subsidized by the Governments. Genuine workingmen, if unable to obtain employment, are allowed to do certain work to pay for the food which is provided for them and their families. Such relief is of a temporary character until more permanent employment is secured.

Benefit societies and insurance companies have been established in every State, and number their members by many thousands. These have a marked effect in encouraging provident habits, and, with the temperance societies, are valuable aids in teaching frugality and moderation, which are notable characteristics in the Australians.

Some of the States have adopted a system of Old-age pensions, and a Royal Commission has recently reported favorably on a scheme for the whole Commonwealth.

Out-door Life.— For those who are fond of an out-door life Australia is an ideal country. The climate is such that one can practically spend the whole year in the open air. The advantages of fresh air have been wisely considered by those who had to do with laying out cities and towns, as well as those connected with the government of the country. Wide streets, squares, and parks are to be found in and adjacent to all the cities, while large tracts of land have been reserved as national parks within a few miles of the centres of population.

This affords every opportunity for out-door sport of all kinds. Rowing, football, cricket, lacrosse, golf, baseball, and almost all other outside games have numerous patrons. In fact, games and sport are carried on so extensively that tourists have criticized Australians for indulging so much in them. Numerous holidays, reasonable hours for work, and long, fine days offer every inducement. Australians are decidedly a sport-loving people. The Melbourne Cup is one of the world's greatest racing events, and the Flemington grounds with their commodious stands and extensive lawns are unsurpassed in any part of the world. The roads are so well made that motoring and cycling are greatly indulged in. Many residents own motors, and during the last few years money has become so plentiful that vehicles for pleasure have been purchased in large numbers.

Wealth of the People.— It is not generally known that the Australians are the richest people in the world, except the residents of England, and a good many of these draw their incomes from Australian investments. During the present year (1906) Australia will export produce of a greater value than ever before. The distribution of wealth is more general than in most other parts of the world. Over 30 per cent of the adult population are possessors of property, while in England only about 12 per cent of the adult population enjoy that privilege. There are 1,100,000 depositors in the savings bank, being 27 per cent of the entire population, and they have to their credit $175,000,000, an average of about $160.

Laws and Socialism.— Taking an active and responsible part in the management of national affairs has a moderating effect upon most politicians, and to a large degree they have recognized the responsibility of office and endeavored to safeguard the country's interest.

The voice of the people can be made fully known through the ballot-box. The judgment of the public may not always be considered the wisest for the country's advancement, but when the error is discovered the same power that caused it can apply the remedy. The Australian Commonwealth franchise is the broadest and most liberal possible. Everyone over the age of 21 (except criminals and lunatics) has the right to vote. In some of the State elections as well, women have the privilege. There were many strongly opposed to woman's franchise. All the arguments about taking her from her home, destroying her womanly instincts, causing her to neglect her proper duties, etc., were indulged in. After the law was passed, how-

1-5. Clubs from the Marquesas Islands.
2, 9. Carving from Hervey Islands.
3. Shell Ornament from the Solomon Islands.
4, 7, 14. Carved work from New Guinea.
6. Australian Carving.
8. Steering Oar, from New Zealand.
10. New Zealand Pipe.
12. Australian Carved Ornament.
16. Carved Shield from New Guinea.

ever, those who previously opposed it, quickly realized (especially if they were parliamentary candidates) that woman was highly intelligent and that it was her duty in the interest of the country to vote.

Australia's socialism has grown with her people. It has not meant the destruction of private property. The State railways, harbors, water-works, telegraphs, telephones, wharves, exporting departments, public schools, and other undertakings, have naturally followed one after the other, and have not been a hardship to the capitalists, but have rather been the means of allowing them to invest their money in other undertakings and thereby assist in opening up the pastoral, agricultural, and mining industries.

Many of Australia's laws have been passed on the belief that the Government could undertake certain things for the assistance of the people at less expense than this assistance could be carried out privately. National credit, as a rule, is much better than individual credit. Money can be borrowed by the State and lent to producers on better terms than it can be borrowed by private people for that purpose. Under certain laws the well-to-do pastoralists, as well as the poorer producer, can be assisted. It is necessary to understand Australian life to realize the need for assistance to pastoralists. The Governments own most of the lands; hundreds of miles of which are let on lease to pastoralists. Wire netting has been found to be the most effective means of protecting the sheep from wild dogs, and of keeping the rabbits down. For the lessee on his own account to undertake to fence his leasehold would mean an expense which would be a heavy burden upon him, and prevent the use of his capital for other improvements; so by combining with adjoining lessees they form a vermin trust, and apply to the Government for miles of wire netting; this is supplied upon the joint security of the lessees and they repay the Government, with interest, in instalments extending over a number of years. Large sums have been lent in this way, and, but little if any loss has occurred, and it has been the means of stocking much land that would otherwise have remained idle. The Governments also assist the farmers by loans from State Banks at low interest, a long term of years being allowed for repayments. Blockers, who only have a few acres, are also assisted, and under certain conditions they borrow from the Government to help build their houses and carry out other improvements. All these loans are only granted on business principles, after the officers of the Land Departments have made full inquiries as to necessary security. The Governments also largely assist in exporting produce and finding outside markets. This business is conducted on commercial lines, certain charges being made for the storage, freezing, and work done. If the producer is in need of ready money before his goods are disposed of an advance is made by the Government. All this may be considered Socialistic; however, upon a moment's reflection it will be seen that it is only an assistance to further stimulate individual enterprise and effort. It has carried many a struggling producer over early years of hardship, and probably saved his property for his family when under other circumstances it might have gone into the hands of the mortgagee.

Charges, Rates, Taxes.— Railway charges are, if anything, less than on the roads owned and worked by private companies in other countries. The conveniences for traveling are good. The Government control of water-works and sewage systems for the large cities has proved economical and satisfactory. The land-tax is not heavy enough to be burdensome. Municipal and local rates are low in comparison with England. The total rates in the Australian cities, including water rates, on property worth $500 per annum, would be from $50 to $100, while in and around London it would be from $150 to $300.

Employer and Employee.— The relations between the employer and the employee are generally harmonious; occasionally disputes may arise but they are nearly always settled without those long strikes which result in heavy loss to both resisting forces and engender so much bitterness of feeling. The employers as a rule pay good wages, the hours worked are short, and the employees are provided with favorable sanitary and safety conditions. Being thus satisfied that their treatment is just, they in their turn do their best to give full value in their work for the wages they receive.

Literature, Art, and Song.— According to Mr. Coghlan, who is a statistical authority, Australia has as large a number of first-class newspapers, considering its population, as any other country in the world, while in the matter of letter-writing the only two countries that surpass it are the United States and England.

That Australians have a taste for literature cannot be denied; what they read may not always be of the highest standard, and what they write may sometimes lack artistic finish, but one must recollect that theirs is comparatively a new country. Its real growth has taken place during the last 50 years. Other countries have not risen rapidly to literary fame. The first settlements of America were made two centuries before the world had the benefit of Irving, Longfellow, Emerson, or Lowell. England's men of letters were not numerous or renowned until many generations had passed away.

While in literature Australia may not up to the present have produced writers of marked distinction, yet there are those of more or less note whose productions are of no small merit, and who have thrown the bright sunshine and free life into their work. The same may be said of art. While no one person stands out as a producer of highly valuable pictures there are several who have the true artist's spirit, and have made creditable displays at the Royal Academy in London and the Salons of Paris. But when one considers musical artists, Australia has no need to feel ashamed. With the climatic conditions it naturally follows that those who are musically inclined have succeeded; and to-day, in proportion to her population, Australia is stated to have more prominent musical talent of world-wide reputation than any other English-speaking country.

Taking the residents of Australia as a whole they are a happy, prosperous, and contented people. They have of course the political and theological differences which are common to all

nations. The leaders of public thought endeavor to convince by reason, not by force. Occasional dissatisfaction is expressed. It is questionable, all things considered, whether any country in the world is more congenial as a place of residence for the following reasons: The death-rate is lower, the primary production is greater, the wages are higher, the standard of living is better, the houses are more substantial, and surrounded with more land, the hours of labor are shorter, telegraphic communication is cheaper, the weather is brighter, the laws more liberal, the wealth more evenly distributed, and class distinctions fewer than in almost any other country.

Besides all this, Australia, in the matter of language, is more English than England or America. One can hear more foreign languages spoken in New York or London in a day than could be heard in Australia in a year.

JOHN G. JENKINS,

Agent-General for South Australia, and Premier 1901–1905.

Austra'lia, South, one of the original states in the Commonwealth of Australia. It occupies the middle of Australia, and at first, as the colony of South Australia, extended between lon. 132° and 141° E., and from the Southern Ocean to lat. 26° N., having then an area of about 300,000 square miles. In 1861 a district lying to the west of the colony was added to it, so that its western boundary was shifted to the meridian of 129°. In 1863 it received in addition the country between its northern boundary and the opposite coast (this portion being now known as the Northern Territory), so that South Australia now possesses a territory extending across Australia, and occupying an area estimated at 903,690 square miles. It is bounded on the east by Victoria, New South Wales, and Queensland; on the west by Western Australia. Its greatest length from north to south is 1,850 miles, and its width 650 miles. The south coast, for the first 120 miles east of where it begins at Port Eucla, is backed by steep limestone ranges from 400 to 600 feet in height, but as a whole the coast is low and desolate-looking. In a straight line from Port Eucla on the west to Cape Northumberland, near the boundary of Victoria, the distance is 850 miles, but the coast-line between these points extends to nearly twice that distance, owing to the indentations of Spencer Gulf and the Gulf of St. Vincent. Opposite the latter is Kangaroo Island, the largest island on the Australian coast, excepting Tasmania. The coast of the Northern Territory is thickly strewn with islands, three of which are of large size. There are also some excellent ports, one of these, Port Darwin, where the overland telegraph and the cable from Batavia and the East meet, being among the finest harbors in Australia. On the eastern side of the Gulf of St. Vincent lie the most populous portions of the state, and here is situated Adelaide, the state capital.

The interior formation of South Australia widely differs from that of the more eastern states. The mountains here run from the sea to the interior, ending somewhat abruptly among the lakes. The principal chain, the Mount Lofty range, begins at Cape Jervis, and follows the shore of the Gulf of St. Vincent past Adelaide, meeting at the head of the gulf, the ridges forming the backbone of Yorke Peninsula. The range still running north is called Flinders range, and ends in a wide mass of mountain 3,000 feet high, separating the lakes Torrens, Eyre, Frome, and Blanche. All these so-called lakes are huge expanses of salt water, swamp, and mud. On the west of Spencer Gulf is Eyre Peninsula, through the heart of which runs the Gawler range, attaining an elevation of 2,000 feet, and ending on the shores of another series of lakes of the same character as Lake Torrens. The principal summits of the Mount Lofty range are Razor-back, in latitude 33° 20′, and immediately north of it Mount Bryan, close to which is the celebrated Burra-Burra copper mine. The highest peaks of the Flinders range are Mount Remarkable, 3,179 feet, Brown 3,174 feet, and Arden 3,000 feet. None of the peaks in the Gawler range attain more than a moderate elevation. On the left bank of the Murray, and near its mouth, a range of moderately elevated heights proceed south-southeast, skirting the coast to its extremity near Cape Northumberland. Throughout these ranges the existence of volcanic agency at a former period is everywhere apparent. The Warburton range and the Stuart ranges lie beyond and to the north and west of the lakes; further north on the Tropic of Capricorn, are the MacDonnell ranges, rising to a height of 4,000 feet, from which the extreme western affluents of the Lake Eyre River system take their rise. The other portions of the territory to the north and west are almost level, and consist of either waterless plains or plains of sandstone boulders, with desert grass and spinifex.

Among the mountains east of Gulf of St. Vincent, primitive limestone, often in the form of a beautiful white marble, is very abundant. There are indications of a large variety of minerals throughout the state, but copper is the only one that has been met with in large quantities, the total production to the end of 1899 being valued at £23,000,000. Gold has been found in various places, but the quantity won has been small. In the Northern Territory gold has also been found over a considerable tract of country, and good progress has been made in mining, while other minerals are known to exist. Almost the only stream within the state proper, which deserves the name of river, is the Murray, which enters the colony on the east in latitude 34°, and flows first circuitously west and then south, into the extensive lagoon called Lake Alexandrina, communicating with the sea by a narrow opening. During the rainy season it is navigable by steamers through its whole course within the state, and for 1,500 miles in New South Wales. In the Northern Territory the Roper River is a fine large stream, navigable for sea-going vessels for 100 miles from its mouth in the Gulf of Carpentaria; the Victoria is also navigable. The climate of South Australia proper greatly resembles that of Sicily and Naples. During nine months of the year it is agreeable, the disagreeable portion of the year being the three summer months of December, January, and February, when the natural heat of the season is greatly increased by hot winds from the interior. What is called winter would be considered in England merely a wet autumn. There are no epidemic diseases. Scrofulous and tubercular diseases are rare, but diseases of the eyes are common in summer, being either occasioned by the impalpable dust floating in the atmosphere, or by exposure to the night air after the glare of the sun.

South Australia produces nearly all the fruits and vegetables that are cultivated in Europe, as well as others, but in temperate regions is chiefly distinguished as a wheat and grape-growing country. Besides supplying its own wants, it sends large quantities of wheat to the neighboring states and to Europe, where "Adelaide" wheat is held in high estimation. The area under wheat is about 1,750,000 acres. The quantity produced varies greatly with the season, but the average production is six bushels per acre. The area under vineyards is gradually extending, and now approaches 20,000 acres. Brandy is produced as well as wine. Hop-growing is attracting some attention, and the olive is also cultivated. The value of the exports of the state is £7,100,000, and of the imports £7,300,000, total £14,400,000. The chief exports are wool, wheat, flour, copper, and copper ore, skins, etc. The value of the wool exported is generally about £1,000,000, and of

wheat and flour from £800,000 to £1,500,000, according to the season. The trade of a large part of New South Wales passes through South Australia. The revenue and expenditures are each about £2,700,000. The length of railways is 1,890 miles. There is a complete system of telegraphs, besides the great line from Adelaide across the continent to Port Darwin, a distance of 2,000 miles. The public debt of the state is £24,309,035, and has been mostly incurred for reproductive public works. See AUSTRALIA; AUSTRALIAN FEDERATION.

Austra'lia, Western, one of the original states in the Commonwealth of Australia. It includes that portion of Australia west of lon. 129° E., and is bounded, east by South Australia, and northwest, and south by the Indian Ocean. It lies between the parallels of 13° 30′ and 35° 8′ S.; greatest length, 1,450 miles north to south; greatest breadth, 850 miles; area, 975,920 square miles. The coast-line measures about 3,000 miles, and, except on the south is indented by numerous bays, creeks, and estuaries. The coast is fringed by many islands, but none of any importance. The principal inlets are Cambridge Gulf, Admiralty Gulf, York Sound, Collier Bay, King Sound, Roebuck Bay, Exmouth Gulf, Shark Bay, Geographe Bay, and King George Sound, the last the most important as having Albany on its shore, the port of call for the European mail steamers. The chief rivers are the Ord and Fitzroy on the north, De Grey, Ashburton, Fortescue, Gascoign, Murchison, Greenough, Swan, and Blackwood on the west. The Swan River is important, as Perth, the capital, is situated on its banks. Some of the rivers within the tropics are large and navigable, but few of the others run all the year, and fewer still are navigable even for boats to any great distance. The interior was till recent years not well known, but at present there is little territory which has not been explored. The country is chiefly an alternation of ridges and hollows, sandy, without grass, and clothed with bushes and scrubby timber, without the trace of a water-course. The really settled and occupied portion of the state forms only a mere fraction of its whole area. The population is mostly collected in the southwest corner, where the first settlements were made, and around the recently discovered gold reefs. Scattered settlements stud the coast at various points. On the west coast are extensive banks covered with the pearl oyster, which give employment to a fleet of boats. The Kimberley district in the north is a region of great promise; it comprises 20,000,000 acres of well-watered land intersected by the Fitzroy River and other large streams, and is said to be admirably adapted for pastoral purposes, besides having a large area suitable for the cultivation of sugar, coffee, and rice. The greater part of the seaboard, except along the Australian bight, is separated from the interior by a low range of hills running parallel to it, and covered with forests. The fertile land exists in patches, and some of it is of a very rich character. The principal crops are wheat, barley, hay, and potatoes; the vine is also successfully cultivated, and excellent wine is made in the colony. The area under cultivation comprises about 140,000 acres, of which wheat occupies 42,000 acres, hay 84,000 acres, vines 2,750 acres. The live stock in 1899 numbered 2,210,000 sheep, 245,000 cattle, 62,000 horses, besides a large number of camels, pigs, goats, and poultry. An available area of 1,000 square miles is covered with jarrah forests. The jarrah is a species of eucalyptus (*E. marginata*); its timber is in great request for railway sleepers, for building purposes, and especially for marine constructions, having the valuable property of resisting the attacks of the white ant on land and the ship worm at sea. Considerable areas in the southwest are covered with karri (*E. diversicolor*). There are also numerous forests of sandalwood trees, the timber of which is exported in large quantities, chiefly to China for incense purposes. Flowers and fruits from all quarters of the globe grow luxuriantly. Among the fruits successfully cultivated are apples, pears, oranges, peaches, plums, apricots, figs, almonds, bananas, olives, etc. English vegetables may be profitably cultivated at almost all seasons. Bees thrive and produce abundant stores of honey.

The mineral resources of the state are not yet fully known. Gold has been discovered in large quantities, and Western Australia is now the chief gold-producing state of Australia, the Coolgardie gold fields being among the most productive. In 1899 the gold exported had the value of £6,246,731. Lead and copper exist abundantly, and several mines are in operation. Iron ore might be raised in almost inexhaustible quantities, and tin also exists. The gold discoveries have formed an epoch in the history of the state, and trade and population have recently increased very rapidly. The imports, which in 1887 were valued at £830,000, amounted in 1899 to £4,474,000, the exports in the latter year being £6,985,000. Besides gold the exports include wool, jarrah and karri timber, sandalwood, pearls, pearl shells, tin ore, skins, etc. The revenue has grown enormously. In 1881 it was £206,205; in 1891, £497,670; and in 1898, £2,754,747. The public debt is £9,203,738, equal to £53 16s. 8d. per inhabitant. There are about 1,400 miles of railway open. The principal towns are Perth, the capital, and Fremantle, which is the chief port. The first part of the state settled was the southwest corner, long known as the Swan River Settlement, established in 1829. From 1850 to 1868 it was a place for the transportation of convicts. In 1890 the state received a system of responsible government similar to that prevailing in the other colonies of Australia.

Austra'lian Alps, a range of mountains in the southeast of Australia, extending over a length of about 400 miles. The highest peaks are in New South Wales, and the highest, according to Lendenfeld, is Mount Townshend (7,353 feet), belonging to a group which he calls the Kosciusko group. The peaks next in height belong to the Bogong group in Victoria, and the west of the Mitta Mitta, the highest of which is Mount Bogong (6,508 feet). They do not reach the snow line, though snow lies in the higher valleys all the summer. Geologically, the Australian Alps are composed mainly of very ancient metamorphic rocks, which have been worn down in the course of ages to table-lands, and which slope down rather steeply on all sides. Volcanic rocks cover the table-land to the south of Mount Bogong.

Austra'lian Bal'lot. See BALLOT.

Austra'lian Federation, the political union of the five Australian colonies, together with Tasmania. The first convention looking to this end was held at Hobart in January 1886. The colonies represented were Victoria, Queensland, Tasmania, Western Australia, and Fiji. Another conference took place in 1891, at Sydney, New South Wales, attended by delegates from each of the colonies. A plan of federal government was proposed, resembling in many of its features that of the United States. A draft bill to constitute the Commonwealth of Australia was adopted by the convention, and it was agreed to submit it to the approval of the individual legislatures of the several colonies. This bill met with success in the lower branch of but one colonial legislature — that of Victoria. In January 1895 there was a conference of premiers of five colonies at Hobart, and the Legislative Assembly of New South Wales passed a federal enabling act in November of that year, and notice of motion was given in other legislatures to bring in a similar bill. The first practical step was taken in 1898. A convention of representatives of New South Wales, Victoria, Tasmania, South Australia, and Western Australia, succeeded in drafting a constitution, which was submitted to the popular vote of each of those colonies in June. The constitution provided for a governor-general, appointed by the Crown; a federal parliament, composed of the Crown, represented by the governor-general, a Senate, and a House of Representatives. The powers of the parliament were set forth in 39 articles, and covered trade with other countries, taxation, coinage, weights and measures, foreign corporations, pensions, arbitration, etc. Free trade between the states was recognized. By the terms of the plebiscite, an affirmative vote of substantially one third of the electors of New South Wales, and of one fifth of the electors of each of the other colonies, was required to adopt this constitution. But the election returns in June were fatal to the scheme. While the majorities in the four lesser colonies were overwhelmingly in favor of the constitution, the requisite affirmative vote in New South Wales was not obtained.

On 2 Feb. 1899, a unanimous agreement was reached by the colonial premiers in conference at Melbourne, regarding the unsettled questions referred to them by the colonial legislatures, thus insuring the success of the federation project. In 1900, a bill making federation effective was introduced into Parliament, at London, and passed, the only amendment offered having reference to the royal prerogative. Later in that year the Earl of Hopetoun was appointed by the queen first governor-general. He resigned in May 1902.

Austrasia, âs-trā'shĭa (the East Kingdom), the name given, under the Merovingians, to the Eastern possessions of the Franks, embracing Lorraine, Belgium, and the right bank of the Rhine. These districts, thickly inhabited by Franks, were of great importance at the time of the rise of the Frankish power.

Aus'tria (from the German OESTREICH or OESTERREICH, eastern empire), or AUSTRIA-HUNGARY, the collective designation of several states of central Europe, consisting of two semi-independent countries, each with its own parliament and government, but with one common sovereign, army, and system of diplomacy, and also with a common parliament.

History of the Country till the Year 982.— After the Romans had vanquished the Noricans, 33 A.D., and gained possession of the Danube, the country north of the Danube, extending to the borders of Bohemia and Moravia belonged to the kingdom of the Marcomanni and Quadi; a part of lower Austria and Styria, with Vienna (Vindobona), a municipal city of the Roman empire, belonged to upper Pannonia; the rest of the country, with Carinthia and a part of Carniola, formed a portion of Noricum. Gorz belonged to the Roman province of Illyricum, and Tyrol to Rhætia. These limits became confused by the irruptions of the barbarians. The Boii, Vandals, Heruli, Rugii, Goths, Huns, Lombards, and Avars, in the course of the 5th and 6th centuries, successively occupied the country. But after the year 568, when the Lombards had established their power in upper Italy, the River Ens formed the boundary line between the German tribe of Bajuvarii, the proprietors of the territory above the Ens, and the Avars, who had removed from the east to the banks of that stream. In 611 the Wendi, a Slavonic tribe, appeared on the Murr, Drave, and Save. In 788 the duchy of Bavaria was dissolved, and the Avars passed over the Ens and invaded the counties of the Franks in the Bavarian territory. In 791 Charlemagne forced them to retire to the Raab, and united the territory extending from the Ens to the junction of the Raab with the Danube (the territory below the Ens) with Germany, under the name of Avaria, or the Eastern Mark (Marchia Orientalis), or Austria; and in the 10th century (in a document of Otho III. 996) it was called Ostirrichi, equivalent to the modern Oesterreich. Many colonists, particularly from Bavaria, were sent by Charlemagne into the new province, and a margrave was appointed to administer the government. The archbishop of Salzburg was at the head of ecclesiastical affairs. After its separation from Verdun, in 843, Avaria formed the east boundary of the German empire. On the invasion of Germany by the Hungarians, in 900, Avaria fell into their hands, and was held by them till 955, when the Emperor Otho I., in consequence of the victory of Augsburg, reunited a great part of this province to the empire. By the power and address of its margraves the whole country was joined again with Germany, and in 1043, under the Emperor Henry III. and the Margrave Albert I. (the Victorious), its limits were extended to the Leitha.

Austria under the House of Bamberg till 1282.— From 982 to 1156 the margraviate of Austria was hereditary in the family of the counts of Badenburg (Bamberg); the succession, however, was not regulated by primogeniture, but by the will of the emperor. In ancient documents mention is made of the estates of Austria in the year 1096. After Henry the Proud (Duke of Bavaria and Saxony) was put under the ban of the empire, Leopold V., margrave of Austria, received the duchy of Bavaria in 1138 from the Emperor Conrad. But when the Margrave Henry, son of Leopold, under the title of *Ja-so-mir-Gott* (Yes-so-me-God), had again ceded it, in 1156, to Henry the Lion, the boundaries of Austria were extended so as to include the territory above the Ens, and the

whole was created a duchy with certain privileges. Under this Duke the court resided at Vienna. Duke Leopold VI., the son of Henry, received the duchy of Styria in 1192 as a fief from the Emperor Henry VI., it having been added to the empire by Otho I., in 955, by his victory over the Hungarians. It was this prince who imprisoned Richard Cœur de Lion, king of England. Duke Leopold VII., the youngest son of the former, erected a palace within the city of Vienna, which was long occupied by the Austrian monarchs, under the name of the old castle. Leopold VII., called the Glorious, established the hospital of the Holy Cross, made Vienna, which had adopted a municipal constitution in 1198, a staple town, and granted 30,000 marks of silver for the promotion of trade and commerce. In 1229 he purchased a part of Carniola from the ecclesiastical principality of Freisingen for 1,650 marks, and left the country in a flourishing condition to the youngest of his three sons, Frederick II., surnamed the Warrior. In 1236 this prince was put under the ban of the empire, on account of his joining the alliance of the cities of Lombardy against the Emperor Frederick II.; and Otho, Duke of Bavaria, seized upon his territory above the Ens as far as Lintz. The rest of the country was granted, as a fief by the emperor, to a margrave, and Vienna became an imperial city.

During the emperor's campaign in Italy Duke Frederick recovered the principal part of his lands, and his rights were confirmed by the emperor at Verona, 1245. The rights of Vienna as an imperial city were abolished, and Frederick was to be called king, as sovereign of Austria and Styria; but all his expectations of empire were disappointed by his death in the battle of the Leitha against Bela IV., king of Hungary, 15 July 1246, in the 35th year of his age. Thus the male line of the house of Bamberg became extinct. The period from 1246 to 1282 is styled the Austrian interregnum. The Emperor Frederick II. declared Austria and Styria a vacant fief, the hereditary property of the German emperors, and sent a governor to Vienna, the privileges of which, as an imperial city, were once more renewed. But the female relations of the deceased Duke Frederick, his sister Margaret (widow of the Emperor Henry VI), and his niece Gertrude, by the persuasion of Pope Innocent IV., in 1248, laid claim to the inheritance of their brother. The Margrave Hermann, with the aid of the Pope and a strong party, made himself master of Vienna, and of several Austrian cities. In Styria he was opposed by the governor Meinhard, count of Görz. But Hermann died in 1250, and his son Frederick, who was afterward beheaded in 1268, at Naples, with Conradin of Suabia, was then only a year old. The whole country was distracted by various parties, and the Emperor Conrad IV. was prevented, by disputes with his neighbors, from turning his attention to Austria. In 1251 the states of Austria and Styria determined to appoint one of the sons of the second sister of Frederick the Warrior, Constantia (widow of the Margrave Henry the Illustrious) to the office of Duke. Their deputies were on the way to Misnia when they were persuaded by King Wenceslaus, on their entrance into Prague, to declare his son Ottocar Duke of Austria and Styria, who made every effort to support his appointment by arms, money, and especially by his marriage with the empress widow Margaret. Ottocar wrested Styria from Bela, king of Hungary, by his victory of July 1260, in the Marchfield; and in 1262 forced the Emperor Richard to invest him with both duchies. Soon after, by the will of his uncle Ulrich, the last Duke of Carinthia and Friuli (who died 1296), Ottocar became master of Carinthia, a part of Carniola connected with it, the kingdom of Istria, and a part of Friuli. But his arrogance soon caused his fall. In 1272 he refused to acknowledge Count Rudolph of Hapsburg emperor, and was obliged to defend himself against Rudolph. After an unsuccessful war he was forced to cede all his Austrian possessions in November 1276. In 1277 he attempted to recover these territories, but, in the battle of the Marchfield, 26 Aug. 1278, he was slain, and his son Wenceslaus was obliged to renounce all claim to them, in order to preserve his hereditary estates. The Emperor Rudolph remained three years in Vienna, and then appointed his eldest son governor. But having succeeded in gaining the consent of the electors of Saxony and Brandenburg, of the three ecclesiastical electors, and of the count-palatine of the Rhine, he granted the duchies of Austria and Styria, with the province of Carinthia, to his two sons, Albert and Rodolph, 27 Dec. 1280.

Austria under the House of Hapsburg.—I. From 1282 to 1526. Albert and Rodolph transferred Carinthia to Meinhard, count of Tyrol, father-in-law to Albert. In 1283 they concluded a treaty, by which Albert was made sole possessor of Austria, Styria, and Carniola. Vienna, having again renounced its privileges as an imperial city, was made the residence of the court, and the successors of Rodolph, from this time, assumed Austria as the family title. The introduction of the Hapsburg dynasty was the foundation of the future greatness of Austria. The despotic Albert was assailed by Hungary and Bavaria and in 1298 he won the Roman crown in an engagement with Adolphus of Nassau. After this he undertook the conquest of Switzerland; but was assassinated 1 May 1308, at Rheinfelden, by his nephew, John of Suabia, from whom he had basely withheld his hereditary estates. The inheritance of John now fell to the five sons of the murdered Albert—Frederick, surnamed the Fair, Leopold, Henry, Albert, and Otho. They were forced to purchase of the Emperor Henry VII. the investiture of their paternal estates (consisting, in 1308, of 26,572 square miles) for 20,000 marks of silver. Under their father, in 1301, the margraviate of Suabia was added to the territories of Austria, and the contest with Bavaria ended in Austria obtaining Neuberg. On the contrary, the attempt of Duke Leopold, in 1315, to recover the forest towns of Switzerland, which had been lost under Albert, was frustrated by the valor of the troops of the Swiss confederacy in the battle of Morgarten. In 1314 his brother Frederick, chosen emperor of Germany by the electors, was conquered by his rival, the Emperor Louis (of Bavaria), in 1322, at Mühldorf, and was his prisoner for two years and a half in the castle of Trausnitz. The dispute with the house of Luxemberg, in Bohemia, and with Pope John XXII., induced the emperor, in 1325, to liberate his captive.

DRESDEN
CHEMNITZ
PRAGUE
B O H E M I A
NURNBERG
MUNICH
Augsburg
Stuttgart
UPPER AUSTRIA
LOWER AUSTRIA
VIENNA
SALZBURG
S T Y R I A
T Y R O L
CARINTHIA
CARNIOLA
Trieste
GULF OF VENICE
ISTRIA
Pulce
Chioggia
Bologna
Ravenna
Modena
Brescia
Mantua
Verona
Udine
Belluno
Trent
Bolzano
Innsbruck
Salzburg
Linz
Passau
Ratisbon
Munich
Augsburg
Ulm
Ravensburg
Kempten
Coburg
Bamberg
Bayreuth
Wurzburg
Aschaffenburg
Fulda
Meiningen
Rudolstadt
Weimar
Eisenach
Gotha
Erfurt
Leipzig
Dresden
Chemnitz
Zwickau
Plauen
Hof
Eger
Carlsbad
Pilsen
Budweis
Prachatitz
Tabor
Pisek
Neuhaus
Iglau
Brunn
Znaim
Krems
Melk
Steyr
Wels
Salzburg
Innsbruck
Brixen
Meran
Bozen
Trent
Riva
Lake Garda
Verona
Mantua
Modena
Bologna
Ravenna
Ancona
Rimini
Pesaro
Fano
Ancona
Loreto
Macerata
Fermo
Ascoli
Teramo
Aquila
Sulmona
Chieti
Pescara
Foggia
Manfredonia
Barletta
Bari
Brindisi
Otranto
Lecce
Taranto
Gallipoli
Cape Santa Maria di Leuca
Cape Otranto
Strait of Otranto
Corfu
Albania
Montenegro
Cattaro
Ragusa
Gravosa
Stagno
Curzola
Lagosta
Pelagosa
Kujola
Lissa
Busi I.
Torcola I.
Pomo I.
S. Clemente I.
S. Andrea I.
Pta. della Bianca
Zirona I.
Solta I.
Brazza
Lesina
Zurla I.
Incoronata I.
Premuda I.
Melada I.
Lunga or Grossa I.
Pta. di Promontore
Unie I.
Sansego I.
Cherso I.
Veglia I.
Ossero
Arbe I.
Pago I.
Zara
Novigrad
Obrovazzo
Dalmatia
Sebenico
Sign
Spalatro
Almissa
Traw
Trau
Ossero
Fiume
Buccari
Carlopago
Segna
Zengg
Carlstadt
Agram
Essek
Peterwardein
Semlin
Belgrade
Danube R.
Save R.
Drave R.
Theiss R.
Adriatic Sea
Gulf of Venice
Gulf of Quarnero
Gulf of Fiume
Gulf of Carlopago
Gulf of Morlacca
Gulf of Cattaro
Gulf of Drin
Gulf of Durazzo
Gulf of Valona
Gulf of Taranto
Gulf of Manfredonia
Gulf of Salerno
Gulf of Naples
Gulf of Gaeta
Gulf of Spezia
Gulf of Genoa
Gulf of Lyons
Gulf of Marseilles
Gulf of Rosas
Gulf of Palamos
Gulf of Valencia
Gulf of Alicante
Gulf of Almeria
Gulf of Malaga
Gulf of Cadiz
Gulf of Lepanto
Gulf of Patras
Gulf of Corinth
Gulf of Athens
Gulf of Nauplia
Gulf of Koron
Gulf of Kalamata
Gulf of Messenia
Gulf of Laconia
Gulf of Argos

AUSTRIA-HUNGARY
SCALE OF MILES
0 25 50 75 100
Population of places is indicated by different lettering, thus;
200,000 and over ..... BUDA-PEST
100,000 to 200,000 ..... Szegedin
50,000 to 100,000 ..... Linz
10,000 to 50,000 ..... Hof
Smaller towns ..... Cernowitz
Railroads
Canals
Bormay & Co., N.Y.
BUDA-PEST
HUNGARY
TRANSYLVANIA
BUKOWINA
Czernowitz
Lemberg
Cracow
Tarnopol
Szegedin
Temesvar
Belgrade
BUKHAREST
SERVIA
MONTENEGRO
Vienna
Prague
Trieste
Venice
Adriatic Sea
Black Sea
Danube
Carpathian Mts.
Transylvanian Alps
Dniester
Pruth
Theiss
Save
Drave
Maros
Aluta
Bistritz
Kronstadt
Hermannstadt
Klausenburg
Grosswardein
Debreczin
Miskolcz
Presburg
Raab
Comorn
Gran
Essek
Peterwardein
Semlin
Mitrowitza
Novibazar
Ipek
Prizrend
Uskub
Widdin
Kalafat
Rustchuk
Giurgevo
Turnu Magurele
Corabia
Craiova
Slatina
Pitesci
Ploiesti
Turtukai
Silistria
Varna
Constantinople
Sea of Marmora
Dardanelles
Gallipoli
Salonica
Greenwich
Antwerp
Berlin
Warsaw
Kiew
Odessa
Lemberg
Brody
Tarnopol
Czernowitz
Kolomea
Stanislawow
Halicz
Zaleszczyki
Kamenetz Podolsk
Jassy
Galatz
Ibrail
Kustendil
Sofia
Philippopolis
Adrianople
Rodosto
Gallipoli
Scutari
Durazzo
Valona
Corfu
Ionian Islands
Cattaro
Ragusa
Spalatro
Zara
Fiume
Agram
Carlstadt
Laibach
Klagenfurt
Villach
Salzburg
Linz
Vienna
Presburg
Raab
Comorn
Gran
Pesth
Szegedin
Temesvar
Arad
Grosswardein
Debreczin
Miskolcz
Kaschau
Eperies
Tokay
Munkacs
Ungvar
Huszt
Sziget
Marmaros
Maramaros
Bistritz
Kronstadt
Hermannstadt
Klausenburg
Maros Vasarhely
Carlsburg
Petrosza
Kimpolung
Radautz
Suczawa
Botushany
Hirlau
Jassy
Roman
Bukeu
Piatra
Focsani
Rimnik
Buzeo
Ploesti
Bucharest
Giurgevo
Rustchuk
Turtukai
Silistria
Varna
Constantinople
Sea of Marmora
Dardanelles
Gallipoli
Salonica
Greenwich
Antwerp
Berlin
Warsaw
Kiew
Odessa
Lemberg
Brody
Tarnopol
Czernowitz
Kolomea
Stanislawow
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Zaleszczyki
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Grosswardein
Debreczin
Miskolcz
Kaschau
Eperies
Tokay
Munkacs
Ungvar
Huszt
Sziget
Marmaros
Maramaros
Bistritz
Kronstadt
Hermannstadt
Klausenburg
Maros Vasarhely
Carlsburg
Petrosza
Kimpolung
Radautz
Suczawa
Botushany
Hirlau
Jassy
Roman
Bukeu
Piatra
Focsani
Rimnik
Buzeo
Ploesti
Bucharest
Giurgevo
Rustchuk
Turtukai
Silistria
Varna
Constantinople
Sea of Marmora
Dardanelles
Gallipoli
Salonica
Greenwich
Antwerp
Berlin
Warsaw
Kiew
Odessa

Upon this the latter renounced all share in the government, and pledged himself to surrender all the imperial domains which were still in the possession of Austria. But Leopold considered the agreement derogatory to his dignity and continued the war against Louis. Frederick, therefore, again surrendered himself a prisoner in Munich. Moved by his faithful adherence to his word, Louis concluded a friendly compact with Frederick, and made preparations for their common government, 7 Sept. 1325. These preparations, however, were never carried into execution; for the agreement had been concluded without the consent of the electors. Leopold died in 1326, and Henry of Austria in 1327; Frederick also died without children, 13 Jan. 1330, after which his brothers, Albert II. and Otho, came to a reconciliation with the Emperor Louis. After the death of their uncle, Henry, margrave of Tyrol, and Duke of Carinthia (the father of Margaret Maultasch), they persuaded the emperor to grant them the investiture of Tyrol and Carinthia, in May 1335; they ceded Tyrol, however, to John, king of Bohemia, by the treaty of 9 Oct. 1356, in behalf of his son John Henry, or rather of his wife, Margaret Maultasch. In 1344, after the death of Otho and his sons, Albert II., called the Wise, united all his Austrian territories, which, by his marriage with the daughter of the last count of Pfirt, had been augmented by the estates of her father in 1324, and by the Kyburg estates in Burgundy in 1326. Of the four sons of Albert II. (Rodolph, Albert, Leopold, and Frederick), Rodolph II. (IV.) completed the church of St. Stephen's, and died in Milan in 1365, without children, a short time after his youngest brother, Frederick. In 1379 the two surviving brothers divided the kingdom, so that Albert III. (with the Queue) became master of Austria, and gave the other territories to his brother, Leopold III. the Pious. Leopold had made repeated attempts to gain the Hapsburg possessions in Switzerland. He was killed 9 July 1386, on the field of Sempach, where he lost the battle, in consequence of the valor of Winkelried, and Albert administered the government of the estates of his brother's minor sons. Margaret Maultasch ceded Tyrol to him on the death of Meinhard, her only son, who was married to the sister of Albert. She retained nothing but a few castles and 6,000 marks of gold. Her claims to Bavaria also she renounced in consideration of receiving Scharding and three Tyrolese cities, Kitzbühel, Ballenberg, and Kuffstein, and 116,000 florins of gold. In 1365 Leopold III. had bought the claims of the count of Feldkirch for 36,000 florins; for 55,000 florins Austria received Brisgau from the count of Fürstenberg, with the cities of Neuberg, Old Brisach, Kentzingen, and Billingen. The remainder of Carniola and the Windisch Mark, after the death of the last count of Görz, were purchased, together with the county of Pludentz, from the count of Werdenberg, and the possessions of the count of Hogenberg, for 66,000 florins; and the city of Trieste was acquired in 1380 by aiding in the war between Hungary and Venice. Moreover, the two governments of upper and lower Suabia were pledged for 40,000 florins by the king of Rome, Wenceslaus, to Duke Leopold. The Austrian and Styrian lines, founded by Albert III. and Leopold III., his brother, continued for 78 years. In 1395, when Albert III. died, his only son, Albert IV., was in Palestine. On his return he determined to take vengeance on Procopius, margrave of Moravia, for his hostile conduct; but he was poisoned in 1404 at Znaym. His young son and successor, Albert V., was declared of age in 1410; and being the son-in-law of the Emperor Sigismund, he united the crowns of Hungary and Bohemia in 1437, and connected them with that of Germany in 1438. But in the following year the young prince died. His posthumous son, Ladislaus, was the last of the Austrian line of Albert, and its possessions devolved on the Styrian line, 1457.

From this time the house of Austria has furnished an unbroken succession of German emperors. Hungary and Bohemia were lost for a time by the death of Albert V., and, after the unhappy contests with the Swiss, under Frederick III., the remains of the Hapsburg estates in Switzerland. But several territories were gained; and, to increase the rising splendor of the family, the emperor conferred upon the country the rank of an archduchy. The dispute which broke out between Frederick and his brothers Albert and Sigismund, relating to the divisions of their paternal inheritance, ended with the death of Albert in December 1464. In the course of the troubles which resulted from this quarrel the emperor was besieged in the citadel of Vienna by the citizens, who favored the cause of the murdered prince. Sigismund now succeeded to his portion of the estate of Ladislaus and Frederick became sole ruler of all Austria. His son Maximilian, by his marriage with Mary, the surviving daughter of Charles the Bold, united the Netherlands to the Austrian dominions. But it cost Maximilian much anxiety and toil to maintain his power in this new province, which he administered as the guardian of his son Philip. After the death of his father, 19 Aug. 1493, he was made emperor of Germany, and transferred to his son Philip the government of the Netherlands. Maximilian I. added to his paternal inheritance all Tyrol, and several other territories, particularly some belonging to Bavaria. He also acquired for his family new claims to Hungary and Bohemia. During his reign Vienna became the great metropolis of the arts and sciences in the German empire. The marriage of his son Philip to Joanna of Spain raised the house of Hapsburg to the throne of Spain and the Indies. But Philip died in 1506, 13 years before his father, and the death of Maximilian, which happened 12 Jan. 1519, was followed by the union of Spain and Austria; his grandson (the eldest son of Philip), Charles I., king of Spain (see CHARLES V.), was elected emperor of Germany. In the treaty of Worms, 28 April 1521, and of Ghent, 7 May 1540, he ceded to his brother Ferdinand all his hereditary estates in Germany, and retained for himself the kingdom of the Netherlands. The house of Austria was now the proprietor of a tract of country in Europe comprising 360,230 square miles. The Emperor Charles V. immediately increased the number of provinces in the Netherlands to 17, and confirmed their union with the German states, which had been concluded by his grandfather, under the title of the circle of Burgundy. In 1526 Austria was recognized as a European monarchy.

II. From 1526 to 1740. Ferdinand I., by his marriage with Anna, the sister of Louis II., king of Hungary, who was killed in 1526 in the battle of Mohacs, acquired the kingdoms of Hungary and Bohemia, with Moravia, Silesia, and Lusatia, the appendages of Bohemia. Bohemia rejoiced to hail Ferdinand its king. Notwithstanding the divided opinions of the nobles, and the rising fortune of his adversary, John von Zapolya (see HUNGARY), he was raised to the throne of Hungary, 26 Nov. 1526, by the Hungarian Diet, and was crowned 5 Nov. 1527. But Zapolya resorted for assistance to the Sultan, Soliman II., who appeared in 1529 at the gates of Vienna. The capital was rescued from ruin solely by the count of Salm, general of the Austrian army, and the imperial forces compelled Soliman to retreat. In 1535 a treaty was made by which John von Zapolya was allowed to retain the royal title and half of Hungary, and his posterity were to be entitled to nothing but Transylvania. But after the death of John new disputes arose, in which Soliman was again involved, and Ferdinand maintained the possession of lower Hungary only by paying the war-like Sultan the sum of 30,000 ducats annually. This took place in 1562. Ferdinand was equally unsuccessful in the duchy of Würtemberg. This province had been taken from the restless Duke Ulrich by the Suabian confederacy, and sold to the Emperor Charles V.; and when his estates were divided it fell to Ferdinand. Philip, landgrave of Hesse, the friend of Duke Ulrich, took advantage of the opportunity offered him by the embarrassment of Ferdinand in the Hungarian war. With the aid of France he conquered Würtemberg; but France ceded it again to Ulrich in the treaty of Caden, in Bohemia, concluded 29 June 1534, on condition that the province should still be a fief of Austria, and after the extinction of the male line of the Duke that it should revert to that country. Ferdinand received also the imperial crown in 1556, when his brother Charles laid by the sceptre for a cowl. He died 25 July 1564, with the fame of an able prince, leaving 3 sons and 10 daughters. According to the directions given in his will, the three brothers divided the patrimony, so that Maximilian II., the eldest son, who succeeded his father as emperor, obtained Austria, Hungary, and Bohemia; Ferdinand, the second son, received Tyrol and Hither Austria; and Charles, the third, became master of Styria, Carinthia, Carniola, and Görz. But in 1595, after the death of the Archduke Ferdinand, the husband of Philippine Welser, the fair maid of Augsburg, his sons Andrew (cardinal and bishop of Constance and Brixen, and governor of the Netherlands for Spain) and Charles (margrave of Burgau) were declared incompetent to succeed their father, and his possession reverted to his relations. In Hungary the Emperor Maximilian met with far better fortune than his father had done. The death of Soliman at Szigeth in 1566 was followed by a peace, and in 1572 Maximilian crowned his eldest son, Rodolph, king of Hungary; he was afterward crowned king of Bohemia, and was elected king of Rome. In his attempts to add the Polish crown to his Austrian dominions he was equally unsuccessful with his fourth son, Maximilian, who engaged in a similar enterprise after the decease of Stephen Bathori in 1587. Maximilian died 12 Oct. 1576, and Rodolph the eldest of his five sons, succeeded to the imperial throne. The most remarkable events by which his reign is distinguished are the war against Turkey and Transylvania, the persecutions of the Protestants, who were all driven from his dominions, and the circumstances which obliged him to cede Hungary in 1608, and Bohemia and his hereditary estates in Austria in 1611, to his brother Matthias. From this time we may date the successful exertions of the Austrian sovereigns to put down the restless spirit of the nation, and to keep the people in a state of abject submission. Matthias, who succeeded Maximilian on the imperial throne, concluded a peace for 20 years with the Turks; but he was disturbed by the Bohemians, who took up arms in defense of their religious rights. Matthias died 20 March 1619, before the negotiations for a compromise were completed. The Bohemians refused to acknowledge his successor, Ferdinand II., and chose Frederick V., the head of the Protestant League, and elector of the palatinate, for their king. After the battle of Prague, 1620, Bohemia submitted to the authority of Ferdinand. He immediately applied himself to eradicate Protestantism out of Bohemia proper and Moravia. At the same time he deprived Bohemia of the right of choosing her king, and of her other privileges. He erected a Catholic court of reform, and thus led to the emigration of thousands of the inhabitants. This large exodus of inhabitants did much to retard the growth of Bohemia. In fact the religious wars waged upon Bohemian soil for so long a time, dating back to the first outbreaks of the Hussites, with the subsequent agitations and conflicts consequent upon the Reformation, long and seriously hampered that state's general development up to modern times. The Austrian states also favoring, in general, the Protestant religion, were compelled by Ferdinand to swear allegiance to him, and Lutheranism was strictly forbidden in all the Austrian dominions. The province of Hungary, which revolted under Bethlem Gabor, prince of Transylvania, was, after a long struggle, subdued. This religious war dispeopled, impoverished, and paralyzed the energies of the most fertile provinces of the house of Austria. During the reign of Ferdinand III., the successor of Ferdinand II. (1637–57), Austria was continually the theatre of war.

In the midst of these troubles Ferdinand ceded Lusatia to Saxony at the peace of Prague, concluded in 1635; and when the war was ended he ceded Alsace to France, at the peace of Westphalia in 1648. The Emperor Leopold I., son and successor of Ferdinand III., was victorious through the talents of his minister Eugene, in two wars with Turkey; and Vienna was delivered by John Sobieski and the Germans from the attacks of Kara Mustapha in 1683. In 1687 he changed Hungary into a hereditary kingdom, and joined to it the territory of Transylvania, which had been governed by distinct princes. Moreover, by the peace of Carlovitz, concluded in 1699, he restored to Hungary the country lying between the Danube and the Theiss. It was now the chief aim of Leopold to secure to Charles, his second son, the inheritance of the Spanish monarchy, ther-

in the hands of Charles II., king of Spain, who had no children; but his own indecision, and the policy of France, induced Charles II. to appoint the grandson of Louis XIV. his successor. Thus began the war of the Spanish Succession (see Succession Wars) in 1701. Leopold died 5 May 1705, before it was terminated. Emperor Joseph I., his successor and eldest son, continued the war, but died without children, 17 April 1711. His brother Charles, the destined king of Spain, immediately hastened from Barcelona to his hereditary states, to take upon him the administration of the government. He was elected emperor 24 December of the same year; but was obliged to accede to the peace of Utrecht, concluded by his allies at Rastadt and Baden in 1714. By this treaty Austria received the Netherlands, Milan, Mantua, Naples, and Sardinia. In 1720 Sicily was given to Austria in exchange for Sardinia. The duchy of Mantua, occupied by Joseph in 1708, was now made an Austrian fief, because it had formed an alliance with France prejudicial to the interests of Germany. This monarchy now embraced 191,621 square miles. Its annual income was between 13,000,000 and 14,000,000 florins, and its army consisted of 130,000 men; but its power was weakened by new wars with Spain and France. In the peace concluded at Vienna 1735 and 1738, Charles VI. was forced to cede Naples and Sicily to Don Carlos, the Infante of Spain, and to the king of Sardinia a part of Milan, for which he received only a part of Parma and Piacenza. In the next year, by the peace of Belgrade, he lost nearly all the fruits of Eugene's victories, even the province of Temeswar; for he was obliged to transfer to the Porte, Belgrade, Servia, and all the possessions of Austria in Walachia and Bosnia. All this Charles VI. willingly acceded to, in order to secure the succession to his daughter, Maria Theresa, by the Pragmatic Sanction. This law of inheritance was passed 1713–19, and acknowledged one after another by all the European powers.

Austria under the House of Hapsburg-Lorraine.— By the death of Charles VI., 20 Oct. 1740, the male line of the Austrian house of Hapsburg became extinct; and Maria Theresa having married Stephen, Duke of Lorraine, ascended the Austrian throne. On every side her claims were disputed, and rival claims set up. A violent war began in which she had no protector but England. Frederick II. of Prussia subdued Silesia; the elector of Bavaria was crowned in Lintz and Prague, and in 1742 chosen emperor under the name of Charles VII. Hungary alone supported the queen. But in the peace of Breslau, concluded 4 June 1742, she was obliged to cede to Prussia, Silesia, and Glatz, with the exception of Teschen, Jagerndorf, and Troppau. Frederick II., by assisting the party of Charles VII., soon renewed the war. But Charles died 20 Jan. 1745, and the husband of Theresa was crowned emperor of Germany under the title of Francis I. A second treaty of peace, concluded 25 Dec. 1745, confirmed to Frederick the possession of Silesia. By the peace of Aix-la-Chapelle, 18 Oct. 1748, Austria was obliged to cede the duchies of Parma, Piacenza, and Guastalla to Philip, Infante of Spain, and several districts of Milan to Sardinia. The Austrian monarchy was now firmly established; and it was the first wish of Maria Theresa to recover Silesia. With this object in view she formed an alliance with France, Russia, Saxony, and Sweden. This was the origin of the Seven Years' war; but, by the peace of Hubertsberg, 1763, Prussia retained Silesia, and Austria had sacrificed her blood and treasure in vain. The first paper money was now issued in Austria, called state obligations, and the Emperor Francis erected a bank to exchange them. After his death, 18 Aug. 1765, Joseph II., his eldest son, was appointed colleague with his mother in the government of his hereditary states, and elected emperor of Germany. To prevent the extinction of the male line of her family Maria Theresa now established two collateral lines; the house of Tuscany, in her second son, Peter Leopold; and the house of Este, in the person of the Archduke Ferdinand. For these separations Maria Theresa indemnified the country by the confiscation of several cities, formerly pledged to Poland by Hungary, without paying the sum for which they stood pledged; by obtaining Galicia and Lodomeria in the first profligate division of the kingdom of Poland in 1772; and by the capture of Bukowina, which was ceded by the Porte in 1777. In the peace of Teschen, 13 May 1779, Austria received Innviertel, and the vacant county of Hohenembs in Suabia, the county of Falkenstein, and the Suabian territories of Tettnang and Argen; and thus at the death of the empress, 28 Nov. 1780, Austria contained 234,684 square miles; it had lost 16,366 square miles, and gained 34,301. The population was estimated at 24,000,000; but the public debt also had increased to 160,000,000 florins. The administration of the empress was distinguished by substantial improvements in connection with government, agriculture, trade, and commerce, the education of the people, the promotion of the arts and sciences, and of religion. The foreign relations of the kingdom also, even those with the Roman court, were happily conducted by the talents of her minister, Kaunitz.

Her successor, Joseph II., was active and restless; impartial, but too often rash and violent. While a colleague with his mother in the government he diminished the expenses of the state, and introduced a new system in the payment of pensions and of officers. But after the death of his mother all his activity and talent as a sovereign was fully developed. As severe to the military as to the civil officers, he adhered, however, to liberal principles. The censorship of the press was reformed; the Protestants received full toleration, and the rights of citizens; the Jews were treated with kindness; 900 convents and religious establishments were abolished, and even the visit of Pius VI. made no alteration in Joseph's system of reformation. The system of education he subjected to revision and improvement; and he tried to foster manufactures by duties on foreign goods. But his zeal excited the opposition of the enemies of improvement. The low countries revolted, and his vexation probably led him to attempt the exchange of the Netherlands, under the title of the kingdom of Austrasia, for the palatinate of Bavaria under an elector. But the project was frustrated by the constancy and firmness of the next agnate, the Duke of Deux-Ponts, and by the German league concluded by

Frederick II. Joseph was equally unsuccessful in the war of 1788 against the Porte. His exertions in the field destroyed his health; and grief at the rebellious disposition of his hereditary states accelerated his death, which happened 20 Feb. 1790. Joseph II. was succeeded by his eldest brother, Leopold II. By his moderation and firmness he quelled the turbulent spirit of the Netherlands, and restored tranquillity to Hungary. The treaty of Reichenbach with Prussia, 27 July 1790, and the treaty of Sistova, 4 Aug. 1791, led to a peace with the Porte. The unhappy fate of his sister and her husband, Louis XVI. of France, induced him to form an alliance with Prussia, but he died 1 March 1792, before the revolutionary war broke out. Soon after the accession of his son, Francis II., to the throne, and before he was elected German emperor, France declared war against him as king of Hungary and Bohemia. In the first articles of peace, dated at Campo Formio, 17 Oct 1797, Austria lost Lombardy and the Netherlands, and received, as a compensation, the largest part of the Venetian territory; two years previous, in 1795, in the third division of Poland, the Austrian dominions had been enlarged by the addition of west Galicia. In the beginning of the year 1799, the Emperor Francis, in alliance with Russia, renewed the war with France. But Napoleon extorted the peace of Lunéville, 9 Feb. 1801, and Francis acceded to it, without the consent of England. By the conditions of the treaty he was to cede the county of Falkenstein and the Frickthal. Ferdinand, Grand Duke of Tuscany, at the same time renounced his claim to this province and received, in return for it, Salzburg and Berchtesgaden, with a part of the territory of Passau, and was afterward made master of the largest part of Eichstädt, and honored with the title of elector. Austria obtained the Tyrolese archbishoprics, Trent and Brixen, and, notwithstanding its cessions of territory to France, had gained, including its acquisitions in Poland, 9,580 square miles; this made the whole extent 253,770 square miles. The public debt had also increased to 1,220,000,000 florins.

The first consul of France now caused himself to be proclaimed emperor; and 11 Aug. 1804, Francis declared himself hereditary emperor of Austria, and united the Austrian states under the name of the empire of Austria. Immediately after this important act he took arms once more with his allies, Russia and Great Britain, against the government of France. The war of 1805 was terminated by the peace of Presburg, (26 Dec. 1805). By the conditions of the treaty Francis was obliged to cede to France the remaining provinces of Italy; to the king of Bavaria, Burgau, Eichstädt, a part of Passau, all Tyrol, Vorarlberg, Hohenembs, Rothenfels, Tettnang, Argen, and Lindau; to the king of Würtemberg the five towns lying on the Danube, the county of Hohenberg, the landgraviate of Nellenburg, Altdorf, and a part of Brisgau; and to the Grand Duke of Baden the remainder of Brisgau, Ortenau, Constance, and the commandery of Meinau. He received, in return, Salzburg and Berchtesgaden; the elector of Salzburg was compensated by the province of Würzburg; and the dignity of grand master of the Teutonic order was made hereditary in the house of Austria. Thus ended a war which cost the Austrian monarchy, besides the territories just enumerated, 90,000,000 florins, which were carried away by the French from Vienna, and 800,000,000 for the other expenses of the war; of which Francis paid a large proportion from his private purse. After the formation of the Confederation of the Rhine (12 July 1806) Francis was forced to resign his dignity as emperor of Germany (6 Aug. 1806), which had been in his family more than 500 years. The old German, or Holy Roman, empire thus came to an end, and Francis had now only the title of Francis I., emperor of Austria. In 1809 he resolved on a new war with France, aided only by Great Britain, which did nothing more than furnish some pecuniary assistance and made a useless attack on Walcheren. Austria fought courageously, but in vain. The peace of Vienna (14 Oct. 1809) cost the monarchy 42,380 square miles of territory, 3,500,000 subjects, and more than 11,000,000 florins of revenue. The public debt was also increased to 1,200,000,000 florins, and all the paper money in circulation was estimated at 950,000,000.

Napoleon, after tearing from the Austrian monarchy its fairest provinces — the duchy of Salzburg, with Berchtesgaden, Innviertel, western Hausruckviertel, Carniola, and Görz, Trieste, the circle of Villach, a large part of Croatia, Istria, a part of the Grisons, the Bohemian territories in Saxony, all west Galicia, the circle of Zamoski in east Galicia, Cracow, with half the salt works of Wieliczka, the circle of Tarnopol, and many other territories which were given to Russia — formed a personal connection with the ancient family of Hapsburg, by his marriage with Maria Louisa, daughter of the emperor of Austria, and (14 March 1812) concluded an alliance with the emperor Francis against Russia. But the emperor of France was repulsed on his invasion of this country; Prussia rose up against him; and after the Congress of Prague had separated without accomplishing anything, Francis, 12 Aug. 1813, declared war against France, and formed an alliance, 9 Sept. 1813, at Teplitz, with Great Britain, Russia, Prussia, and Sweden, against his son-in-law. In the battle of Leipsic, the Austrian troops took an honorable part. The firmness with which the emperor signed the act of proscription against his son-in-law, and fixed the fate of his daughter and her infant, excited general respect. He signed the same act against Napoleon a second time, when he returned from Elba. He also opposed Murat in Italy. Yet the Austrian cabinet endeavored to provide for young Napoleon in the settlement of the affairs of France. By the Congress of Vienna, 1814–15, Austria gained the portion of Italy which is usually known as Lombardy and Venetia, and recovered, together with Dalmatia, the hereditary territories which it had been obliged to cede. The former Grand Duke of Würzburg, on the contrary, ceded his territory to Bavaria, and again took possession of Tuscany. The final act resulting from the congress was signed in 1820. In 1821 liberal movements in Italy were put down. The July revolution of 1830, in France, cause warlike preparations to be made; but after Great Britain had acknowledged the new government Austria acknowledged it also. Insurrections which took place in Modena, Parma, and the Papal states, 1831–2, were

suppressed without much difficulty. In the London conference relative to the affairs of Belgium Austria took an active share; but in proportion as Great Britain and France became more closely united, Austria entered into more intimate relations with Russia and Prussia. In the Polish insurrection Austria ultimately gave indications of a strong leaning in favor of Russia. The death of the Emperor Francis I., 2 March 1835, and the accession of Ferdinand I. made little change in the Austrian system of government. Metternich still continued at the head of affairs and to foster the reactionary policy. In 1846 the failure of the Polish insurrection had led to the incorporation of Cracow with Austria, but discontent with the government very widely prevailed in the empire. In Italy, the declarations of Pio Nono in favor of reform, and the concessions into which most of the other governments of the Italian peninsula had been hurried, increased the difficulties of Austria. In Hungary the constitutional opposition became stronger and stronger, and latterly, under the guidance of Kossuth and other popular agitators, assumed the form of a great constitutional movement. In 1848 the expulsion of Louis Philippe shook all Europe to its foundations. Metternich found it impossible any longer to guide the ship of state, and the government found itself compelled to grant a free press, and allow the citizens freely to arm themselves. The popular movement made great progress in Hungary; and in Italy a formidable insurrection broke out, threatening the very existence of the Austrian power in the peninsula. In the very centre of the empire, in Vienna itself, the insurrection made equal progress, and the royal family, no longer in safety, removed to Innsbruck. The Austrian monarchy appeared now to be hanging by a thread. The Hungarian diet declared itself permanent, under the presidency of Kossuth. Various ministerial changes took place, and at last the emperor abdicated in favor of his nephew, Francis Joseph. More vigorous measures were now adopted, and Austria, strongly aided by the forces of Russia, succeeded in suppressing the Hungarian insurrection. Haynau, on the occasion, rendered himself notorious by his severity, and Hungary underwent the fate of a conquered country. The year 1855 is memorable in Austrian history for the conclusion of a concordat with the Pope which put the educational and ecclesiastical affairs of the empire entirely into the hands of the papal see. It established an ecclesiastical censorship of the press, and placed all schools, even private schools, under the surveillance of the bishops; it proclaimed the complete independence of the bishops in relation to the civil government, so that all decrees proceeding from Rome might be published without obtaining the royal *placet*, and it authorized the bishops to convoke the provincial councils and diocesan synods without the consent of the civil authority. In 1859 the hostile intentions of France and Sardinia against the possessions of Austria in Italy became so evident that she declared war by sending an army across the Ticino, but after disastrous defeats at Magenta and Solferino she was compelled to cede Milan and the northwest portion of Lombardy to the Sardinian king. In 1864 she joined with Prussia and the other German states in the spoliation of Denmark, but a dispute about the conquered provinces of Schleswig-Holstein involved her in a war with her allies (1866), while at the same time Italy renewed her attempts for the recovery of Venice. Austria had accordingly to show front both in the north and in the south. The southern army under Archduke Albert fought successfully, defeating the Italians under Victor Emanuel at Custozza, 24 June, and driving them back across the Mincio, but the fortune of the northern army under Gen. Benedek was very different. On 3 July Benedek was completely defeated by the Prussian forcesat Königgrätz (Sadowa) in Bohemia, and the road to Vienna lay open to the victors. Francis Joseph now ceded Venetia to Napoleon III., and claimed his intervention to assist in procuring a peace, evidently wishing to make a separate treaty with Italy, so as to be at liberty to employ the southern army against Prussia. This design did not succeed, however. Both Italy and Prussia were willing to accept the mediation of Napoleon, but Italy would not hear of a separate arrangement, and continued the war. On 20 July Admiral Tegetthoff defeated the Italian fleet near the Dalmatian island Lissa; but, on the other hand, the Prussians continued to advance into Austria, and threatened Vienna. Francis Joseph accordingly saw himself obliged to conclude a peace with Prussia 23 August, and a little later peace was concluded with Italy also, 3 October. The result of the war was the cession of Venetia through France to Italy, and the withdrawal of Austria from all interference in the affairs of Germany. (See Seven Weeks' War.)

Since 1866 Austria has been occupied chiefly with the internal affairs of the empire. The first aim of the government was to restore the constitution of the state, which had been established in February 1861, but which had been suspended since 1865 owing to the demand of Hungary for self-government. As Austrian statesmen were anxious for a settlement of the dispute, the Hungarian demands were finally agreed to, and the empire of Austria divided into two parts, the one made up of the Cisleithan or Slavonic-German provinces, the other of the Transleithan provinces, the latter forming together the kingdom of Hungary. These two divisions of the empire were to be entirely independent, except in matters of diplomacy and military and naval matters — to some extent also in matters of finance. This settlement was consummated by the coronation of the Emperor Francis Joseph I. as king of Hungary, which took place at Pesth-Ofen, on 8 June 1867. During the session of the Reichsrath, that is, the diet of the Cisleithan provinces, held in the same year, the important question of the concordat of 1855 came up for discussion. The Liberal majority in the diet were desirous of seeing it entirely repealed, but as they fully recognized the insuperable obstacles in the way of this step, they were content to proceed by separate enactments intended to weaken the power that had been gained to the papal see by the concordat. With this end in view three measures were brought forward, one for the re-establishment of civil marriage, one for the emancipation of the schools from the domination of the Church, and one for the placing of the different creeds on a footing of equality. Before 25 May 1868, all these measures had passed through both houses of the diet, and on

that day they received the imperial sanction. These laws were declared by the Pope to be "abominable," as well as null and void. Further enactments having in view the weakening of the power of the papal see in the state were passed in 1874, and were condemned by the Pope in the severest terms. The fact of the Austro-Hungarian dominions comprising so many different nationalities with different languages has always given the government much trouble, both in the management of internal affairs and in regard to external matters. In the recent revival of the Eastern question, for instance, the course of Austria was hampered by the sympathy shown by the Magyars for the Turks, while her Slav subjects were naturally more favorable to Russia. Previous to the outbreak of hostilities between Russia and Turkey she joined with the other powers in remonstrance with Turkey, but as to the actual struggle remained neutral. At the close of the war in the middle of 1878 Austria took part in the Congress of Berlin, where the settlement of the Eastern question was arranged, and by this congress it was decided that the provinces of Bosnia and Herzegovina should in future be administered by Austria-Hungary instead of Turkey. Since then the external history of the monarchy has been uneventful, but there has been considerable friction at home between the different nationalities and political parties.

Area and Divisions.— The Austrian empire extends from about lat. 42° to 51° N., and from lon. 8° 30′ to 26° 30′ E.; the total area in round numbers is 240,000 square miles. Its greatest length from east to west is about 860 miles; its greatest breadth about 400 miles. It is bounded south by Turkey, the Adriatic Sea, and the kingdom of Italy; west by Switzerland, Bavaria, and Saxony; north by Prussia and Russian Poland; and east by Russia and Rumania. On the shores of the Adriatic, along the coasts of Dalmatia, Croatia, Istria, etc., lies its only sea frontage, which, compared to the size of the monarchy, is of insignificant extent. Besides being divided into the two great divisions above mentioned, the Austro-Hungarian monarchy is further divided into a number of governments or provinces. The following table exhibits the name and area of these governments, with their population in 1890 and 1900:

Natural Features.— Although presenting every variety of surface the prevailing character of the Austrian dominions is mountainous, there being few districts where mountains are not found; while the plains do not occupy more than a fifth part of the whole superficies. The loftiest ranges, and the most extensively ramified, are found in Tyrol, Styria, Illyria, and the southern parts of Austria proper. In some of these regions the scenery is bold and romantic, and has been considered equal to that of Switzerland. The most extensive tracts of low or flat land occur in Slavonia and the southeast and central parts of Hungary; much of this level land is remarkably fertile, but it is met at various points by vast morasses and arid steppes. The principal valleys are found in Tyrol, Salzburg, Styria, and Illyria. Extensive plains stretch along the courses of the rivers, particularly the Danube, the Theiss, and the March. The principal rivers of Austria are the Danube, the Elbe, the Save, the Drave, the Waag, the March, the Inn, the Teiss or Theiss, and the Maros. The Danube for upward of 800 miles is navigable for quite large vessels throughout the whole Austrian territory; while all the others, most of them tributaries of the Danube, are navigable for vessels of smaller size. All the rivers abound in fish. The lakes are numerous and often picturesque, although those in the lowlands, particularly in the plains of Hungary, are rather marshes than lakes. Austria lies between the isotherms of 60° and 50°, and has a climate nearly as various as its surface. The northern regions, between the 49th and 51st degrees of north latitude, have an average temperature resembling that of the north of France. Between lat. 46° and 49° the heat is considerable; and between 42° and 46°, which comprises the whole of South Austria, it is still greater; the winter lasting two or three months only, and being, in general, extremely mild. The principal products of the north are wheat, barley, oats, and rye; in the centre, vines and maize are added; and in the south, olives. The productive capabilities of the soil, however, are not rendered available to their full extent. The wines of Austria are inferior on the whole, with exception of a few choice kinds, including the well-known Tokay. A great portion of the

Divisions.	Area in sq. m.	Population, Dec. 31, 1890.	Population, Dec. 31, 1900.
Austrian Provinces —			
Lower Austria	7,654	2,661,799	3,100,493
Upper Austria	4,631	785,831	810,246
Salzburg	2,767	173,510	192,763
Styria	8,670	282,708	1,356,494
Carinthia	4,005	361,008	367,337
Carniola	3,856	498,958	508,150
Coast land	3,084	695,384	756,546
Tyrol and Vorarlberg	11,324	928,769	981,989
Bohemia	20,060	5,843,094	6,318,697
Moravia	8,583	2,276,870	2,437,706
Silesia	1,987	605,649	680,422
Galicia	30,307	6,607,816	7,315,816
Bukowina	4,035	646,591	730,195
Dalmatia	4,940	527,426	593,783
	115,903	23,895,413	26,150,597
Hungarian Provinces —			
Hungary and Transylvania	108,258	15,231,527	16,656,904
Croatia and Slavonia	16,773	2,201,927	2,397,249
Fiume	8	30,337	38,139
Military out of the country		25,752	114,811
	125,039	17,489,543	19,207,103
Total	240,942	41,384,956	45,357,700

worst wine is made into brandy. The average produce of wine is about 540,000 gallons, of which Hungary yields by far the largest proportion. The forests cover 69,000 square miles, or one third of the productive soil of the empire, and yield timber of excellent quality, adapted for all purposes. Wild deer, wild swine, chamois, foxes, lynxes, and a species of small black bear, are found in many districts, the fox and lynx being particularly abundant. Herds of a native breed of horses, of small size, roam wild over the plains of Hungary. All the domestic animals of England are known throughout the empire. A large portion of the countries now composing the Austrian empire was at one time submerged by the sea, particularly Hungary, where the general appearance of its vast plains, the nature of their soil, and, above all, the occurrence of fossil sea shells, leave no room to doubt the former dominion of the ocean. Throughout all Austria the Tertiary formation prevails, with a margin of the Secondary formation, stretching to a greater or lesser extent into the surrounding countries, and diversified by patches of igneous rocks of the Tertiary and Alluvial epochs. In mineral productions Austria is very rich, possessing, with the exception of platinum, all the metals. We may more particularly mention gold, silver, iron, copper, lead, zinc, quicksilver, coal, and salt. The total annual value of the mineral products of the Austrian empire is estimated at upward of £12,000,000; of which £2,300,000 represents coal; £2,000,000 lignite; £4,300,000 smelted ores; and £3,400,000, salt.

Manufactures and Commerce.—Manufactures are in the most flourishing condition in Bohemia, Moravia, Silesia, and Lower Austria; less so in the eastern provinces, and insignificant in Dalmatia, Bukowina, and the military frontiers. The total money value of manufactured products amounts to at least £130,000,000, the value of agricultural products to more than £200,000,000. As regards the individual branches of manufacture, there are machines produced yearly to the value of £4,000,000 to £5,000,000, and the supply about equals the demand. In the manufacture of musical and scientific instruments Austria holds a high position; those of Vienna are especially celebrated. The manufacture of stoneware and chinaware is very extensive, being valued at about £2,500,000 yearly, and giving rise to a brisk export trade. The glass manufacture is one of the oldest and most highly developed branches of industry in Austria. The manufactories, about 200 in number, are spread over the whole of the monarchy, but are most numerous in Bohemia, where glass and glasswares of every kind are produced. The yearly value of this class of manufactures is estimated at about £2,500,000, of which a very considerable quantity is exported. The manufacture of metal goods is carried on to a great extent, being valued at about £10,000,000; and some of the iron and steel goods, such as scythes and reaping hooks, have a world-wide reputation. The manufacture of gold and silver plate and jewelry is also important, and the articles of Vienna workmanship compete successfully with the French. The production of chemicals reaches the amount of £5,000,000, and about covers the home demand. As regards articles of food, the sugar from beets has an annual value of about £12,000,000; of beer the production is £4,000,000 in value, the number of breweries is over 2,000; spirits are distilled to the value of £3,500,000. The manufacture of tobacco is a state monopoly, and is carried on in 38, mostly large, establishments. Of textile industries, the silk manufacture, since the loss of the Lombardo-Venetian provinces, has become greatly limited. The manufactures of woolen, hemp, and flax are among the oldest and most important of the state. The first gives employment to about 400,000 persons, and turns out about £14,000,000 worth of goods yearly, of which a considerable proportion is annually exported. In the whole monarchy there are about 650,000 spindles and 65,000 looms employed in woolen weaving. The linen manufacture (including also hemp and jute) gives employment to a greater number of persons than any other branch of industry (many of them in their homes), and produces goods to a greater value. The chief seats of the manufacture are Bohemia, Moravia, and Silesia. The annual produce of the cotton manufacture is next in value to that of woolens. Although about 2,400,000 spindles are in activity, cotton yarn has to be imported. On the other hand, however, excellent cotton cloths are exported. Tanning is carried on to the greatest extent in Moravia, Lower Austria, and Bohemia, yet not sufficiently to supply the demand. The manufacture of leather goods, however, is very large, and in the production of gloves (in Vienna and Prague) Austria stands next to France. Altogether the manufacture of leather and leather goods employs about 200,000 persons and produces goods to about £10,000,000 yearly.

In addition to the general import and export trade, Austria carries on,—partly from its central position in the contient of Europe, and partly from its numerous navigable streams, excellent roads, and in later times its partially completed railway system,—a very considerable amount of business in the transit of goods through her territory to other countries. In 1887 the total value of the imports into Austria-Hungary was, in round numbers, £53,900,000, while the value of the exports was £69,860,000; the respective figures for the year 1897 were £62,940,000 and £63,854,000. These values were exclusive of coin and bullion, the import of which into Austria-Hungary in 1897 amounted to £8,322,000, while the export for the same year was £4,304,000. The principal import is raw cotton, which was imported in 1897 to the value of £4,225,000; wool being imported to the value of £3,209,000; cotton and woolen yarn to the value of £2,433,000; silk and silk goods to the value of £2,725,000; coffee to the value of £2,192,000; tobacco leaf and manufactured to the value of £2,167,000; coal and coke to the value of £3,100,000. Among the other chief articles furs and hides were imported to the value of £1,842,000; leather was imported to the value of £1,783,000; machinery, locomotives, etc., to the value of £1,642,000; hardware and clocks to the value of nearly £1,000,000; books, newspapers, and maps to the value of £1,492,000; grain to the value of £3,400,000; cattle to the value of £1,300,000. Wood formed the chief article of export, the value of this product being in 1897 £7,000,000; next came sugar, value £5,120,000; cattle to the value of £3,800,000. Among other exports of importance were grain to the value of £3,475,000; leather and leather

wares (including gloves), £2,242,000; hardware, £1,533,000; eggs, £3,660,000; coal and coke, £2,850,000; woolen manufactures, £1,542,000; glass and glassware, £1,867,000; paper and paperwares, £909,000; wool, £883,000; malt, £2,042,000; wooden goods, £1,600,000; hides, etc., £1,420,000. Nearly one half of the commerce of Austria is carried on with Germany, the next places being occupied by Great Britain, Italy, Russia, and the United States. Including fishing vessels and small craft, Austria-Hungary, in the beginning of 1897, had 12,447 vessels of all sizes, with a tonnage of 270,250, and employing 34,431 men. Of these 227 of 212,069 tons were sea-going vessels, the coasting vessels being 1,739 in number with a tonnage of 35,515. The principal ports of the empire are Trieste, Pola, and Fiume. In 1898 there were 20,445 miles of railway open for traffic in the empire, of which 10,598 were in Austria, and 9,847 in Hungary.

Money, Weights, and Measures.— On 1 Jan. 1900 a new monetary system went into effect, the coinage being changed from a silver to a gold basis, and the standard coin and money of account being the crown (equal to 20.3 cents in United States gold). Practically the chief medium of exchange is banknotes, of various denominations. The Austrian centner, the weight by which all large quantities are rated, is 123½ pounds avoirdupois. The metze (pl., metzen), the largest dry measure = 1.7 of a bushel, or somewhat less than the fourth part of an English imperial quarter, nine metzen making two quarters nearly. The eimer, the most generally used liquid measure, is equal to 14.94 English wine gallons. The Vienna foot is equal to 12.45 inches English. The joch of land is 1.43 English acre.

Population.— None of the European states, with the exception of Russia, exhibits such a diversity of race and language among their population as does the Austrian empire. The Slavs, who amount to above 19,000,000, or 45 per cent of the total population, are the chief of the component nationalities of the monarchy in point of numbers, forming the great mass of the population of Bohemia, Moravia, Carniola, Galicia, Dalmatia, the kingdom of Croatia and Slavonia, and Northern Hungary, and half the population of Silesia and Bukowina. This preponderance, however, is only apparent, as none of the other races are split up into so many branches differing so greatly from each other in language, religion, civilization, manners, and customs. These branches are the North Slavic Czechs, Moravians, and Slovaks, the Ruthenians and Poles, and the South Slavic Slovenians, Croats, Serbs, and Bulgarians. The Germans, about 10,570,000 in number, are scattered over the whole monarchy and form almost the sole population of the archduchy of Austria, Salzburg, the greatest portion of Styria and Carinthia, almost the whole of Tyrol and Vorarlberg, considerable portions of Bohemia and Moravia, the whole of the west of Silesia, etc.; and they are also numerous in Hungary and Transylvania. The Magyars or Hungarians (7,440,000 in number, or about 16 per cent of the total population) form the great bulk of the inhabitants of the kingdom of Hungary and of the eastern portion of Transylvania. To the Italic or Western Romanic stock belong the inhabitants of South Tyrol and parts of the coast lands and Dalmatia, numbering about 700,000 in all. A considerable portion of the southeast of the empire is occupied by members of the Rumanian (or Eastern Romanic) stock, who number altogether about 2,800,000, and form more than half the population of Transylvania, besides being spread over the southeastern parts of Hungary, Bukowina, and part of Croatia and Slavonia. The number of Jews is also very considerable (above 1,000,000), especially in Galicia, Hungary, Bohemia, and Moravia. There are also several other races whose numbers are small, such as the Gypsies (95,000), who are most numerous in Hungary and Transylvania, and the Albanians in Dalmatia and neighboring regions. The population is thickest in Lower Austria, Bohemia, Silesia, and Moravia; thinnest in Salzburg. Generally speaking, it decreases in density from west to east.

Religion.—The state religion of Austria is the Roman Catholic, and next in numbers is the Greek Church. Calvinism and Lutheranism are also professed by a large body of the people; the former mostly in Hungary and Transylvania, the latter in the German provinces and in Galicia. The civil power exercises supreme control in all ecclesiastical matters, the emperor being, in everything but name, head of the Church; and as no sentence of excommunication, or other ecclesiastical edict, can be issued without the sanction of the Crown, the Pope's direct authority in Austria is somewhat limited. In 1890 there were in the Austrian portion of the monarchy 18,784,063 Roman Catholics, 2,797,089 Greek Catholics united to the Roman Church, 540,715 non-united, 430,849 Protestants, and 1,135,118 Jews. In Hungary and Transylvania there were 8,823,105 Roman Catholics, 1,670,283 Greek united and 2,633,491 non-united, 3,427,896 Protestants, and 724,588 Jews.

Education.— The intellectual culture of the people is at very different stages of advancement among the different races. It is highest in the German provinces and lowest in the east. In Upper and Lower Austria, Salzburg, Tyrol, Moravia, Silesia, and Bohemia, almost all the children of suitable age are in attendance on the public schools; while in Bukowina only about 34, and in Galicia about 59 per cent of them are at the schools. The educational system has been entirely remodeled in recent times. The elementary schools, or those in which the common branches are taught, are designated national schools or schools for the people (*Volksschulen*), and there children have to attend from the end of their 6th to the end of their 14th (in some provinces only their 12th) year. A higher class of elementary schools are known as town schools (*Bürgerschulen*), in which a superior education may be obtained. For the training of instructors for the people's schools, there are 43 normal schools for male teachers and 26 for female. As secondary schools or institutions of a more advanced grade, there are the gymnasia and the "real-schools," as they are called. The gymnasia resemble the best sort of our grammar schools, being intended chiefly to prepare pupils for the universities, great attention being paid in them to the classical languages. In the real-schools a more practical end is kept in view, and modern languages and physical science form the groundwork of the educational course. A complete course in a gymnasium extends over four years, in a real-school either three or four. There

are also schools of an intermediate stamp known as "real-gymnasia." The higher education is provided for by the universities, the polytechnic institutes, and the various institutions in which particular subjects are taught. There are 11 universities in the monarchy, namely, in Vienna, Prague (two — a German and a Bohemian), Pesth, Gratz, Cracow, Lemberg, Innsbruck, Klausenburg, Agram, and Czernowitz. Most of these have four faculties — Catholic theology, law and politics, medicine, and philosophy. There are also several technical high schools in which mathematics, physics, and natural science are the chief objects of study. Besides these there are theological institutions; schools for jurisprudence and philosophy; schools of commerce, industrial arts, agriculture, arboriculture, and mining; military schools, naval schools, art schools, conservatories of music, etc. The principal libraries are the royal library at Vienna, with 450,000 volumes, 24,000 manuscripts, and 7,000 incunabula; and the university libraries of Vienna and Prague.

Constitution, Revenue.— As already mentioned, the Austrian dominions now consist of a German, or Slavo-Germanic, or Cisleithan empire, and a Transleithan or Hungarian kingdom, each with its own parliament, ministers, and government. The same hereditary sovereign rules over both, and they have a common army and navy, and a sort of common parliament known as the Delegations. The Delegations consist of 120 members, one half of whom are chosen by and represent the legislature of German Austria, and the other half that of Hungary, the upper house of each legislature returning 20 and the lower house 40 deputies. In all matters affecting the common affairs of the monarchy the Delegations have a decisive vote, and their resolutions do not require the confirmation of the representative assemblies in which they have their source. The Delegations meet alternately in Vienna and Budapest. Their ordinary mode of procedure is to sit and vote in two chambers, the 60 deputies of Cisleithan Austria forming the one, and the 60 of Hungary the other. But if no agreement can be arrived at in this manner, the two bodies must meet together and without further debate give their final vote, which is binding for the whole empire. The jurisdiction of the Delegations extends specially to all matters affecting foreign affairs, war, and finance. The constitution of German Austria was finally established in December 1867. The provinces have each a diet or legislature of their own for provincial affairs, these diets being 16 in number, one each for Bohemia, Dalmatia, Galicia, Upper Austria, Lower Austria, Salzburg, Styria, Carinthia, Carniola, Bukowina, Moravia, Silesia, Tyrol, Vorarlberg, Görz and Gradisca, and Istria, the municipal council of Trieste having similar functions. The provincial diets are composed of the archbishops and bishops, the rectors of the universities, the representatives of the great estates, of towns, of boards of commerce, of rural communes, etc. The laws passed in these diets have reference to provincial taxation, agricultural, educational, and other matters. The national parliament or legislature of German Austria, called the *Reichsrath* (or council of the realm), consists of an upper house or house of lords (*Herrnhaus*), and a lower house or house of deputies (*Abgeordnetenhaus*). The former is composed of princes of the imperial family, of nobles whose families have a hereditary right to this dignity, of the archbishops, the bishops of princely rank, and of a certain number of life members nominated by the emperor. The lower houses consist of 353 members, elected by all citizens above 24 possessing a small property qualification. The rights belonging to the Reichsrath are: consent to all laws relating to military service; co-operation in the legislation on commercial matters, customs, railways, etc.; and examination of the estimates of the income and expenditure of the state, and other financial matters. The constitution of Hungary, including also Croatia, Slavonia, and Transylvania, dates from the foundation of the kingdom, or about 895 A.D. It rests upon a number of statutes published at long intervals, the principal of these being the *Bulla Aurea* or Golden Bull of Andrew II., granted in 1222, by which the government was defined as an aristocratic monarchy. The legislative power is vested in the king and the parliament (*Reichstag*) conjointly. The latter consists of an upper house or house of magnates, and of a lower house or house of representatives. The house of magnates consists of the archdukes of the imperial family who have attained their majority, 54 ecclesiastical dignitaries, 151 counts, and 36 barons as hereditary members, 84 life members nominated by the sovereign, or elected by the chamber, etc. The lower house (of 453 members) is composed of elected representatives. The Hungarian Reichstag corresponds to the Reichsrath of the Cisleithan provinces, and accordingly only deals with such matters as are common to the provinces belonging to the Hungarian crown. Transylvania is, so far as legislation and administration are concerned, entirely incorporated with Hungary. Croatia and Slavonia, however, have a Landtag or diet of their own, which, like the provincial diets of the Cisleithan portion of the empire, consists of only one chamber, and which is competent to deal with all matters belonging to the interior administration of the provinces, with religion and education, and with the administration of justice. Fiume, which was formerly associated with Croatia and Slavonia, and subject to the Landtag of these provinces, has, since August 1870, been put directly under the central Hungarian government.

There being three distinct parliaments in the empire, there are also three budgets, namely, that for the whole empire, that for Cisleithan, and that for Transleithan Austria. In the budget of the whole empire for 1902 the revenue and expenditure were each estimated at 365,181,966 crowns; in that for Cisleithan Austria the revenue was estimated at 1,685,966,357 crowns, and the expenditures at 1,685,117,944 crowns; and in that for Transleithan Austria the estimated revenue was 1,086,870,018 crowns, the estimated expenditure being a little less. A small portion of the imperial revenue of Austria is derived from customs and other sources, and the remainder is made up by the two divisions of the empire, 70 per cent thereof being contributed by the Cisleithan and 30 per cent by the Transleithan portion.

Recent Politics.— Austria to-day is what Metternich with less truth called Italy, little more than a geographical expression. Three bonds do indeed unite its discordant nationalities; but

for the hasty observer the country might well seem in the last stages of decomposition. There is nothing really Austrian in Austria — no Austrian interests, no Austrian language, or literature, or patriotism, no Austrian nationality, no Austrian standard of civilization; nothing except the emperor, and the army, and the cockpit of the Reichsrath that the races share in common. The Germans form a compact entity by themselves in Upper and Lower Austria and the Duchy of Salzburg. In Bohemia there is a respectable colony of them along the borders of Saxony and Bavaria, over 2,000,000 strong, but even so they are outnumbered by the Czechs in the ration of 3 to 5. All together the German-speaking subjects are about a third of the total population of Austria — some 8,500,000 out of 24,000,000. The Czechs in Bohemia, Moravia, and Silesia number roughly 5,000,000. In Galicia some 4,000,000 Poles hold down a trifle over 3,000,000 Ruthenians. A couple of million Slovenes, Servians, and Croats are scattered over Carinthia and Carniola, while nearly 1,000,000 Italians inhabit the Tyrol. None of these races can alone be said to represent Austria, though all of them claim to; and their mutual wranglings, struggles to realize themselves, struggles to elbow out their neighbors and seize an incontestable ascendency, are the background, and at times something more, of modern Austrian politics. But for the dashing tenacity of the Magyars, Hungary might be as heterogeneous as her partner in the dual monarchy. The Magyars are only 7,500,000 out of nearly 18,000,000, but they are a race with the fierce hardihood and determination of the Teutonic stock and a grace and fascination that are neither Latin nor Celtic, but distinctively their own. Since the two nations entered into a partnership agreement as coequal and sovereign states, the Magyars have devoted all their brilliant energies and the immense force of a concentrated one-idealness to making themselves paramount throughout the southern half of the realm. They revolted against being Germanized, but see no inconsistency in insisting that the Servians, Croats, Rumanians, and Slovenes shall be Magyarized; and they have set about the task with unsparing persistency just saved from relentlessness by their genius for wise compromise. A restricted suffrage, excluding nineteen twentieths of the people from the polls, keeps public affairs in their grasp. The schools have been a much more effective instrument in the development of a national feeling, and the Magyars have thoroughly worked them to that end. Like the Russians and Americans, but unlike the English, the Magyars recognize that where there is difference of speech there will be difference of sentiment, of heart, of interests, and at a pinch perhaps of loyalty, and have accordingly refused to make the preservation of dialects an object of government. Fifty years ago the Hungarian nobles spoke German and a bastard monkish Latin in their homes and diets. To-day the native tongue obtains, among all classes, and the absorption of all manner of outlanders,— German, Slovacks, Jews, Rumanians, and Croats,— by the irresistible and peaceful process of denationalization in the schoolroom, has gone on at such a pace that the Magyars increase nearly three times as quickly as any of the neighboring races. The struggle of the nationalities in Hungary has ended in a more or less resigned acquiescence in Magyar rule.

In Austria, as in Spain, the factory is placed some distance behind the barracks as an element of national welfare, and a contemptuous bureaucracy shackles trade with a hundred entangling regulations. The Magyars, on the other hand, have been as attentive to commerce as to their racial position. Perhaps there is no country in which the state, as such, has done more for industrial development. The really vital domestic problems of Hungary are, indeed, no longer racial, and as freedom of worship is the law, they have never been acutely religious. But in the rise of what is called Agrarian Socialism, there is something that may test Magyar statesmanship severely. Meanwhile the Magyars are the backbone of the dual monarchy. Against the rising tides of Pan-Slavism they present a compact and unbending front. Together with the German empire they may be considered the outposts of Europe against Slav aggression; and even in the domestic affairs of the monarchy their unbreakable unity as a political force has made their influence wellnigh decisive. The *Ausgleich* of 1867,— the partnership agreement between the two halves of the realm,— prescribed that matters of common concern, such as foreign affairs, diplomatic representation, and naval and military matters, should be arranged by 60 delegates from each country, meeting twice a year. The Austrian delegation is made up of Germans, Czechs, Poles, Ruthenians, Italians, whose feuds make steady co-operation all but impossible. The Hungarian delegation, on the other hand, is composed of 55 Magyars and 5 Croatians, working with the directness and harmony of a single man. The consequence is that in the long run the Hungarian view is fairly sure to carry the day. So far each renewal of the *Ausgleich* has brought substantial modifications in favor of Hungary, and the centre of gravity has, in fact, shifted from Vienna to Budapest. The emperor, when driven to it, might go against the German-speaking Austrians, but never against the Magyars; and the Magyars, fully realizing their power, have extorted concession after concession from their unhappy partner; have applied the screw so persistently, that it is becoming a question whether they are not as unpopular among Austrian statesmen as the very Czechs themselves. The troubles of the dual monarchy are due to the failure of the Germans to repeat in Austria the successes of the Magyars in Hungary. "You look after your hordes," said Count Beust to a Hungarian statesman when the Austrian empire became the dual monarchy, "and we'll look after ours." The Czechs of Bohemia have turned to ridicule the count's too valiant declaration. The Germans of Vienna, one must remember, are very different from the Germans of Berlin. Of all the sections of the Teutonic race they appear to have the least robustness of intellect or character and the laxest grip on practical affairs. Indolent, hypercritical, and self-satisfied, they are the emasculated editions of their northern kinsmen. From whatever cause, some paralyzing blight of lassitude and ineffectiveness seems to have eaten its way into their energies. Against their cultured fecklessness the Czechs oppose the elemental force of racial ambition, the driving power of a people that has the conscious-

ness of a great destiny before it and feels itself on the top of the rising wave.

The Germans protest that they have educated themselves beyond the point where race is everything and cannot at this time of day be expected to return to first principles. It is of course tenable that the variety of parties into which the Germans are split up argues an advanced and broad political intelligence. At the same time it makes a poor barrier against the impact of a race that subordinates everything to a single practical end; and unless the Germans are prepared to see a great part of their old ascendency pass away, they must be ready to drop «theorizing,» take up the issue that has been forced upon them, and meet their antagonists with weapons not necessarily of their own choosing. In other words, they need simplifying if they are to combat the Czechs successfully. As it is, the Czechs for the last 30 years have been slowly driving them to the wall. City after city has fallen into their hands; Prague and Pilsen, that only a quarter of a century ago were German in tongue and sentiment, are now Slavonized down to their very street names. And in politics and industry as well as music and literature and the lighter arts, the past hundred years have seen the Czechs advance in a quite wonderful fashion. They have long ceased to fear the Germans, and with the disappearance of fear comes naturally the claim to equality. Moreover, the Czechs have a strong historical case. Four hundred years ago what are now the crown-lands of Bohemia, Moravia, and Silesia formed the Czech kingdom of St. Vacslav; and what is now Hungary was then the kingdom of St. Stephen. The Czechs offered their crown in 1526 to the Hapsburgs, at the same time, for the same reasons, and on the same conditions as the Magyars; stipulating only that they should retain their old rights of self-government. This contract, together with the Pragmatic Sanction, was the legal basis of the Hungarian rebellion of 1848. Th Czechs still use it to point the justice of their demands for a resurrection of St. Vacslav's kingdom, maintaining that their case is on all fours with that of Hungary, rests on the same documents, and is supported by the same coronation oaths. The Hapsburgs never quite lived up to their side of the agreement. They allowed the Turks to overrun Hungary at will, and when the Reformation came and the Czechs gathered round John Huss, they stamped out the heresy in blood and established a strong German colony along the northern borders of Bohemia for the protection of the faith and the suppression of the natives. The Czechs have kept their native tongue alive, and just across their borders are their kinsmen of the Russian empire. The card of Russian sympathy is often played, and after every fresh frustration of their national hopes follows the spectacle of 5,500,000 Czechs cautiously sounding the Czar's «racial instinct.» It is this that lends color to the common charge that the Czechs are disloyal, but it is to be noticed that when the situation is reversed and the emperor makes even the shortest step toward Home Rule, the Germans at once adopt their opponents' tactics, throw themselves into the arms of their Prussian brethren, and vow that sooner than stay and be swamped by a hated and inferior race, they would willingly exchange the Hapsburgs for the Hohenzollerns and enroll themselves among Kaiser Wilhelm's subjects. The suspicion cannot be avoided that these dramatics are at bottom intended for home consumption, and that the tune would be quickly changed if the czar or kaiser were to listen too seriously.

The whole history of the dual monarchy goes to show that real consolidation and unity can be effected only by the seemingly paradoxical method of allowing each nationality the widest possible freedom. Justice toward and equal treatment of all races is the only sure road to peace and permanency. It is a hard one for the Germans to tread, for it means the overthrow of an ascendency once paramount in every corner of the realm; but unless universal suffrage brings to the front an entirely new set of problems, trod it must be. The interplay of these racial ambitions has been complicated, sometimes retarded and sometimes acutely emphasized by a hundred differences of religious, economic, and purely political interests, all of which have representatives in the Reichsrath. They act upon one another under the shadow of the racial issues in a way that no foreigner can disentangle. The confusion of the country is worthily reproduced in the 15 distinct parties and the seven or eight languages that crop up in the Vienna parliament. Austria-Hungary is a polyglot chaos in which even Austrians do not profess to see more than a half light. The prophecies of disruption may therefore appear at least plausible. But it is one of the many paradoxes of the dual monarchy that it seems unable to break up. In part it is protected by the very diversity and number of the antagonisms it is obliged to house. A more visible bond of union is the army, in which all must serve, which is of all races and creeds, and therefore of none, and the atmosphere of which is broadly and impressively imperial. What its actual effectiveness will prove to be like, should it ever be tested, is one of the most interesting military problems of the day. The only force with which it can be compared in the excellence of its units and the variety of its nationalities and tongues is the allied army that rescued the Pekin legations; and the parallel is not altogether hopeful. A polyglot army must of necessity be to some extent a disorganized army, and while the forces of the dual monarchy use German as the language of military command, the rank and file and the bulk of the officers retain their own speech for general purposes. The heterogeneous character of its composition has had a steadying influence on the internal struggles of the dual monarchy, however much it may hamper its efficiency on the battlefield. The army has kept itself largely aloof from politics, and though the Czechs did once attempt to transfer the racial bitterness to the parade ground by answering the roll-call in their own tongue, a sharp rebuke from the emperor was enough to bring them to reason.

A second and equally powerful bond of union is the monarchy. Not only is it accepted everywhere, but the idea of upsetting it in favor of any other form of government has never yet been broached. Even the Kossuth irreconcilables, who would like to see the *Ausgleich* abolished and Hungary direct her own fiscal policy,—a quite possible development,—and manage her own foreign affairs, still do

not propose to sever the personal tie that binds the two countries. And not only is the monarchy secure in the affections of the people, but the dynasty is equally popular. So long as there is a throne it is not conceivable that any one but a Hapsburg should occupy it. This two-fold devotion to monarchy and to the dynasty has been greatly strengthened of late years, partly by the breakdown of parliamentary government and the weariness which has made the people look to the throne as an escape from the turmoil and wranglings of small groups, and partly through the patience and wisdom, the sterling fair-mindedness and competency of the present emperor, as well as the ghastly tragedies of his private life. But it is a curious delusion to argue that just because Francis Joseph is so adequate and well beloved, and comes so near to the ideal of what a constitutional monarch should be, therefore the empire must go to pieces when his moderating and persuasive influence is withdrawn. Such a reign as his is far more than a merely personal triumph; it is the consecration of a system; it exalts the monarchy as well as the monarch, and it smooths out the path for his successors by bequeathing to them an office made more illustrious by his example and memory, more powerful and more deeply based in the hearts of the people. So far from being a signal for dismemberment, the close of the present emperor's reign is more likely to witness a splendid rally round the house and throne of the Hapsburgs. The general peace of Europe would indeed be jeopardized in the event of a scramble for the fragments of the dual monarchy. But no such catastrophe is likely, for the reason that it is to no one's interest to bring it about. It is not for secession from, but for the fullest liberty within, the empire that "the numerous nationalities involved" are struggling. The only genuine secessionists are Herren Wolf and Schönerer and their followers, who wish to incorporate German-speaking Austria with the German empire. It is possible that their wishes may ultimately be gratified, but not in our time, not till after the next European war, if even then, and not till the clericalism of Austrian Germans has considerably toned down. What the Czechs and the other races want, is the same independence as the Magyars possess, and such independence is as inconsistent with Russian as with German domination. It is against their interests to break away from the Hapsburgs. The day of small states has gone by, and a lonely Czech kingdom could not exist for a year by the side of Russia.

Army.— Military service is obligatory on all citizens capable of bearing arms who have attained the age of 20, and lasts up to the age of 42, either in the active army, in the landwehr, or the landsturm. The period of service in the active army is 12 years, of which three are passed in the line, seven in the reserve, and two in the landwehr. In 1900 the standing army numbered 361,693 men (including officers) on the peace footing, and 1,826,940 men and 45,238 officers on the war footing.

Navy.— On account of the recent development of the Italian navy, Austria has found it necessary for her self-defense to have a fleet of her own, and the last ship of a new squadron was launched in 1904. The new ships are remarkable for their armament and speed, and will compare favorably with any equal number and size of ship in the world. Leaving out the ships constructed prior to 1887, the new fleet is composed of two battleships, the Erzherzog Friedrich and the Erzherzog Karl, of 10,600 and 10,100 tons respectively, and 19.25 knots speed. Each will carry four 9.45-inch Skoda guns of 40 calibres and twelve 7.48-inch of 42 calibres. The first will have in addition fourteen 2.75-inch and the other 2 of the same calibre, each being furnished with a full complement of small bore quickfirers. The 7.48-inch guns will fire four rounds a minute.

The next division is composed of three ships of 8,300 tons each, named the Habsburg, Babenberg and Arpad. Their speed is 18.5 knots, and the armaments three 9.4-inch and twelve 6-inch guns each, besides the usual complement of small calibre quickfirers.

Then comes a division of three coast defence ships, the Monarch, Wien and Budapest, of 5,600 tons each and 17 knots speed. Their armament of four 9.4-inch and six 5.9-inch each, with fourteen smaller calibre quickfirers, is extremely formidable for their size, and it is well disposed and protected, entitling them to be reckoned as battleships.

The cruisers of the Austro-Hungarian navy are, in order of size, the Kaiser Karl VI., of 6,250 tons; the Maria Theresa, of 5,370; and the Kaiser Franz Joseph I. and Kaiserin Elizabeth, of 4,060 tons each. Each carries two 9.4-inch guns; the first two eight 6-inch quickfirers; and the last two six 6-inch quickfirers each, with numerous small calibre pieces. Their speed is between 19 and 20 knots, and they hold a place between armored and protected cruisers.

Two ships classed as battleships, launched in 1887, the Erzherzog Rudolf of 6,900 tons and the Erzherzogin Stefanie, of 5,100 tons, may be added to the effective squadron and would raise it to fourteen vessels. Their armament is sufficiently powerful, consisting of three and two 12-inch, six 4.7-inch and six 6-inch guns respectively, with two 2.75-inch pieces each. Their speed is 16 knots.

There are three small cruisers of 2,300 tons each, the Zenta, Jaguar and Aspern; and three torpedo cruisers, of 1,600 to 1,700 tons each, the Panther, Leopard and Tiger. The seven torpedo boat destroyers, range from 310 to 610 tons, of 21 knots speed, and there is a small torpedo boat flotilla, which is being increased. Experiments are also in progress with submarines.

The personnel of the Austro-Hungarian navy is excellent, and should the squadron it can turn out ever be called on to act alone or as part of the naval force of an alliance, it can be relied on to give a good account of itself.

Judiciary.— The courts of first instance comprise 940 *Bezirksgerichte,* county courts, and 71 *Landes und Kreisgerichte,* provincial and district courts; *Geschworenengerichte,* or jury courts being connected with the latter. These courts act as courts of inquiry and have summary jurisdiction. The courts of second instance, or courts of appeal from the lower courts, having the supervision of the criminal courts, comprise 9 *Oberlandesgerichte* or higher provincial courts. There are also special tribunals for military, revenue, shipping, and other matters, including four industrial courts and three commercial courts. The *Oberste Gerichts und Kassationshof,* Supreme Court of Justice and Court of

Cassation, at Vienna, is the final court of appeal. The High Court of Administrative Affairs decides differences between private individuals and public officials, and the Reichsgericht, or Court of the Empire, the conflicts of law and jurisdiction between different authorities.

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Austrian Succession. See SUCCESSION WARS.

Au'thors, British Society of, an association of authors formed in London in 1883, for social and business purposes. It has a governing committee of 30 members; maintains an attractive club-room and publishes a periodical called 'The Author.' The late Lord Tennyson was its president till his death.

Au'thors Club, an American organization founded in New York in 1882, and incorporated in 1887. It is governed by an executive committee without a president. Any person who is the author of a published book proper to literature, or of creditable literary work equivalent to such a book, is eligible to membership. The club holds meetings semi-monthly, and gives Saturday receptions for ladies in the winter season. It has a library consisting of the publications of its members and another devoted to literary biography.

Au'thors, French Society of, an organization founded in Paris in 1837, for the protection of authors in their rights, and open to any man of letters. It is governed by an elective committee of 24 members, and has a pension fund which provides for aid in work, for sickness and in old age. Besides publishing a journal, the 'Chronique,' the society has collected a large sum of money from pirating publishers.

Au'thors, American, Society of, an organization founded in New York in 1892, and incorporated in 1895, having for its objects the promotion of a professional spirit among authors and a better understanding between authors and their publishers, and, in general, the protection of literary property and the advancement of the interests of American authors and literature. All persons engaged in literary pursuits are eligible to membership. The society has a pension fund for members who may become needy.

Auto de fe, ow'tō dā fā (Spanish); **Auto da Fe** (Portuguese), lit. "act of faith." See INQUISITION.

Auto-intoxication, a poisoning of the body by its own products. In the complicated processes that make up the sum total of human metabolism many products are formed which if not modified in some manner would poison and kill the body. The simplest illustration of this is seen in the function of respiration, in which the carbon dioxid in the venous blood is oxidized in the lungs and thus eliminated. The urine contains a number of bodies which if prevented from leaving the body would cause its death. Thus auto-intoxication may result from the normal products elaborated in the body if these are not modified, or are prevented an outlet. But the problem of auto-intoxication is much more complicated in many of its manifestations. Sick-headache, gout, diabetes, many neuralgias, Addison's disease, myxedema, acromegaly and many other obscure diseased conditions are known to be due to some form of perversion of the normal processes of metabolism and are instanced as forms of auto-intoxication. The general organs of defense in the constant play of these factors may be divided into two general groups, (1) those that have the function of transforming by chemical means many of the poisonous products of the normal metabolism of the body, and (2) those organs that are chiefly concerned in the elimination of these products. To the first group belong the liver, the mucous membranes, the thyroid, lymphnodes, the adrenal glands, the blood cells, the blood serum and the lymph. In the second group are the kidneys, the lungs, the skin, and the intestines.

Classification.— Auto-intoxication may result (1) from the failure of functions of certain organs having a definite chemical function. Pancreatic diabetes, bronze diabetes, pernicious anæmia, myxedema, acromegaly, cachexia, strumipriva, Addison's disease, these all come in this class; (2) by a faulty metabolism whereby normal amounts of waste products are not thrown off. Gout, diabetes, oxaluria, are examples of this type; (3) through retention of the normal physiological products in the organs themselves. Carbon dioxid poisoning is a type; (4) by means of excessive production of physiological or pathological products. Diabetic coma, cystinuria, acetonuria, uremia are types of this form. Such a classification is necessarily very inadequate and will be found to be of service only as a general framework on which a more exact systematization of knowledge may take place. Consult: Herter, 'Chemical Pathology' (1902); Vaughan and Novy, 'Cellulartoxins' (1902). See ANIMAL ALKALOIDS; METABOLISM; PTOMAINE; TOXICOLOGY.

Au'to Sugges'tion. See HYPNOTISM.

Au'tocrat of the Breakfast Table, The, a noted work by Oliver Wendell Holmes, consisting of imaginary conversations around a boarding-house table. The characters are introduced to the reader as the Autocrat, the Schoolmistress, the Old Gentleman Opposite, the Young Man Called John, The Landlady, the Landlady's Daughter, the Poor Relation, and the Divinity Student. It is the most popular of Dr. Holmes' books; and in none of them are his ease of style, his wit, his humor, his kindly sympathy and love of humanity, more clearly shown.

Automatic Telephony. See TELEPHONY, AUTOMATIC.

Autom'atism, in animals the power of movement or of action without any stimulus independent of that arising in the protoplasm of cells and tissues. Thus Descartes regarded animals (other than man) as "automata," and declared that they act independently of any volition, or instinctive or intellectual power or faculty; in other words, that their so-called mental acts are involuntary and mechanical — that they

may be compared to machines. In physiology while automatism is apparently the result of the internal conditions of the living body, yet strictly speaking, says Loeb, no animal movements are exclusively determined by internal conditions. The co-ordinated character of automatic movements, he says, has often been explained by a "centre of co-ordination," which is supposed to keep a kind of police watch on the different elements and see that they move in the right order. "But," he adds, "observations on the lower animals show that the co-ordination of automatic movements is caused by the fact that the element which beats most quickly forces the others to beat in its own rhythm." The swarm-spores of algæ, which possess no ganglion cells, show spontaneity equal to that of animals having ganglion-cells, and he concludes that automatism is due to a chemical cause; that is, the pressure or absence of certain ions, or, in other words, to the chemical constitution of the protoplasm. Consult Loeb, 'Physiology of the Brain' (1901).

Autom'aton, a mechanical contrivance whose actions are arranged to correspond to those of a human being. Friar Bacon had the reputation of having constructed a brazen head which spoke, and Regiomontanus an iron fly, which, after making the tour of the room, returned to its master. Albertus Magnus is said to have spent 30 years in constructing a human figure which advanced to the door when anyone knocked, opened it, and saluted the visitor. In the water-clock presented to Charlemagne by Harun al-Rashid, 12 doors in the dial opened respectively at the hour which they represented; they continued open till noon, when 12 knights issued out on horseback, paraded round the dial, and then returning shut themselves in again. Camus constructed an ingenious toy for Louis XIV., consisting of a carriage drawn by two horses, containing a little figure of a lady with a coachman and attendants. The coachman cracked his whip, the horses moved their legs naturally, and when the carriage arrived opposite the king's seat it stopped; the page stepped down and opened the door; the lady alighted and presented a petition to Louis. The flute-players, the tambour-player, and the wonderful duck of Vaucanson are celebrated for the astonishing ingenuity displayed in their construction. Among the most remarkable automata are the whist-playing and other figures designed by Maskelyne.

Automobile. The word denotes primarily: A vehicle designed mainly for transportation of persons on highways or over unprepared ground, equipped with an internal combustion, hydrocarbon-vapor engine, which furnishes the motive power and forms a structural portion of the vehicle. Secondarily, it is used as synonymous with "motor vehicle," denoting a vehicle moved by inanimate power of any description, generated or stored within it, and intended for the transportation of either goods or persons on common highways. As an adjective the word denotes broadly some relation to mechanically-driven vehicles. Even certain railway cars used on short feeder lines in France, Austria, Germany and Italy are known as "automobile railway cars" because they are driven by means of engines of types first used in motor vehicles, and, having passenger or freight space, also form independent, self-contained transportation units.

The automobile, in the more distinctive primary sense of the word, consists of:

(1) Fuel tank; (2) Carburetter; (3) Engine, with 3a, the Mechanism of the Cooling System, and 3b, the Ignition System; (4) Clutch Mechanism; (5) Power Transmission Mechanism, with 5a, Change-Gear Mechanism, and 5b Differential Gear; (6) Vehicle Frame and Springs; (7) Running Gear; (8) Brake Mechanism; (9) Steering Mechanism; (10) Carriage Work; (11) Lubrication System, and (12) Operating System, including the devices by which the operation of the vehicle is brought under control of hand or foot motions of the driver. These various portions of the automobile form an organic whole, being more or less interdependent, and sharp lines distinguishing one portion from another cannot always be drawn. The classification serves convenience in description, however.

1. *Fuel Tank.*—The source of the power developed by the automobile motor is a liquid hydrocarbon fuel (see HYDROCARBONS), which may be benzine, benzol, gasolene, naphtha, kerosene, crude oil, alcohol (pure or mixed with other hydrocarbons, or water), a solid hydrocarbon, such as naphthaline, that can be liquefied at a low temperature (79° C.), or calcium carbide (see ACETYLENE), throwing off hydrocarbon gas (acetylene) when moistened. In order to be utilized, the liquid fuel must be transformed into vapor, the vapor mixed with oxygen or atmospheric air, and the mixture ignited. Aside from the process of generating an unstable gas by vaporizing the fuel, the principle of the automobile motor is identical with that of the gas engine operated with illuminating gas (see GAS ENGINE).

The fuel tank is usually made of sheet copper and is provided with internal bulkheads to obviate swashing of the liquid. It should have as few seams as practicable, the solder should contain no ingredient soluble in the liquid the tank is intended to contain, and it should be mounted on a rigid foundation to obviate torsion, from which leakage might result. In most gasolene tanks a small air vent in the screw cap by which the charging aperture is closed permits the liquid to be drawn off gradually by gravity through a pipe leading to the carburetter. But the same air vent, if left open, causes loss of fuel by evaporation. By a more modern arrangement a small quantity of exhaust gas is piped into the tank at each exhaust stroke, supplying sufficient pressure to feed the fuel, even if the tank is below the level of the carburetter.

2. *Carburetter.*—Early carburetters were spacious and situated at some distance from the motor, connected by a pipe often 12 to 18 inches long and containing a diaphragm of wire gauze to prevent a flame from accidentally striking back to the vapor and liquid contained in the carburetter. Air was let into the latter from the atmosphere and brought in contact with a considerable area of the liquid (then always benzine, gasolene or naphtha), from which vapor was absorbed either by simple surface evaporation, or by forcing the air through the liquid, or by passing the air at high velocity through a narrow channel containing a wick saturated with the liquid. In all cases the suc-

tion stroke of the motor piston caused the air current.

The composition of the mixture drawn into the cylinder, to be fired, was regulated by an additional air channel leading direct from the atmosphere to the induction pipe. In warm and dry weather the duct leading through the carburetter was contracted and the direct air admission opening was enlarged, while in cold and damp weather this adjustment was reversed. The object was to obtain an explosive charge of unvarying quantity and composition for a motor intended for constant speed and power development, all necessary changes in vehicle speed being effected through the power-transmission gearing. In raw weather ice (from atmospheric moisture precipitated on the metal cooled by the evaporation of the fuel)

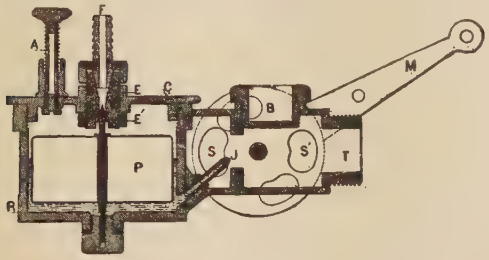

FIG. 1.— SIMPLE MODERN CARBURETTER, WITH AUTOMATIC ADJUSTMENT ACCORDING TO THROTTLE OPENING.

A, Floating plunger. B, Inspection screw to T. C, Cap carrying float feed adjustment. EE', Lock nut to V. F, Gasoline admission pipe. J, Gasoline nozzle. M, Regulating lever having disks formed with two openings to accord with S and S', in wall of mixing chamber. P, Float. R, Float chamber. SS, Air inlets. T, Induction pipe, to engine.

was frequently formed in the carburetter and induction pipe, clogging them. By degrees the method of heating the air, by passing it around the exhaust pipe, was learned, and all pipes were shortened. Still, starting a "cold" motor was an uncertain operation, often requiring preliminary heating of the metal, as it still does (1904) when the heavier oils are used as fuel.

The evolution of the modern carburetter was brought about by the necessity of regulating the force of explosions by a throttling system, to relieve the operator of frequent mechanical gear changes. The steps in this evolution were many and irregular, the most important one consisting in the employment of a nozzle from which the liquid fuel is drawn off in a spray by air suction, to take the place of surface evaporation. Thus the quantity of fuel introduced in each explosive charge is regulated by a mechanical factor which is under control, namely, the air current created by the suction stroke, and not materially affected by temperature and atmospheric conditions. This system requires a modification, however, because an air current will suck liquid gasolene from a nozzle placed in its path in proportion to the square of the velocity of the current (approximately), while the power developed is in simple proportion to the velocity of the piston. An automatic device is therefore required for reducing the air current which draws the spray of fuel, while increasing the current of atmospheric air when the motor speed is being raised, and *vice versa*. The difference in devices serving this purpose constitutes the main difference in carburetters.

3. *Engine.*—In adapting the gas engine to the automobile the first requirement, after devising the carburetter, was the reduction of weight and bulk. The heavy foundation and heavy fly-wheel were undesirable. A small cylinder with a piston working at high speed was preferable to a larger cylinder working with low compression and small piston speed. When weight was cut down and compression of the explosive charge was increased, it was found that the rapid succession of explosions shook the engine and vehicle in a manner destructive to the mechanism and disagreeable to the occupants of the vehicle. By lightening reciprocating parts of the engine, distributing the weight of rotary parts equably with relation to the axis of revolution, by building engines with two, three or four cylinders instead of one, and balancing the explosions in one cylinder against those in an opposed cylinder, but most of all by learning to graduate the volume of the explosive charges according to the requirements for power, excessive shaking and vibration were in course of years considerably reduced.

Equally good results have been obtained with cylinders lying horizontally and standing vertically, the former being more readily "balanced," the latter more easily inspected and repaired. Automobile motor cylinders are made of cast iron, seldom of steel. The pistons are of the trunk pattern, fitting loosely in the cylinders. Circumferential grooves in the pistons contain split iron rings (usually two or three at the upper and one at the lower end) sufficiently elastic to expand snugly against the cylinder wall. The high temperature produced in the cylinders by the successive explosions of

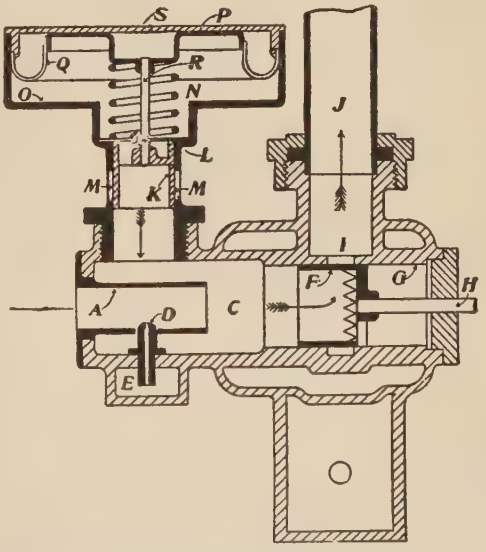

FIG. 2.— COMPLICATED MODERN CARBURETTER, WITH AUTOMATIC ADJUSTMENT ACCORDING TO THROTTLE OPENING AND PISTON SPEED.

I, inlet to induction pipe J to cylinder. F, throttle piston (to uncover aperture I more or less) actuated by rod H to governor. D, gasoline spray nozzle communicating through E with gasoline float chamber (not shown). A, air inlet. M, additional air ports more or less uncovered by piston K, held in normal position by spring N and diaphragm P, rigid, and Q, flexible S, pinhole vent, moderating action of spring N.

charges compressed 75 to 100 pounds per square inch before ignition preclude the use of packed fits.

Throttling of the explosive charge is accomplished by obstructing the induction pipe between the inlet valve and the carburetter nozzle by means of a butterfly valve, or in any other suitable manner. Excessive speed of the motor under light load or when running idle is obviated by a centrifugal governor acting usually upon the throttle valve, but in some instances upon the exhaust valve. In small motors the inlet valve is usually automatic, opened by the suction in the cylinder against the resistance of a helical spring as in a gas engine; in large motors the inlet valve is frequently actuated from the cam shaft, as is the exhaust valve when opening, and with this construction throttling of the motor is sometimes effected by shutting the inlet valve before the suction stroke is completed.

In four-cylinder motors reduction of the power development was until 1902 commonly effected, when required, by preventing ignition in one or two of the cylinders, and also by shutting the exhaust valve before the exhaust stroke was completed, thereby setting up internal resistance and also reducing the volume of the next explosive charge, while changing its composition by mixing it with the remaining exhaust gases. These methods are now (1904) almost abandoned. The earliest means of reducing the effective power of the motor consisted in retarding the ignition, so that the combustion would not be finished when the exhaust valve was opened. This method is still generally used, but only as an auxiliary to the throttling of the explosive charge.

Mufflers.—When the burnt gases are exhausted from the cylinder they are still of high temperature and of high tension and their escape into the atmosphere is therefore accompanied by a report-like noise. To subdue this noise a muffler is employed, consisting of an expansion box through which the gases must pass and in which the current of the gas is partially obstructed and subdivided. One of the most efficient mufflers consists simply in a box filled with parallel plates turned edgewise against the current of gas.

3a. *The Ignition System.*—When the mixture of gasolene spray and air (usually heated by contact with the exhaust pipe) reaches the inlet valve of each cylinder, the fuel is partially or wholly vaporized and absorbed in the air current. Entering the cylinder, some recondensation takes place if the cylinder walls and piston are cold (as at the start), but the next piston stroke compresses the charge to a small volume (usually ¼ to ⅓ of the whole cylinder volume), and thereby heats its and prepares it for ignition. The means employed for igniting the charge consisted at first altogether, and still occasionally, in a kerosene lamp (later pattern: an alcohol vapor lamp) over the flame of which (later: *in* the flame) a platinum tube was screwed into the upper end, or combustion chamber, of the cylinder. The outer end of the tube was closed and brought to red heat or incandescence by the flame.

By the compression stroke a small portion of the charge was forced into the tube and fired back into the cylinder when it reached the hot portion of the tube. The ignition took place at the highest compression or slightly earlier or later, varying according to the piston speed,

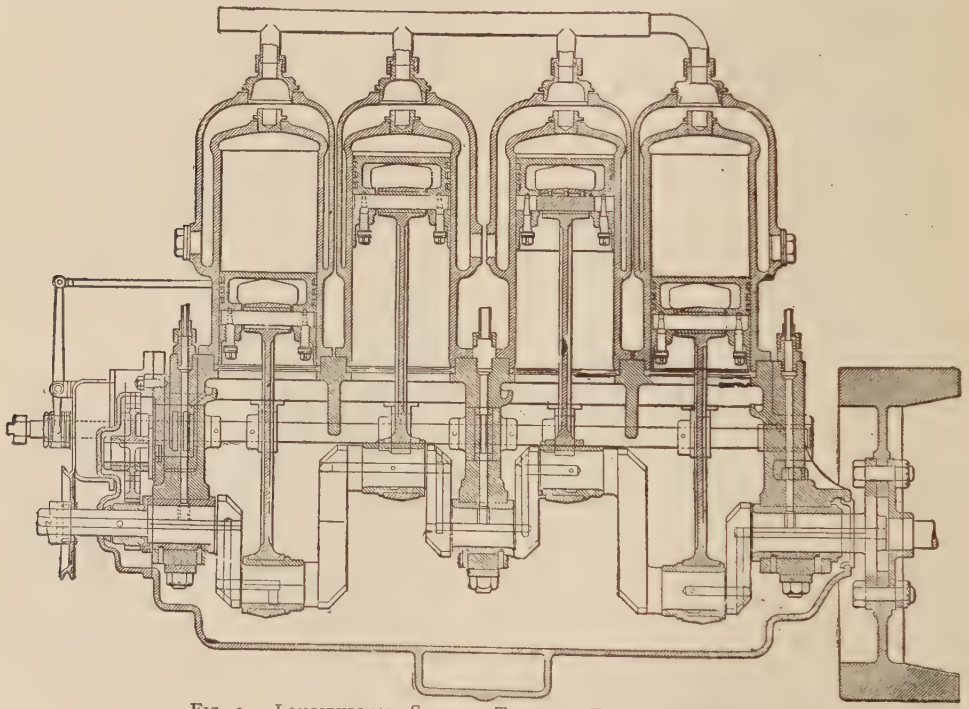

Fig. 3.— Longitudinal Section Through Four-Cylinder Motor and Flywheel Clutch.

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but the variation was insufficient to give the highest power at the highest piston speed and yet not too early for low speed, because the whole charge should be aflame and expanding with maximum force shortly after the power stroke has begun and, when the piston moves with high velocity, this cannot be accomplished unless the ignition begins long before the compression is at its maximum, the time required for spreading the flame being almost constant for a vapor mixture of given composition.

The method was also unadapted for a motor in which the new throttling system introduced

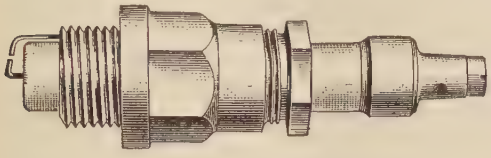


Fig. 4.— Jump Spark Plug.

variations in compression, and the open flame of the lamp was a source of danger in case of gasolene leaks or road accidents. So, when the throttled fuel admission came in vogue, «hot tube» ignition, despite its reliability, was gradually abandoned in favor of the electric spark, produced internally in the cylinder head by (1) a dry battery; (2) an induction coil (see INDUCTION), causing a high-tension current; (3) an interrupter or «trembler,» and (4) a switch turning the current off and on at the proper time, operated from the same camshaft from which the exhaust valve is opened. A «spark plug» contains the two terminal wires, insulated by porcelain, lava or pressed mica within a hollow metal screw plug, and is screwed into the cylinder head. The terminals are about 1-16 inch part, and this is the length of the «jump

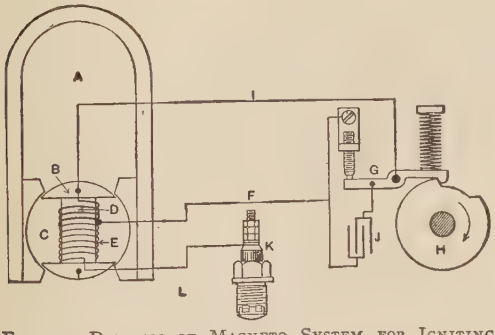


FIG. 5.— DIAGRAM OF MAGNETO SYSTEM FOR IGNITING EXPLOSIVE VAPOR MIXTURE BY PRIMARY CURRENT JUMP SPARK.

A, permanent field magnets; B, armature of H-section; C, armature coil wound in two sections, D and E, connected in series; F, wire to one terminal of circuit breaker G, worked by cam H; I, grounding wire from other terminal of G to metal of armature and thence on to metal work of motor and vehicle; J, condenser in parallel with G; K, spark plug, wired from E's outer terminal.

spark.» The metal mass of the vehicle frame serves to «ground» the current. The wiring throughout is insulated. Instead of a jump spark a «hammer spark» or a «wipe spark» may be used.

The main drawback to this arrangement arises from the fact that the life and potentiality of dry batteries vary greatly, so that they often fail unexpectedly. Storage batteries are used in their place in many European automobiles, but these, too, eventually give out and must be recharged. A dynamo, however, driven by the vapor engine, furnishes a current for ignition so long as the mechanism remains in order, rendering the ignition an automatic function. While the other methods remain in extensive use, the dynamo driven by belt or gear from the motor shaft, is fitted to most high-powered automobiles, especially in the form known as the magneto.

In the further development it became customary to use both the magneto, either high tension or low tension, and a storage battery, the latter being required for starting the engine from the seat by turning on the electric spark in that one of the cylinders in which an ignitable charge remained after the last stop.

3b. *The Cooling System.*— Part of the heat generated by the explosions is transformed into the work of driving the piston, but a large portion is absorbed as heat in the piston, cylinder walls, valves, etc. These, unless artificially cooled, become so hot as to ignite the lubricating oil, and also the next explosive charge before the piston is in position to receive a new impulse. Such premature ignition drives the piston back in the direction opposite that de-

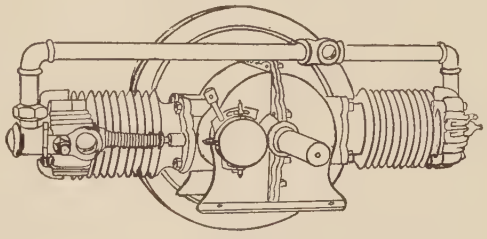


Fig. 6.— Horizontal, Two-Cylinder, Air-Cooled Automobile Engine.

sired and stops the motor. The burning of lubricating oil also leaves a deposit on walls and valves which soon interferes with piston travel, valve action and spark ignition. The means adopted to keep the motor sufficiently cool are in brief as follows:

Small cylinders (up to 2 horse-power) may be ribbed externally, thereby increasing the metal surface, from which heat is lost by radiation and contact with the atomsphere. Rapid motion, constantly bringing fresh cool air to the heated metal, is essential to render this system efficacious. When the motor works at full charges while the vehicle is at rest or moving slowly, renewal of the air must be effected by a blow fan or equivalent means. A few automobiles are operated with air-cooled motors; some of them are now equipped with a fan, but until recently the motors were usually shut down when the cars were at rest, and the vehicles are not adapted for heavy, slow

work. The smaller each cylinder, the more acceptable the air-cooling method, because a small cylinder has more radiation surface in proportion to the volume of vapor burned than a large cylinder.

Ordinarily the automobile cylinder is kept at the proper temperature by means of a "water jacket" surrounding cylinder and valve chamber, a water circulating pump (driven from the motor shaft) and a "radiator" consisting of a nest of coiled tubes. The latter are strung with metal fins, soldered on, to increase the radiation area. A water tank is connected with this system. The order of circulation is from water jacket to radiator, thence to the tank through pump and back to the water jacket. The pump is usually of the centrifugal class, sometimes "rotary" (see PUMPS), and in a few automobiles is omitted, circulation in that case depending solely upon the difference in temperature between the water in the jacket and that in the radiator, the latter being unusually large.

By increasing the dimensions of the pump, to produce more rapid circulation, and reducing the diameter of radiating tubes while increasing their total radiation surface, the amount of water to be carried and the capacity of the tank, have been gradually diminished. With the so-called "honeycomb" coolers the water tank is almost dispensed with, consisting of only two small compartments framing a network of flattened tubes erected in front of the motor, through which air is drawn rapidly by means of an exhaust fan, usually forming the spokes of the engine fly-wheel. The air current in this case is defined within a closed motor hood. In other cases the hood is provided with slits. In the winter when water might freeze and burst water jacket, cylinder or radiator, calcium chloride or glycerine is admixed to lower the freezing point, or a special oil distilled from crude petroleum is used instead of water.

The water jackets were up to 1903 commonly cast integrally with the cylinders, cylinder heads and valve chambers, but the difficult cored castings were often faulty, especially when only cylinder heads and valve chambers were jacketed. More recently sheet copper has been secured to flanges on the cylinders, etc., so as to form a jacket between the copper and the plain cylinder casting, and weight reduction as well as some elasticity (affording security against accidental freezing of the water) have been gained thereby, while the quality of castings has been improved.

With reference to sheet copper jackets, it is now noted, however, that difficulties were experienced in securing the joints against eventual leakage and in 1906 only three or four firms continued to employ this method, while the art of producing sound castings of complicated design and with integral jackets and cylinder heads had advanced greatly.

4. *Clutch Mechanism.*— A vapor engine, like the gas engine, must be started by hand power, or auxiliary power of some kind, as no power is stored in it while at rest. It cannot be started, therefore, under load without an inconvenient effort, and every automobile vapor engine (excluding those used on motor bicycles and motor boats) is arranged to be started running idle to be subsequently connected with its load by a clutch. Often there is a separate clutch for each rate of gear reduction. In earlier automobiles this was the rule, while now (1904) it is the exception. All the various forms of clutches used in other branches of mechanical engineering have been tried on automobiles, all being more or less perfectly adapted to the requirements: That they shall grip a motor shaft revolving at high velocity without sudden seizure; that they shall be automatically self-adjusting to wear within a considerable range and further adjustable by a screw or other convenient means; that the clutch surface shall be large enough and smooth enough to obviate injurious heating when slipping, and that the release shall be positive, without requiring much physical effort.

The clutch most commonly used in those automobiles having the motor shaft disposed longitudinally of the vehicle, consists of a male truncated cone (angle 10 to 12 degrees), engaging a corresponding female cone formed in or attached to the rim of the motor flywheel. The male cone is leather faced, and is secured, slidingly, to the transmission gear shaft, a strong helical spring pressing it forward (or, in later construction, drawing it back) into the female cone. To secure concentricity of the two cones the transmission gear shaft is usually journaled in the end of the motor shaft (carrying the flywheel) by a ball bearing, and end thrust at this point is obviated in modern design. The engagement of the clutch is effected by a clutch lever which releases the spring, permitting the cones to come together. The same action usually releases one set of brakes, which is intended to be used only when the motor is disengaged from the driving gear. After disengaging the clutch it requires a further movement of this lever to set these brakes.

During 1905 and 1906 the cone clutch yielded its popularity for high-class automobiles to the internal expansion clutch, which consists of two segments expanded by toggle levers or similar means against the inside of a drum formed upon the flywheel, and to the multiple-disk clutch, consisting of many small disks secured to the clutch shaft, alternating with an equal number of annular disks secured in the flywheel; both series of disks being keyed against rotation but free to slide.

5. *Power Transmission Mechanism.*— In starting a heavy car from a standstill by clutching a rapidly revolving motor shaft, there would be danger of breaking the connections between the clutch and the rear wheels (which are the driving wheels in nearly all automobiles, so far), or of stopping the motor by the resistance, unless the latter were reduced by gearing permitting the vehicle to move slowly while the motor shaft revolves at high velocity. As motor power is proportional to motor speed, under a given load, the necessity for at least one gear reduction between motor shaft and driving wheels remains, even with modern motors capable of being throttled to low speed, the power of the higher speed being frequently required for overcoming the inertia of the vehicle — on hills, for example.

As a matter of fact, most heavy automobiles have three geared driving connections and one

GASOLINE TOURING CARS.

direct connection for going ahead, and one geared connection for driving backward, while lighter vehicles have one gear reduction for going ahead and one for reverse, besides the direct drive ahead. In all cases the motor speed alone determines the power available at the moment, and the motor speed in conjunction with the driving gear employed determines the vehicle speed. The art of driving an automobile consists largely in using the smallest gear reduction (the «highest gear») and the smallest motor speed that, combined, will produce the desired vehicle speed. Before motors could be throttled to give a wide range of power development, the art of driving consisted largely in the manipulation of the levers by which the gear reduction was changed. The development has been from gear control of the vehicle to throttle control of the motor; under both methods the brakes are freely used as an auxiliary, especially in congested traffic.

Hundreds of transmission systems have been, and are, in use, and are described in textbooks on the subject. The mechanical elements of which they are composed are mainly those well known in machine tool practice: the belt, spur wheel, bevel gear and shaft, the countershaft, sprocket wheel and chain. From 1886 to 1902 belts were employed to transmit power from a transverse motor shaft to a parallel countershaft in automobiles evolved from the model first designed and built by Karl Benz, of Mannheim, Germany, in 1886. By a series of stepped pulleys, any pair of which could be clutched and keyed to the shafts, respectively, this belt system served also as engagement clutch and change-gear device. In commercial competition with toothed-gear transmission, patterned after the vehicle designed by Gottlieb Daimler, of Cannstatt, Germany, also in 1886, the belt system gradually lost favor, probably more by reason of the energy and ingenuity applied to the general improvement of vehicles equipped with tooth-gear transmission and change-gear devices, than owing to any intrinsic superiority of the gear drive. For the present (1904) belt transmission is practically abandoned. A surviving adaptation of the principle is the «expansion pulley» belt transmission system, which also takes the place of all change-gear mechanism. Only one belt is used, which has broad chamfered edges and transverse reinforcing strips sufficiently rigid to permit the belt to ride mainly on the edges over V-pulleys of changeable diameter. When the driving pulley is expanded the driven pulley is correspondingly contracted. The gear ratio may in this manner be altered by insensible graduations. See Pulley.

Fig. 9 shows one pattern of power transmission in a vehicle with a transverse motor shaft. Fig. 10 shows the system of bevel-gear transmission, through change-gear mechanism, to a differential gear on a countershaft and sprocket-and-chain transmission from the ends of the latter to the rear wheels, the rear axle being fixed. Fig. 11 shows the system of bevel-gear transmission, through change-gear, to a differential gear on a divided rear axle which revolves and turns the wheels keyed to it. In modern construction of this type the rear driving axle is relieved of the support of all weight, being contained within a tubular supporting axle, brazed or bolted to the differential gear casing, on the ends of which the wheels are mounted by ball or rolling bearings, while the driving-axle-ends are keyed to the external faces of the wheel hubs.

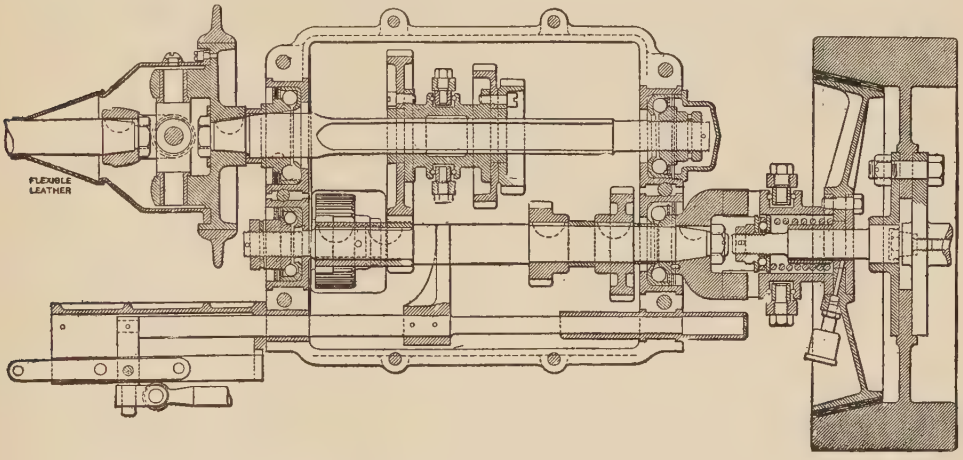


Fig. 8.— Cone Clutch (to the right), Sliding Gear Mechanism and Universal Joint (to the left) to Bevel-gear Shaft.

5a. *Change-Gear Mechanism.*— The primitive change-gear included a clutch or key for each gear ratio. With numerous variations, the general principle is as follows: To the transverse motor shaft, prolonged beyond the flywheel, are rigidly secured spur wheels of varying diameter. On a parallel countershaft are mounted other spur-wheels meshing pairwise with those on the motor shaft, but free to rotate around their own shaft, instead of with it, unless clutched. To a small spur wheel on the motor shaft corresponds a large one on the countershaft, and this combination produces, of course, the low countershaft speed which can be still further reduced by transmitting the motion from a small sprocket wheel at the end of the countershaft to a larger one on the rear wheel of the vehicle.

Suppose the speed is divided by five from motor to countershaft and further divided by three by the sprocket chain ratio, the total reduction is then from 15 to 1; the wheel revolves once for fifteen revolutions of the motor shaft. The vehicle speed will further depend upon the diameter of the rear wheels. If this is about 34 inches, making the circumference about 9 feet, and the motor shaft revolves 900 times per minute or 15 times per second, the rear wheels, revolving once per second, will advance the vehicle 9 feet per second or 540 feet per minute. In ten minutes the car will have traveled 5,400 feet, or somewhat more than a mile, corresponding to between 6 and 7 miles per hour. By throttling the vapor admission the motor speed may be reduced to 200 revolutions per minute, reducing the vehicle speed to 1⅔ miles per hour. In early automobiles, where throttling was not so effective, the brake served to reduce the motor speed by increasing the resistance.

While one pair of spur wheels drives, the several other pairs are, with this system, in mesh, but revolve idly. This accounted largely for the metallic noise of the earlier models. One of the pairs of spur wheels was not strictly in mesh but a small intermediate pinion on a rock shaft transmitted the motion to the spur wheel on the countershaft, thereby reversing its direction and causing the vehicle to be driven backwards when the clutch was applied to this purpose. Clutch levers and change-gear levers were identical, and were so interlocked that only one clutch could be set at one time. Modern developments of this system are much simplified, mainly by the employment of epicyclic gears.

The change-gear system which was developed when the engine was placed in the front portion of the vehicle with the motor shaft in the plane of the lengthwise axis, was designed to reduce noise, wear and waste of power, by having only one pair of spur wheels in mesh at one time. It is known as the clash-gear or sliding-gear system (see Fig. 8). The shaft carrying the cone clutch has a universal joint coupling it to a shaft in prolongation of it, the latter carrying spur wheels of different diameter rigidly secured. It is journaled in an oil-tight casing hung in the vehicle frame. Lower in the same casing is journaled a parallel squared shaft carrying a slidable sleeve with rigidly secured spur wheels so disposed that, in one position of the sleeve, none of these spur wheels is in mesh with any of those in the fixed, upper shaft. But when a fulcrumed fork, acting against a flange of the sleeve causes the latter to slide a short distance, one pair of gears, say, the lowest gear, are engaged. A further motion in the same or the opposite direction, releases the low gear and engages the second gear. A still further motion releases the second and engages the third; and in the same manner the fourth and the reverse are engaged and released. A small pinion on a special rock shaft produces the reverse, as in the older system. The edges of the spur teeth are rounded to facilitate meshing, and the cone clutch is automatically released while a change of gear is made; yet it

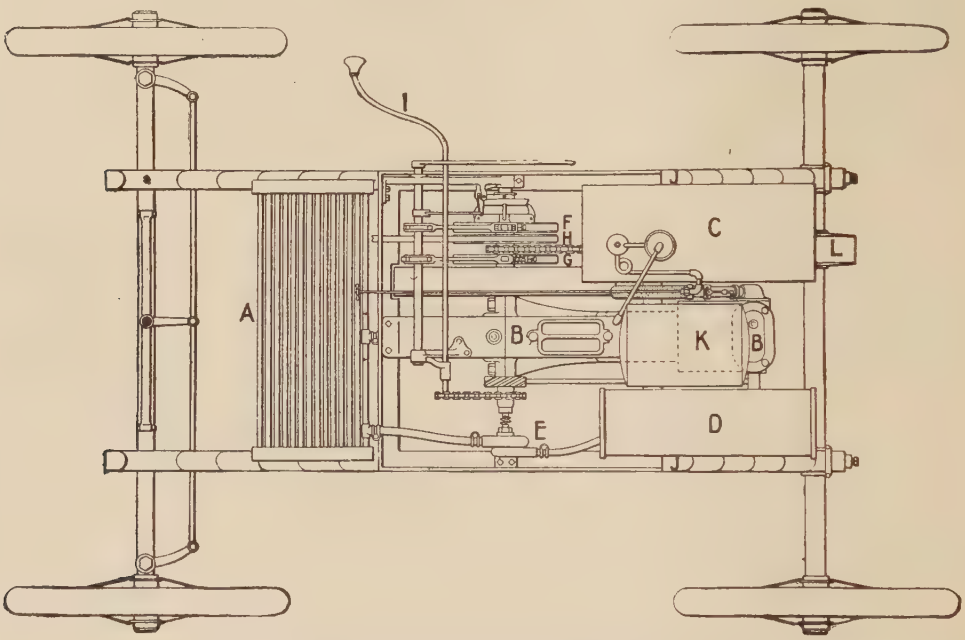
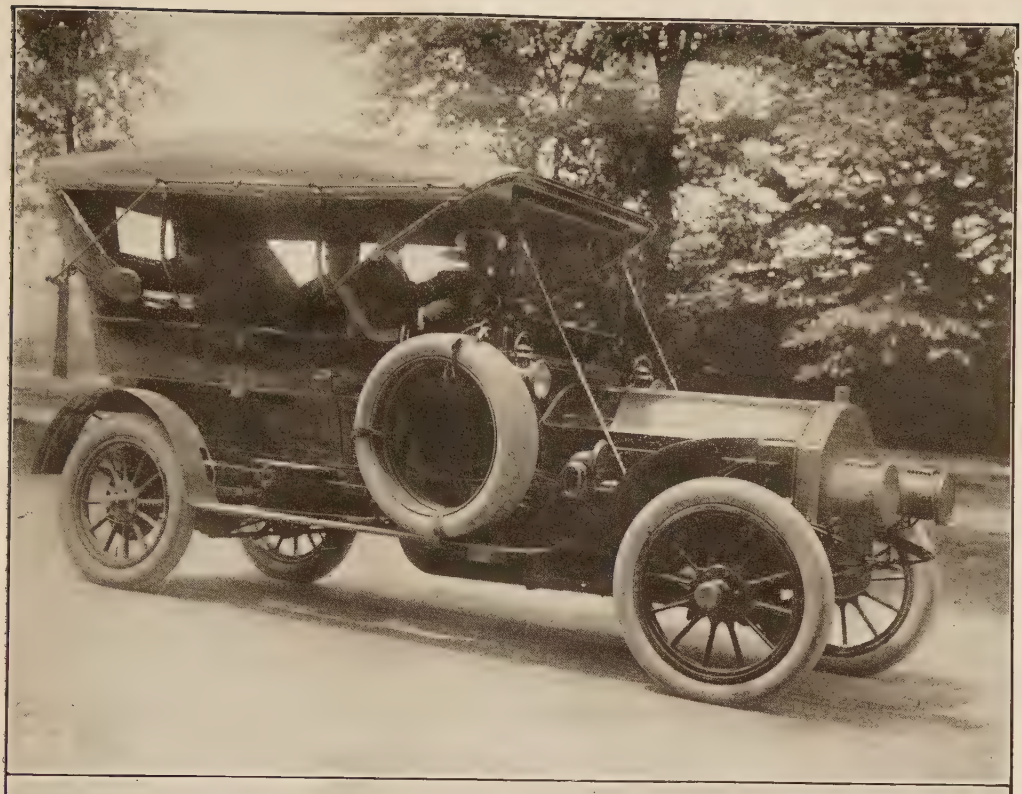


FIG. 9.— PLAN VIEW OF AMERICAN AUTOMOBILE "RUNABOUT"
MECHANISM.

With Transverse Engine Shaft, Horizontal Single-Cylinder Engine, Change-Gear by Brake Clutches and Epicyclic Gears and Side-Spring Vehicle Frame. Steering wheel, pillar, and gear not shown.

A Radiator.
B Engine.
C Gasoline tank.
D Muffler.
E Water pump.
F-G Clutches.
H Chain.
I Starting crank.
J-J Side springs.
K Water tank.
L Differential.



1. American Touring Car with Full Road Equipment.

2. Automobile Used for Excursions and Sightseeing.

requires rapid and resolute manipulation of the change-gear lever (or levers) to avoid burring of the spur wheels.

Ingenious arrangements are made in many cars to have consecutive motions of the gear lever produce a consecutive transition from the lower to the higher gear, and *vice versa*. In some cases the upper shaft is divided into two portions, the rear one of which, in its foremost position, grasps the front portion by a hollow square while all spur wheels are disengaged, thereby transmitting power direct from the motor shaft to the differential gear without speed reduction. The advantage is always bought at the cost of more gear complications for the lower speeds.

5b. *Differential Gear.*—This apportions motion between the two rear wheels, permitting one to revolve faster than the other, as at turns, where the outer wheel describes a longer curve than the inner one. The differential gear used in automobiles was at first the same as used in other mechanical constructions (see DIFFERENTIAL GEAR), consisting of two bevel-gear plates, of equal diameters, mounted on the contiguous end portions of the divided shaft, designed to be revolved, and four bevel-gear pinions journaled radially between the two gear plates and meshing with them. Motion transmitted to the ring holding the outer ends of the pinion shafts, cause both bevel-gear plates to revolve equally, unless one resists more than the other, in which case the small pinions revolve and permit the plate which moves easier to move farther. In the United States a form of differential gear was developed in connection with automobiles, in which straight spur wheels and pinions took the place of bevel-gears.

6. *Vehicle Frame and Springs.*—The need of a special metal frame for supporting the machine portions of an automobile has been realized only by degrees. The small motors of early vehicles were mounted either in the wagon box at the rear of the seat (only one seat), with two radius rods running from the motor shaft to the rear axle (so as to keep the sprocket chain at even tension), or on a rigid frame of angle iron or steel tubes extending from the rear to the front axle. The latter method survived in a few instances up to 1900 and is now observed only in some heavy vehicles intended for slow hauling of goods, in which the absence of spring suspension for the motor mechanism is not so injurious as in fast-moving cars. Metal reaches between the two axles, serving merely to brace the construction, survived longer, but finally disappeared with the general adoption of a rigid steel frame supported by four semi-elliptical springs and carrying the entire mechanism as well as the vehicle body. Some notable American exceptions to this rule have inverted elliptical springs transversely in front instead of the two semi-elliptical springs, giving the front axle more freedom to oscillate, as required when traveling over rough ground. Many popular small American automobiles form another exception, having the entire frame secured by clips to the inactive middle portions of two side leaf-springs, whose bent-down rear and front portions are secured to the rear and front axles, respectively (see Fig. 9).

At first most frames were made of wood or drawn steel tubes brazed together (an adaptation from bicycle construction). Subsequently greater rigidity was attained by armoring the wood with steel flitch plates, or by the use of structural iron or steel in various shapes, bolted and riveted together. This was convenient for experimental work, changes being easily effected. When the types of vehicles became more defi-

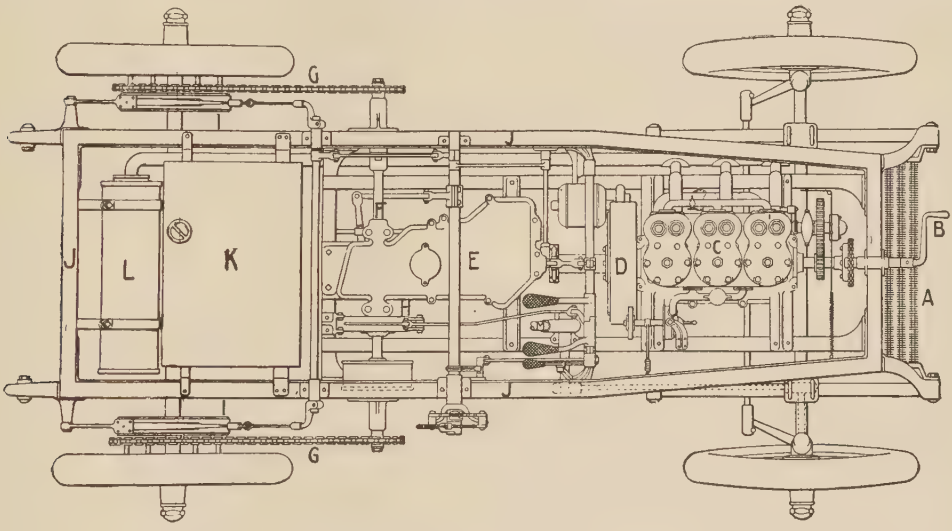


FIG. 10.— PLAN OF AUTOMOBILE "CHASSIS" OF TYPE COMMON FOR "TOURING CARS."

With 3-cylinder engine, longitudinal shaft, cone clutch, clash change-gear, sprocket chain drive from countershaft to rear wheels. Steering wheel, pillar, and gear not shown.

A Radiator.
B Starting handle
C Motor.
D Flywheel.
E Change gear case.
F Counter-shaft.
G-G Side chains.
H Band brake.
J-J Sides of frame
K Gasoline tank.
L Muffler.

nitely accepted. frames pressed in one piece from large blanks of sheet steel made their appearance. P ns of sheet steel joined the side reaches forming a protection underneath against mud and dust and prevented oil drip.

The springs used in automobiles are generally common carriage leaf springs calculated for such weights as they are intended to support. In course of time their length and weight have been gradually increased, with a view to combining strength with great flexibility. In case of side springs extending from axle to axle, as referred to above, this tendency influenced and modified the general design of the vehicles.

7. *Running Gear.*— In this division may be included axles, wheels and tires. Nearly all early automobiles (1890 to 1898) were equipped with wire-spoke wheels, the spokes laced tangentially to the hub on the suspension principle borrowed from bicycle construction. These wheels have given way to stout wood wheels, seldom more than 34 inches in diameter, built around a metal hub and enclosed in an iron ring to which a solid or inflated rubber tire is attached. The pneumatic or air-inflated rubber-covered canvas tire is used almost exclusively for pleasure automobiles, and its maintenance involves from 25 per cent to 50 per cent of the cost of operating a vehicle. On the other hand, air-tires afford a cushioning action, supplementary to that of the carriage springs, which protects machinery and wheels, especially against lateral shocks, in a manner for which no substitute has been found for vehicles intended for a speed above 15 or 20 miles per hour. At such and higher speeds the tire resiliency is characterized by the avoidance of vertical recoil.

Automobile wheels are also made of steel tubing, locked and brazed in a steel hub; elastic wheels with S-shaped spokes of tempered metal leaves have been tried, as well as composite wheels involving a cushioning medium between the felloe and the hub. So far (1904) the wheels have not been dished (to gain strength), as inclined or "set" axle ends do not lend themselves readily to traction from one motive centre, but front wheels are sometimes arranged to revolve in a slightly inclined (2°) plane, with a view to facilitating the steering operation by bringing the ground contact of the wheel directly under the pivot pin, a design of special value on rough ground where slanting impacts at the wheel rim would otherwise tend to turn the wheel or strain the steering gear.

The front axle of automobiles is stationary and frequently bowed down at the middle to permit a low position of the motor. To each end, just beyond the spring clips, is brazed a "knuckle" or fork, in which is journaled a pivot pin carrying at right angles, or slightly inclined, the rock shaft around which the front wheel revolves, usually on ball or roller bearings. The pivot pin is mounted in end-thrust ball bearings. Each pivot pin carries, besides the wheel shaft, a lever arm, projecting either forward and slightly outward, or rearward and slightly forward. The arms are connected by a rod, synchronizing the turning of the two wheels. The steering gear acts upon this rod or upon an additional arm on one of the pivot pins. The "fifth wheel" device has never been generally used in automobiles, being practical only when steadied with the leverage of a long pole, as in horse-drawn vehicles.

The bearings in automobile wheels were first plain "parallel bearings," then mostly ball bearings. Then followed a reaction favoring plain bearings. Lately ball bearings (in Europe) and roller bearings (in America) are usually fitted and, if well made and calculated for their loads, give satisfaction and reduce traction resistance, besides being more durable than parallel or coned shaft bearings.

Rear axles are either stationary (solid, tubular or H-shaped), carrying wheels revolved by sprocket wheels and chains, or rotary and divided near the middle by the differential gear, the wheels keyed to the axle ends and the bearings clipped to the vehicle springs. It was early found, however, that an axle supporting the

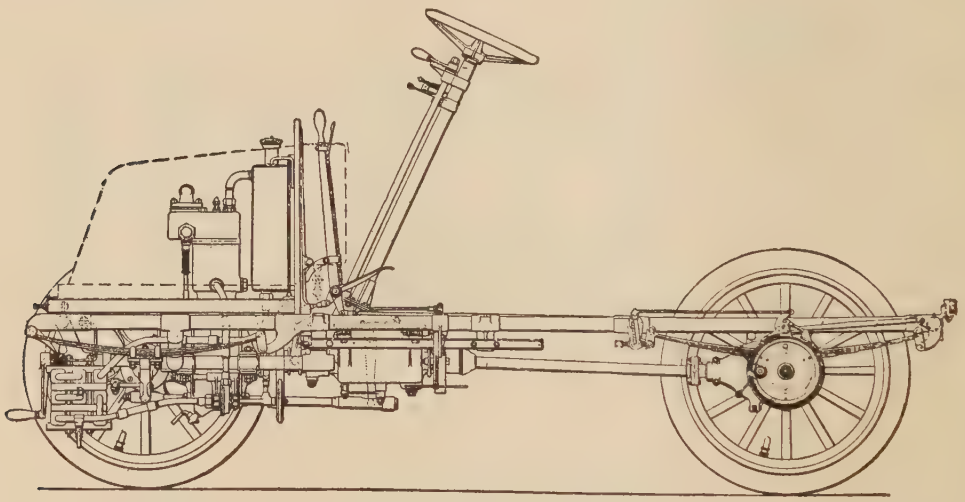


FIG. 11.— SIDE ELEVATION OF AUTOMOBILE CHASSIS.
With bevel-gear driving shaft from change-gear to differential gear on special rear driving axle separate from the rear supporting axle of the vehicle.

1. Type of European High-power Touring Car.

2. American Touring Car 1906, with Air-cooled 4-cylinder Engine and Dummy Radiator Front.

greater portion of the vehicle's weight should not be subjected to the alternating stresses resulting from rotation, unless it was made much stronger, theoretically, than a fixed axle. Gradually the divided and revolving axle was therefore modified until a design was developed separating motive power from support, as explained under Power Transmission.

(8) Brake and (9) Steering mechanism, and also (10) Carriage work are essentially constructed on the same principles in vapor engine automobiles as in motor vehicles in general and are referred to under Motor Vehicles.

11. *Lubricating System.*— The lubrication of vapor engines presents certain difficulties caused by the very high temperature of pistons and cylinder walls, and the liability of fouling valves and spark points if an excess of lubricant is used. A thin oil of high flash and ignition test is required, but it is of still higher importance that the oil shall not "crack"; that is, split into portions which burn completely when ignited and other portions which leave a residue. The mercantile method of placing different oils on the market under the same name, and the same oil under different names (allowing agents to name it), has obscured lubricating problems and re-

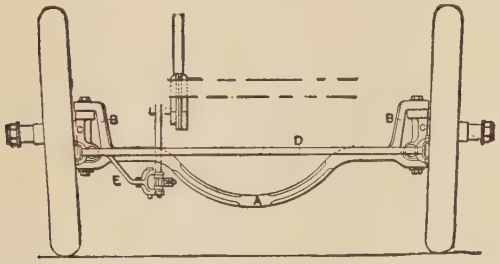


Fig. 12.— Elevation of Automobile Front Axle with Knuckles, Steering Pivot Pins, and Inclined Wheel Shafts.

A, Front Axle; BB, Knuckles; CC, Pivot pins; D, Rod connecting arms on pivot pins; E, connection from arms to steering gear (not shown).

tarded uniformity in practice. With vertical cylinders it is customary to place a quantity of oil in the crank casing and depend upon lubricating the cylinder and connecting rod by the oil splashed from the casing by the rotation of the crank. For horizontal cylinders sight feed drip lubricators regulated by hand have been extensively used, as they still are for steering gear, transmission gear and wheel bearings, but the most approved practice demands a force feed system operated from the cam shaft of the engine, so as to proportion the feed to the engine speed.

It is common practice to stuff the change-gear box with grease (vaseline and graphite is a popular mixture) and to use cylinder oil for all other bearings. Mechanical oilers distributing the oil from a central reservoir, often placed on the dashboard, through a system of canalization and by pressure derived from small positive plunger pumps within the reservoir, driven by gear or chain from the cam shaft, are generally employed.

12. *Operating System.*— The devices by which the operator of an automobile controls the motor, clutch or clutches, the change-gear, brakes, steering wheel and the lubrication system have undergone many changes and remain much diversified. The starting device is nearly always a detachable crank fitting the squared end of the motor shaft, either in front of the vehicle or at the side. The motor, when started, automatically releases the crank, the turning of the shaft pushing the crank out of engagement by a screw action supported by a spring. In many automobiles a small lug prevents the insertion of the crank if the ignition device happens to be adjusted to give an early spark which would start the piston in the wrong direction, and whereby the crank might be thrown violently back, injuring the starter.

The spark-timing handle and the throttle handle are generally placed close to the steering wheel (or steering lever), while one band brake (usually acting on the circumferential ring of the differential gear), and the cone clutch are actuated by one or more pedals. The change-gear lever (sometimes two) and the brake lever (actuating band brakes contracting around, or expanding into, drums in the rear wheels) usually extend through slots in the footboards, or at the side of the vehicle within convenient reach of the operator's right hand. In a few cases the operating devices are at the left side, the operator's seat being there. Automobiles vary more, perhaps, in the arrangement of operating devices than in any other feature of construction, and a brief general description covering established practice is therefore impossible.

In the broadest definition of "automobile," which is sanctioned by common usage, the word may be applied to any mechanically propelled vehicle, whether the source of power is a vapor engine, or steam engine, an electric accumulator or storage battery, stored compressed air or any other form of primary or secondary generator, but historically the word was not coined or applied until (about 1888, it seems) the appearance in France of benzine vapor engine vehicles, while steam cars for common highways antedate locomotives, having been made, especially in England, before the railways were thought of. The development of electric vehicles also began independently of the vapor engine vehicle. If a distinction should be made between automobiles and motor vehicles — and the distinction would be a convenience in nomenclature — the latter term should be the broader one, including all forms of power, while "automobile" should be reserved for motor vehicles equipped with a vapor-explosion engine and driven by purely mechanical transmission of power from the engine shaft.

Recent Development.— From 1904 to 1906 the development of the automobile in America was marked by a very general adoption of four-cylinder engines, even for vehicles of small size, and by a wider use of the air-cooling system, both resulting in a remodeling of the "runabout" style, with its single-cylinder engine in the middle portion of the frame. The single-chain drive to the rear axle was usually replaced by a bevel-gear shaft. The characteristics of the "runabout" were thereby removed; it became simply a "small car" for two persons, often equipped with sliding gear transmission. The epicycle transmission gear, on the other hand, found extensive employment in delivery wagons and trucks, being more easily operated by inexperienced drivers. Two-cylinder engines, of the

horizontal, "double-opposed" type, were commonly used for these business vehicles and were second to the four-cylinder engine in popularity for pleasure automobiles of medium size and power.

In general, the development was toward greater refinement in all details of the vehicles, but at the same time the increased reliability of the gasoline engine was seized upon by some manufacturers as a signal for a return to the "gasoline buggy" type, a vehicle built as an ordinary buggy or surrey placed on a steel frame, however with a horizontal, two-cylinder engine underneath it and a very simple steel cable driving device to pulleys on the rear wheels; the reverse being operated by a small sheave acting by direct frictional contact upon the solid tires of the large dished carriage wheels.

In practically all automobiles the tread pedals, or piano pedals, used for control of clutch and brakes and sometimes for the throttle, as well, were replaced by pedals pushed forward by the foot instead of down.

In accordance herewith, information in regard to steam and electric vehicles for common roads, as well as vehicles propelled through electric motors deriving their current from either a steam or a vapor engine, will be found, together with general information applying to all types, under MOTOR VEHICLES.

MARIUS C. KRARUP,
Formerly Editor of 'The Automobile.'

Automobile Speed Records. The most important affairs in the world of automobiling, from the viewpoints of record-making and breaking, enthusiasm and excitement, are the Glidden Tour, the Auto Show, and the Vanderbilt Cup Race. This latter event, inaugurated in 1904, was, for that year, over a 30-mile triangular Long Island course. The records made and the big attendance, 50,000, stamped this cup race as certain to become a great national annual affair in the realm of outdoor sport. George Heath, an American, was the winner, in a French Panhard. Lytle, also an American, finished third in an American-made car, a 24-horse-power Pope-Toledo. The exact distance was 284.4 miles; time, 5 hours, 26 minutes, 45 seconds; the average rate of speed being 52.2 miles.

The second Vanderbilt Cup Race, held October 14, 1905, resulted in the triumph of Hemery, a Frenchman, in a Darracq car, Heath's Panhard being second. The distance covered was 283 miles; time, 4 hours, 36 minutes, 8 seconds, the average rate of speed being 61.51 miles per hour.

The third Vanderbilt Cup Race, held on October 6, 1906, was won by Louis Wagner, a Frenchman. The distance covered was 297.1 miles; time, 4 hours, 50 minutes, 10 seconds. The average rate of speed per hour being 61.43 miles. More than 250,000 people witnessed the event.

Grand Prix, Sarthe Circuit (France), 766 miles, 12 14.07. Florio Cup Contest, Brescia Circuit (Italy), 311.12 miles, 4.46.47. 1905 Ardennes, Ardennes Circuit, 372.8 miles, 5.58.-32½. 1905 Bennett Cup, Auvergne Circuit, 341.4 miles, 7.10.00. 1906 Ardennes, Ardennes Circuit, 376 miles, 5.38.00.

Auton'omy, the self-government of a state. This power may reside within limited bodies of the same people, such as parishes, corporations, religious sects. These districts or communities may be autonomous, if not absolutely, yet within certain defined limits. They may be said to enjoy a partial, limited, or local autonomy. Autonomy is often used to designate the characteristic of the political condition of ancient Greece, where every city or town community claimed the right of independent sovereign action. Recently the word is more specifically used of territories or provinces, which, while subject in some matter to a higher sovereignty, are autonomous in other respects. Thus the Treaty of Berlin made eastern Rumelia an autonomous province; though subject to the direct political and military authority of the Sultan, it was to have administrative autonomy in all its internal affairs. Egypt possesses a higher autonomy. The self-government enjoyed by the British colonies may be described as a modified form of autonomy.

Autoplate, a machine for making and finishing curved stereotype printing plates for use in printing newspapers, invented by H. A. Wise Wood of New York, the first put into use upon the New York *Herald.* This machine, after a flexible papier-maché matrix, made from a type page, is inserted therein, proceeds to cast printing plates, weighing about 50 pounds each, at the rate of four a minute, and to dress their edges and inner surfaces and prepare them for attachment to the printing cylinders, and this is done automatically — all within the compass of one machine. Previous to the advent of the autoplate such work had been invariably done by hand-worked devices, with which the fastest rate of production attainable was at the rate of slightly less than one plate per minute. So great a change did this invention make in the work of stereotyping upon the larger newspapers, that not only was the machine generally adopted, but in every case the hand apparatus were entirely dispensed with, and sole dependence placed upon the autoplate.

Autran, ō-trän′, **Joseph,** French poet: b. Marseilles, June 1813; d. there, 6 March 1877. His verse is admired for its purity of form and refined sentiment. He attracted attention in 1832 with an ode to Lamartine, 'The Departure for the East.' His works include 'The Sea,' poems (1835); 'Milianah,' an epic (1842); 'Rural Life' (1856); and 'The Daughter of Æschylus,' drama (1848), which won a prize from the French Academy.

Autrefois Convict, ō′tr-fwä′ kôn-ve′, in criminal pleading, a plea made by a defendant indicted for a crime or misdemeanor, that he has formerly been tried and convicted of the same. This plea is similar in form as the plea of *autrefois acquit,* and is based upon the same general principle, to wit: that no man's life or liberty shall be twice put in jeopardy for the same offense. A plea of *autrefois convict,* which shows that the judgment on the former indictment has been reversed for error in the judgment, is not a good bar to another indictment for the same offense. But a prior conviction before a justice of the peace, and a performance of the sentence pursuant to the judgment, constitute a bar to an indictment for the same offense, although the complaint on which the judgment proceeded was so defective

that his judgment might have been reversed for error. The New York Code of Criminal Procedure, § 9, expressly prohibits a second prosecution for the same crime. At common law it is necessary, according to the weight of authority in a majority of the United States, to specially plead former conviction or acquittal. In many of the States, however, by statute, the plea of *autrefois acquit* may be taken advantage of under the plea of not guilty. The statute adopted in New York is similar in its terms to that of many other States. It is provided by the New York Code of Criminal Procedure, § 322, that a plea of former judgment of conviction or acquittal of the crime charged may be pleaded with or without the plea of not guilty.

Au'tumn, the season of the year which follows summer and precedes winter. Astronomically, it is considered to extend from the autumnal equinox, 22 September, in which the sun enters Libra, to the winter solstice, 22 December, in which he enters Capricorn. In popular speech it includes the months of September, October, and November.

Autun, ō-ten, France (ancient *Bibracte*), a town in the department of Saône et Loire, of considerable interest both from its antiquities and from its modern edifices. Of the former the more remarkable are two Roman gates of exquisite workmanship and in good preservation, the ruins of an amphitheatre and of several temples; of the latter the most conspicuous is the cathedral of St. Lazare, a Gothic structure of the 11th century. Pop. (1896) 11,873.

Autunite, a beautiful canary-yellow mineral, occurring in thin, tabular crystals of orthorhombic symmetry, but closely approaching the tetragonal mineral torbernite in form. Both of these minerals are hydrous phosphates of uranium, but while calcium is an essential constituent of autunite, whose formula is $Ca(UO_2)2P_2O_8 + 8H_2O$, it is replaced by copper in torbernite, which is further distinguished by its green color. Autunite has eminent basal cleavage, resulting in a pearly lustre on the basal plane, while on the edges of the crystal the lustre approaches adamantine. It has a hardness of 2 to 2.5 and a specific gravity of about 3.12. Some autunite is beautifully fluorescent. Its name is derived from its most noted locality, Autun, France, where it is found in closely aggregated masses of crystals. Other noteworthy occurrences are in Cornwall, England, in Saxony, North Carolina and South Dakota.

Auvergne, ōvārn'y, a province of central France, now included in the departments Cantal, Puy-de-Dôme, and Haute Loire. The mountains of Auvergne are the highest in the interior of France, the highest of them, Puy-de-Dôme, being 4,805 feet above the sea. It is entirely composed of volcanic matter, and has a regular crater 1,000 feet in circumference, and 300 feet deep. The whole of the cones present the same general character — well-defined craters enclosed by regular cones, on whose sides the lava currents may be traced as easily as on those of Vesuvius.

Auvergne, Mountains of, a branch of the Cevennes, chiefly situated in the departments of Puy-de-Dôme and Cantal (France). The most important peaks are Puy-de-Sancy (6,185 feet), Plomb du Cantal, and Puy-de-Dôme.

Auwers, Arthur, German astronomer: b. Göttingen 12 Sept. 1838. He became assistant in the observatory at Königsberg in 1859, and at Gotha in 1862; in 1866 was made a member of the Berlin Academy and astronomer to it. In his capacity of president of the Astronomical Society he was conspicuously identified with the preparation of the great co-operative catalogue of over 100,000 stars. For his services to astronomy he was made a foreign member of the Academy of Sciences at Washington, from which he also received the Watson gold medal. Among his works are 'Neue Reduktion der Bradleyschen Beobachtungen 1750–62' (1882–8), and 'Katalog von 9,789 Sternen' (1896).

Aux Cayes, ō-kā', a seaport town of Haiti, situated on the southwest coast of the island, about 85 miles west of Jacmel. It has an excellent harbor, a good export trade, and is the seat of an American consular agent. Pop. about 25,000.

Auxerre, ō-sār' (ancient *Antissiodurum*), a town in France, 96 miles southeast of Paris. It is finely situated on a height above the Yonne, which here becomes navigable, but is very poorly built. Its principal edifices are its cathedral of St. Stephen, a splendid Gothic structure, with a finely proportioned interior, and windows containing most beautiful stained glass; the church of St. Germain, with some curious crypts; and a magnificent old episcopal palace, now converted into the Hôtel de Prefecture. The manufactures consist of woolens, hats, wine casks, leather, red and yellow ochre, earthenware, and violin strings; and the trade is chiefly in wood and in the wines of the district. Of these wines the most famous is the white Chablis. Pop. (1896) 15,082.

Auxonne, ō-sŭn' (Latin *Asona* or *Aussona*), a town in France, 18 miles east-southeast of Dijon, on the left bank of the Saône, here crossed by a beautiful bridge of 23 arches. Auxonne is well built, the seat of a court of commerce, and has a communal college, and a public library containing 4,000 volumes; a castle, an arsenal, and a cannon foundry. Pop. (1896) 6,700.

Auzout, ō-zoo', **Adrian,** French mathematician: d. 1691, inventor of the micrometer, still in use among astronomers to measure the apparent diameter of celestial bodies. He was the first who thought of applying the telescope to the astronomical quadrant.

Ava, ā'va, or **Aungwa,** a town in Asia, the former capital of Ava or Birmah, on the Irrawaddy. It has a circuit of about five miles, and consists of an inner and an outer town, each surrounded by a brick wall. Pop. (1891) 39,477.

A'va, Arva, Yava, or **Kava** (*Piper methysticum*), a plant of the natural order *Piperaceæ*, possessing narcotic properties. It is a shrubby plant, with heart-shaped acuminate leaves, and very short, solitary, axillary spikes of flowers. It is a native of many of the South Sea Islands, where

the inhabitants intoxicate themselves with a fermented liquor prepared from the upper portion of the root and the base of the stem. The rhizone is thick, woody, rugged, and aromatic. The intoxicating liquor is prepared by macerating it in water. The narcotic property is ascribed to an acrid resin, *kawine*, present in the root. The taste is unpleasant to those unaccustomed to it, and has been likened to that of rhubarb and magnesia. The intoxication is not like that produced by ardent spirits, but rather a stupefaction like that caused by opium. It is succeeded by a copious perspiration. The habitual use of ava causes a whitish scurf on the skin, which, among the heathen Tahitians, was reckoned a badge of nobility, the common people not having the means of indulgence requisite to produce it. Ava is, like cocaine, a local anæsthetic.

Avadhuta, ä'va-d'-hoo'ta, a member of a mendican sect in southern India addicted to self-torture.

Av'alanche, a mass of snow or ice which slides down steep mountain slopes. On lofty mountains snow would accumulate indefinitely if the excess were not removed by sudden falls or by glaciers which bring it into the valleys, where it melts. Avalanches may occur at any season of the year, but they are most frequent in early spring after the snow has begun to melt from the sun's rays. The water which collects beneath the snow bank loosens it from the ground, and the whole mass may then be precipitated to the base of the mountain. Such avalanches occur regularly in the Alps, where they are known as *grundlawinen.* Another type (*staublawinen*) occurring in the winter season is characterized by the dry and finely divided condition of the snow, and results from the overloading of the snow-fields. A third class is the ice-avalanche, occurring along the course of glaciers. Avalanches are often very destructive, sweeping away trees, houses and everything in their path. Their destructive effects are greatly increased by the wind-blasts which accompany them. Those occurring in winter usually cause the greatest loss of life, as they develop suddenly and without warning; those that take place in spring generally follow a definite path and are more or less regular in their occurrence. The planting of forests on the high slopes sometimes affords protection from avalanches, but when this is not feasible, stone structures are employed.

Aval Islands. See BAHREIN.

Av'alon, Cal., a summer resort on Santa-Catalina Island, established for the purpose of supplying the comforts of life at a minimum cost. It is owned by a joint stock company, and was literally built to order when it was determined to build the town. The sight selected was a desert, with not a tree in sight and only a few shanties of fishermen along shore. Water was found in a neighboring cañon to the north and piped over the hills. The ground was leveled, the hollows filled, and small prominences cut down. The surveyor platted the tract, laid out streets, avenues, walks, and a central plaza or park with provision for fountains. This accomplished, the plumbers followed, and a system of sewerage and water pipes was introduced. The aid of the forester was next called into play, and the streets and avenues were planted with small Australian eucalyptus trees. A wharf was built, a hotel or restaurant, several cottages for the superintendent, a number of tents erected, and what is known as the "tent city" was finished. The tent city is a feature peculiar all along the southern California coast, for the benefit of ranchers and others from the inland cities and towns who desire to escape the heat and enjoy life at the seashore at a minimum cost.

What is known as the "tent city" is more or less peculiar to California, and the local papers, from the heart of the Sierras to the sands of the ocean, during the summer months, all contain glowing advertisements of the "tent city." Such cities, with a population of several hundred, are found at many points on the Pacific coast. The equipment of the "tent city" constitutes a business in itself. At Avalon is a large circus tent which in winter contains furniture of every description. Here, in fact, the "tent city" was in winter quarters, everything being classified and arranged with order and system. In April or May a gang of workmen descends upon the winter quarters, and like magic the vacant lots are filled, and in a day a city is reared as though by the touching of the proverbial button. Each tent is neatly and well furnished, and can be rented for a nominal cost, the owners of the island giving the ground rent and free water, each lot being sewered and perfect in its sanitary arrangement. The visitor can rent a tent for sleeping, a parlor and kitchen, or he can rent a single room. In the centre of the "tent city" is a store where every description of food, carefully prepared and cooked, can be obtained. Near by the Y. M. C. A. has opened a reading room and library.

The questions of the physical and moral welfare of such a community would seem an important and difficult one to manage, but all this and even the amusements are included in the plan, and we have a city where every door is open and where probably the jail is used hardly once in the season. On the borders of the city is a large amusement hall, and in the neighboring grove is a band stand where the finest band in southern California gives an open-air concert from 7 until 9, seats being provided for 1,200 people. No smoking is allowed within the area of the seats. At the end of the concert the band adjourns to the "pavilion," and a ball is given free to the inhabitants of the "tent city" and others. No policeman is in evidence in the town, though guardians of the peace are present in citizen's clothes. In fact, here is a summer municipality of large size, conducted by a corporation that attends to everything; keeps the town clean, provides amusement, sustains a health officer, administers justice through a justice of the peace, provides the government with a post-office, and maintains two daily boats between the island and the mainland — an experiment in government worthy the attention of the pessimist who affects to believe that communities cannot be run by machinery, as this virtually is, so well arranged and systematized are the methods. It might be assumed that a series of stringent and excessive taxes would be imposed upon each resident, but investigation shows that each resident of the tent city of Avalon pays but $2.75 per capita per season for the privileges, which is the

THE CURVING BEACH AT AVALON, SANTA CATALINA, CALIFORNIA.

cost of round trip fare from Los Angeles to the island, a distance of 50 miles, more or less. This and the rent of tent constitute the sole tax. The winter population is generally less than 1,000, but in summer 75,000 persons are to be found at times living within the corporate limits.

Av'alon, the legendary elysium of King Arthur, being his abode after disappearing from the haunts of men; called also *Avilion.* The name is also identified with Glastonbury, and has been given to a peninsula of Newfoundland.

Avalos, ä'va-lōs', the name of a noble Neapolitan family, which included Ferdinand D' Avalos, Marquis de Pescara: b. Naples, 1490; d. 1525. He served with distinction in the army of Charles V., and was taken prisoner by the French at the battle of Ravenna in 1512. He beguiled the hours of captivity by writing a 'Dialogue of Love,' which he dedicated to his wife, the beautiful and accomplished Vittoria Colonna. He soon recovered his liberty, and subsequently displayed extraordinary ability in the wars of Charles V.

Avancini, Nicholas, an ascetic writer of the Society of Jesus: b. 1612; d. 1686. His little book of meditations on the life and doctrine of Jesus Christ which has been translated into several languages and is widely used to-day by members of clergy, first appeared in Vienna in 1665. By reason of its arrangement, its scriptural sources, its pithy suggestiveness, and its practical character, Cardinal Gibbons states that it has been his Vade Mecum, his book of meditations during all the years of his ministry.

Avare, L', la-vär' (The Miser), the title of one of the most famous of Molière's prose comedies, first produced 9 Sept. 1668. It is founded on the 'Aulularia' of Plautus, and was paraphrased by Fielding in his comedy of 'The Miser.' Harpagon is a sexagenarian miser who incarnates the spirit of avarice and has determined to marry a young woman named Mariane, but ultimately prefers his gold to matrimony.

Avars, ä'värz, or **Avares,** a nation of Mongolian or Turkish origin, who at an early period migrated to the regions around the Don, the Caspian Sea, and the Volga. They served in Justinian's army, and later made themselves masters of Dalmatia, pressed into Thuringia and Italy, where they fought with the Franks and Lombards, and extended their dominion over the Slavonians dwelling on the Danube and farther north, as well as over the Bulgarians on the Black Sea. They were at length overcome by Charlemagne, and after 827 disappear from history; but the valley of Erlav, a small tributary of the Danube in Lower Austria, was called the "land of the Avars" as late as the 10th century.

The name is also borne by a tribe estimated to number upward of 100,000, now living in the Caucasus Mountains, noted for their struggle with Russia, in which they were led by Schamyl (q.v.). See also Lesghians.

Avatar, ăv'a-tär', in Hindu mythology, an incarnation of the Deity. Ten avatars are peculiarly distinguished, and four of them are the subjects of *Purânas,* or sacred poems. These 10 are among the incarnations of Vishnu, the supreme God. The Matsya avatar was the descent of the Deity in the form of a fish; Kachyapa or Kûrma, in that of a tortoise; Varâha, as a boar; Nara-sinha, as a monster, half man, half lion; Vâmana, as a dwarf; Parasurama, as the son of Jamadagni. All these took place in the *Satya Yuga,* or golden age. The seventh incarnation was in the form of the four sons of King Dasaratha, under the names of Râma, Lakshmana, Bharata, and Satrughna, in order to destroy certain demons that infested the earth. The achievements of Râma form the subject of the celebrated epic called the Râmâyana. The eighth avatar of Vishnu, in the form of Krishna, is the best known of all, from the fact that it forms the subject of the great Sanskrit epic poem, the Mahâbhârata. Its object was to relieve the earth from the Daityas, and the wicked men who oppressed it. The ninth was in the form of Buddha. The Kalki, or tenth avatar, is yet to come at the end of the *Kali Yuga,* or the iron age. See Vishnu.

Avatcha, a-vä'cha, a volcano and bay in Kamchatka. The volcano, 9,000 feet high, was last active in 1855. The town of Petropavlovsk is situated on the bay.

Ave Maria, ä'vā ma-rē'a (Latin; hail Mary, from *averre*); among the Roman Catholics the beginning of a prayer to the Virgin, whence the whole prayer is called *Ave Maria.* It is the beginning of the salutation which the angel addressed to the Virgin, as he announced to her that she should be the mother of the Saviour (Luke i. 28; "Hail, highly favored, the Lord is with thee; blessed art thou among women."). See Rosary.

Avebury, ā'bėr-ĭ, Lord. See Lubboch, Sir John.

Ave'bury, England, a village in Wiltshire, occupying the site of a so-called Druidical temple, which originally consisted of a large outer circle of 100 stones, from 15 to 17 feet high, and about 40 feet in circumference, surrounded by a broad ditch and lofty rampart, and enclosing two smaller circles. On the neighboring downs are numerous barrows or tumuli, one of which, called Silbury Hill, rises to the height of 130 feet, with a circumference of 2,027 feet at the base, covering an area of more than five acres.

Avellaneda, a-vā'lya-nā'da, Alfonso Fernandes de, the pseudonym of the writer of a sequel to 'Don Quixote,' issued prior to the sequel by Cervantes. See Don Quixote.

Avel'lane'da, Nicholas, Argentine statesman: b. Tucuman, 1 Oct. 1836; d. 26 Dec. 1885. He was professor of political economy in the University of Buenos Ayres; minister of public instruction in 1868–74, and president of the republic in 1874–86. He published several historical and economical works.

Avellaneda y Arteaga, a-vā'lya-nā'da ē är'tā-ä'ga, **Gertrudis Gomez de,** distinguished Spanish poet, dramatist and novelist: b. Puerto Principe, Cuba, 23 March 1814; d. Madrid, 2 Feb. 1873. Under the pseudonym Peregrina she contributed to Andalusian journals many 'Lyric Poems' (1851–54), and afterward wrote a series of spirited novels: 'Two Women,' 'The Baroness de Joux,' 'Dolores,' and others. She gained still higher distinction with the tragedies 'Alfonso Munio,' the hero

of which was her own ancestor, and 'The Prince of Vianna.' Her later compositions had a tone of melancholy; among these are Biblical dramas, as 'Saul' and 'Balthasar'; the spiritual song, 'At the Cross,' and 'The Last Ascent of My Harp' (1850). In the later years of her life she composed 16 plays which still have a place on the Spanish stage.

Avellino, ä'vĕl-lē'nō, a town in Italy, 29 miles east of Naples. It has a square adorned with an obelisk, and possesses several agreeable promenades. Pop. (1901) 23,700.

Ave'na. See OATS.

Avenarius, Richard, German philosopher: b. Paris 1843; d. Zürich 1896. He studied philosophy at the universities of Zürich, Berlin, and Leipsic, and from 1877 to his death was professor of philosophy at Zürich. He wrote on Spinoza's pantheism, published a theory of experience and contributed many papers to magazines and reviews, upon philosophical subjects.

Avenches, ȧ-vänsh', Switzerland, a town in the canton of Vaud, seven miles northwest of Fribourg. It is the ancient Aventicum, capital of Helvetia under Roman rule, and is noted for its Roman relics, notably the ruins of an amphitheatre, and a Corinthian column belonging to a temple of Apollo. In Roman times it was a city of 20,000 inhabitants. The population now is about 2,000.

Av'enel, Mary, a character appearing in Scott's novels, 'The Monastery' and 'The Abbot.'

Avenel, äv-nĕl', **Paul,** a French poet and novelist: b. Chaumont 9 Oct. 1823. He was active in connection with several periodicals, and besides several vaudevilles, he wrote 'The Peasant Woman from the Abruzzi' (1861), a drama; 'The King of Paris' (1860), a historical romance; 'The Calicoes' (1866), scenes of real life. Among several collections of poems may be mentioned 'Alcove and Boudoir,' interdicted in 1855 and re-published in 1885.

Aven'ger of Blood, among primitive peoples the next of kin to a murdered man, upon whom was laid the duty of avenging the crime by killing the murderer. In this custom may be detected the source of the system of criminal law.

Av'entine, the southernmost of the seven hills of Rome, on the left bank of the Tiber, between the river and the Cælian hill. The Circus Maximus lay to the northeast of the Aventine, between it and the Palatine, and the baths of Caracalla were on the southeast.

Aven'turine. See QUARTZ; SUNSTONE.

Avenzoar, ä'vĕn-zō'ăr, or more correctly, **Abu-Merwan-Mohammed - ben - Abdalmalec - ben-Zohar,** Arabian physician of the 12th century: b. Seville, Spain; d. Morocco, 1169. He became eminent in his profession, traveled much, and passed through many adventures, among which was a long imprisonment at Seville. He had the care of a hospital, and composed a work entitled 'Al Theiser,' containing a compendium of medical practice, and including many facts and observations not found in the preceding writers, which was probably the result of his own experience. The report of his having lived to the age of 135 is probably an error arising from his having been confounded with his son, of the same name and profession, who lived at Morocco, and was the author of a treatise on the regimen of health.

Av'erage, in maritime law, is general, particular or petty. General average (also called gross) consists of expense purposely incurred, sacrifice made, or damage sustained for the common safety of the vessel, freight and cargo, or the two of them, at risk, and is to be contributed for by the several interests in the proportion of their respective values exposed to the common danger, and ultimately surviving, including the amount of expense, sacrifice or damage so incurred in the contributory value. Indemnity for general average loss is ordinarily stipulated for in policies against the risks in navigation, subject, however, to divers modifications and conditions. Under maritime policies in the usual form, insurers are liable for the contributions, for loss by jettison of cargo, sacrifice of cables, anchors, sails, boats, delay for the purpose of refitting, voluntary stranding, etc. Average particular (also called partial loss) is a loss on the ship, cargo or freight, to be borne by the owner of the subject on which it happens, and is so called in distinction from general average, and, if not total, it is also called a partial loss. It is insured against in marine policies in the usual forms on ship, cargo or freight, when the action of peril is extraordinary, and the damage is not mere wear or tear, and on the ship covers loss by sails split or blown away, masts sprung, machinery of steamship disabled, planks started, change of shape by strain, loss of boat, breaking of sheathing or upper works or timbers, damage by collision or stranding, by lightning or fire, or in defense against pirates or enemies, or by hostile or piratical plunder. Petty average consists of small charges formerly assessed upon the cargo, to wit: anchorage, pilotage, beaconage, towage, quarantine, etc.

Av'erage Man, An, a society novel by Robert Grant. It is a story of manners rather than plot, concerning itself more with types than with individuals.

A'verell, William Woods, American military officer: b. Cameron, N. Y., 5 Nov. 1832; d. Bath, N. Y., 3 Feb. 1900. He was educated at West Point, and served on the frontier, and in several Indian campaigns till the beginning of the Civil War, when he was appointed colonel of the Third Pennsylvania Cavalry, and assigned to the command of the cavalry defenses of Washington. During the war he distinguished himself on numerous occasions as a cavalry raider and commander, and at its close was brevetted major-general of volunteers. He resigned from the regular army while holding the rank of captain, in 1865, and, under an act of Congress, was reappointed captain in August 1888, and was placed on the retired list in the same month. He was United States Consul-General at Montreal in 1866–9. He invented a system of asphalt pavement now quite generally adopted and the Averell insulating conduits for wires and conductors.

Avernus, ȧ-vėr'nŭs, a small circular lake, now called *Lago d'Averno*, in Naples, kingdom of Italy, between the ancient Cumæ and Puteoli. It is surrounded by hills of a moderate height, which used to be covered with immense woods,

while the atmosphere was charged with unhealthy mephitic effluvia, and occupies the crater of an extinct volcano. By ancient Greek writers, subsequent to Homer, it was fabled to be the entrance to the infernal regions, and to have been the place where Ulysses entered in his visit to the shades. It was also thought that the Cimmerians of Homer dwelt on the banks of this lake. The sibyl of Cumæ is said to have had her grotto here, and Virgil represents her as guiding Æneas when he made his descent (“*facilis descensus Averno*”) to the infernal regions at this place.

Averroes, av-er-rōs′ (corrupted from *Ebn* or *Ibn Roshd*), a renowned Arabian philosopher: b. Cordova, Spain, 1126; d. about 1198. He became a cadi or judge first in Seville and afterward in Cordova. He was accused of rejecting the established religion, and in consequence deprived of his offices, and fled to Fez. Here he was condemned by a spiritual court to recant and undergo a public penance. Upon this he went back to his own country, but was latterly restored to his dignities in Morocco. Averroes regarded Aristotle as the greatest of all philosophers, and explained his writings, with only a slight deviation from his views. Besides commentaries on Aristotle and other philosophical works he wrote also a compendium of physic, called ‘Colliget’ (a corruption of the Arabic ‘Kulliyat,’ or summary), and treatises on jurisprudence, astronomy, grammar, etc. His commentaries upon Aristotle, in a Latin translation, were repeatedly printed at Venice in the 15th and 16th centuries. His ‘Colliget’ also was early translated into Latin, and several times printed. See Renan, ‘Averroës et l’Averroisme’ (1860); Müller, ‘Philosophie und Theologie von Averroës’ (1875).

Aversa, a-vĕr′sa, a town of Italy, nine miles north of Naples, on a plain covered with vines and orange trees. It is the seat of a bishop, and is famed for a kind of almond-cake, called *torrone,* in great demand at Naples. Pop. (1901) 23,477.

A′very, Benjamin Parke, American journalist and diplomatist: b. New York 1829; d. Peking, China, 8 Nov. 1875. He went to California in 1849 and became connected with several papers on the Pacific coast, among them the San Francisco *Bulletin.* In 1872 he was appointed editor of the ‘Overland Monthly.’ From 1874 to 1875 he was United States minister to China. His chief work is ‘Californian Pictures in Prose and Verse’ (1877).

A′very, Elroy McKendree, American writer: b. Erie, Mich., 1844. He served in the Federal army during the Civil War, and has since been prominent in educational matters. Among his many published works are textbooks in physics and chemistry, ‘Words Correctly Spoken’ (1887); and ‘A Popular History of the United States,’ now in progress of publication.

Avery, Otis, American dentist: b. Bridgewater, Oneida County, N. Y., 19 Aug. 1808; d. Honesdale, Pa., 1904. He then took up the study of dentistry, and began the practice of his profession at Honesdale, Pa., where he lived for the greater part of his life. For some years he was the only dentist between Honesdale and Utica, N. Y., and at the time of his death was the oldest practising dentist in the United States.

A′very, Samuel Putnam, American merchant: b. New York, 17 March 1822; d. there 12 Aug. 1904. He became a copper-plate and wood engraver, and subsequently an art publisher and dealer. He was a founder of the Metropolitan Museum of Art; life member of the American Museum of Natural History, American Geographical Society, American Historical Society, American Zoological Society; president of the Grolier Club, and first president of the Sculpture Society. In 1891, with his wife, he created and endowed the Avery Architectural Library, in Columbia University, as a memorial of his deceased son; and in May 1900 presented to the trustees of the New York Public Library a collection of etchings, lithographs, and photographs, numbering more than 17,500 pieces, together with a number of large volumes illustrated by the same arts.

A′very, Waitstill, American lawyer: b. Norwich, Ct.; d. North Carolina, 1821. He practised his profession successfully; was appointed in 1777 attorney-general of North Carolina, and was at the time of his death the patriarch of the bar of that State. He was prominent in the political affairs of the State, being a member of the State congress prior to the Revolution, and of the State legislature after the establishment of peace. In 1777 he was appointed one of a commission to treat with the Cherokee Indians.

A′very's Gores, the name of several tracts of land in Vermont, granted to Samuel Avery in 1791. One of them is in Addison County, nearly on the summit of the Green Mountains, now forming a part of Granville.

Aves, ā′vās, or **Bird Islands,** a group of small islands belonging to Venezuela, valuable for their deposits of guano.

Aves, ā′vēz, the class of vertebrated animals which contains the birds. They have been defined by Dr. Gadow as “oviparous, warm-blooded, amniotic vertebrates, which have their anterior extremities transformed into wings.” The metacarpus and fingers carry feathers or quills; there is an intertarsal joint, and the feet have not more than four toes, of which the first is the hallux. See Birds.

Aves′ta, or **Zend-Avesta,** the Bible of Zoroaster, the sacred book of ancient Iran, and holy scripture of the modern Parsis. The exact meaning of the name “Avesta” is not certain; it may perhaps signify “law,” “text,” or, more doubtfully, “wisdom,” “revelation.” The modern familiar designation of the book as Zend-Avesta is not strictly accurate; if used at all, it should rather be Avesta-Zend, like “Bible and Commentary,” as *zand* signifies “explanation,” “commentary,” and *Avesta u Zand* is employed in some Persian allusions to the Zoroastrian scriptures as a designation denoting the text of the Avesta accompanied by the Pahlavi version or interpretation. The story of the recovery of the Avesta, or rather the discovery of the Avesta, by the enthusiastic young French scholar, Anquetil du Perron, who was the first to open to the western world the ancient records of Zoroastrianism, reads almost like a romance. Du Perron's own account of his departure for India in 1754, of his experiences with the *dasturs* (or priests) during a seven years' residence among them, of his various

difficulties and annoyances, setbacks, and successes, is entertainingly presented in the introductory volume of his work 'Zend-Avesta, Ouvrage de Zoroastre' (1771). This was the first translation of the ancient Persian books published in a European language. Its appearance formed one of those epochs which are marked by an addition to the literary, religious, or philosophical wealth of our time; a new contribution was added to the riches of the West from the treasures of the East. The field thus thrown open, although worked imperfectly at first, has yielded abundant harvests to the hands of later gleaners. With the growth of knowledge of the language of the sacred texts, we have now a clear idea also of the history of Zoroastrian literature, and of the changes and chances through which with varying fortunes the scriptures have passed. The original Zoroastrian Avesta, according to tradition, was in itself a literature of vast dimensions. Pliny, in his 'Natural History,' speaks of two million verses of Zoroaster; to which may be added the Persian assertion that the original copy of the scriptures was written upon twelve thousand parchments, with gold illuminated letters, and was deposited in the library at Persepolis. But what was the fate of this archetype? Parsi tradition has an answer. Alexander the Great,—"the accursed Iskander," as he is called,—is responsible for its destruction. At the request of the beautiful Thais, as the story goes, he allowed the palace of Persepolis to be burned, and the precious treasure perished in the flames. Whatever view we may take of the different sides of this story, one thing cannot be denied: the invasion of Alexander and the subjugation of Iran was indirectly or directly the cause of a certain religious decadence which followed upon the disruption of the Persian empire, and was answerable for the fact that a great part of the scriptures was forgotten or fell into disuse. Persian tradition lays at the doors of the Greeks the loss of another copy of the original ancient texts, but does not explain in what manner this happened; nor has it any account to give of copies of the prophet's works which Semitic writers say were translated into nearly a dozen different languages. One of these versions was perhaps Greek, for it is generally acknowledged that in the 4th century B.C. the philosopher Theopompus spent much time in giving in his own tongue the contents of the sacred Magian books.

Tradition is unanimous on one point at least: it is that the original Avesta comprised 21 *Nasks,* or books, a statement which there is no good reason to doubt. The same tradition which was acquainted with the general character of those Nasks professes also to tell exactly how many of them survived the inroad of Alexander; for although the sacred text itself was destroyed, its contents were lost only in part, the priests preserving large portions of the precious scriptures. These met with many vicissitudes in the five centuries that intervened between the conquest of Alexander and the great restoration of Zoroastrianism in the 3d century of our era, under the Sassanian dynasty. At this period all obtainable Zoroastrian scriptures were collected, the compilation was codified, and a detailed notice made of the contents of each of the original Nasks compared with the portions then surviving. The original Avesta was, it would appear, a sort of encyclopædic work; not of religion alone, but of useful knowledge relating to law, to the arts, science, the professions, and to every-day life. If we may judge from the existing table of contents of these Nasks, the zealous Sassanians, even in the time of the collecting (226–380 A.D.), were able to restore but a fragment of the archetype, perhaps a fourth part of the original Avesta. Nor was this remnant destined to escape misfortune. The Mohammedan invasion, in the 7th century of our era, added a final and crushing blow. Much of the religion that might otherwise have been handed down to us, despite "the accursed Iskander's" conquest, now perished through the sword and the Koran. Its loss, we must remember, is in part compensated by the Pahlavi religious literature of Sassanian days.

Fragmentary and disjointed as are the remnants of the Avesta, we are fortunate in possessing even this moiety of the Bible of Zoroaster, whose compass is about one tenth that of our own sacred book. A grouping of the existing texts is here presented: (1) Yasna (including Gathas); (2) Visperad; (3) Yashts; (4) Minor Texts; (5) Vendidad; (6) Fragments.

Even these texts no single manuscript in our time contains complete. The present collection is made by combining various Avestan codexes. In spite of the great antiquity of the literature, all the existing manuscripts are comparatively young. None is older than the 13th century of our own era, while the direct history of only one or two can be followed back to about the 10th century. This mere external circumstance has of course no bearing on the actual early age of the Zoroastrian scriptures. It must be kept in mind that Zoroaster lived at least six centuries before the birth of Christ.

Among the six divisions of our present Avesta, the Yasna, Visperad, and Vendidad are closely connected. They are employed in the daily ritual, and they are also accompanied by a version or interpretation in the Pahlavi language, which serves at the same time as a sort of commentary. The three divisions are often found combined into a sort of prayer-book, called Vendidad-Sadah (Vendidad Pure); that is, Avesta text without the Pahlavi rendering. The chapters in this case are arranged with special reference to liturgical usage.

Some idea of the character of the Avesta as it now exists may be derived from the following sketch of its contents and from the illustrative selections presented:

1. *Yasna* (sacrifice, worship), the chief liturgical work of the sacred canon. It consists mainly of ascriptions of praise and of prayer, and corresponds nearly to our idea of a prayer-book. The Yasna comprises 72 chapters; these fall into three nearly equal parts.

The greater part of the Yasna book is of a liturgic or ritualistic nature, and need not here be further described. Special mention, however, must be made of the middle section made up by "the Five Gathas" (hymns, psalms), a division containing the 17 sacred psalms, sayings, sermons, or teachings of Zoroaster himself. These Gathas form the oldest part of the entire canon of the Avesta. In them the prophet of the new faith is speaking with the fervor of the Psalmist of the Bible. In them we feel

the thrill of ardor that characterizes a new and struggling religious band; we are warned by the burning zeal of the preacher of a Church militant. Now, however, comes a cry of despondency, a moment of faint-heartedness at the present triumph of evil, at the success of the wicked and the misery of the righteous; but this gives way to a clarion burst of hopefulness, the trumpet note of a prophet filled with the promise of ultimate victory, the triumph of good over evil. The end of the world cannot be far away; the final overthrow of Ahriman (Anra Mainyu) by Ormazd (Ahura Mazda) is assured; the establishment of a new order of things is certain; at the founding of this "kingdom" the resurrection of the dead will take place and the life eternal will be entered upon.

The *Visperad* (all the masters) is a short collection of prosaic invocations and laudations of sacred things. Its 24 sections form a supplement to the Yasna. Whatever interest this diversion of the Avesta possesses lies entirely on the side of the ritual, and not in the field of literature. In this respect it differs widely from the book of the Yashts, which is next to be mentioned.

Yashts (praises of worship) form a poetical book of 21 hymns, in which the angels of the religion, "the worshipful ones" (*Yazatas, Izads*), are glorified, and the heroes of former days. Much of the material of the Yashts is evidently drawn from pre-Zoroastrian sagas which have been remodeled and adopted, worked over, and modified, and incorporated into the canon of the new-founded religion. There is a mythological and legendary atmosphere about the Yashts, and Firdausi's 'Shah Nameh' serves to throw light on many of the events portrayed in them, or allusions that would otherwise be obscure. All the longer Yashts are in verse, and some of them have poetic merit. There are several translations of the Avesta. The best (except for the Gathas, where the translation is weak) is the French version by Darmesteter, 'Le Zend Avesta,' published in the 'Annales du Musée Guimet'. An English rendering by Darmesteter and Mills is contained in the 'Sacred Books of the East,' Vols. IV., XXIII., XXXI.

Aveyron, ạ'vā-rôñ', a department in the south of France. It is extremely mountainous, and is traversed by five considerable rivers, the Aveyron, after which the department is named, the Viaur, the Truyère, the Lot, and the Tarn. Of these, the only one navigable within the department is the Lot. It is only in the west that plains of any considerable extent are found. Agriculture is in a very defective state, but considerable attention is paid to sheep-breeding. Cheese of an excellent quality is made and exported in large quantities. Aveyron possesses valuable coal, iron, and copper mines, besides other minerals. Pop. (1901) 377,559.

A'viary, a house or enclosure, larger than an ordinary cage, for living birds. Out-of-door aviaries are common in the warm countries of southeastern Europe and in Asia, and are also quite numerous in England. The freedom of motion possible for a bird in a good-sized aviary helps to keep them in good condition, and many species which are unable to bear the close confinement of a cage flourish in the larger enclosures. In a climate like that of the United States, where the extremes of temperature are great, outdoor aviaries are uncommon except in zoological gardens. In the New York Zoological Park is an aviary built in 1900, measuring 153 feet long, 72 feet wide, and 55 feet high; at present this is the largest in the world. It is a wire cage, in the shape of a pointed arch, supported by steel frames. It stands among trees, and several are enclosed by it. Game birds, herons, and other large species live in this aviary, and many smaller species, which would suffer out of doors in winter, dwell there during the summer months. See Cage-Birds.

Avicebron, ä-ve'thā-brōn', **Solomon ben Jehuda ibn Gabriol,** Hebrew poet and philosopher: b. Cordova, about 1028; d. about 1058. Of his poetical works, 'The Royal Crown' is the most famous; of the philosophical, 'The Fountain of Life,' written in Arabic, but known only through a Latin translation (re-edited in Münster, in 1895).

Av'icen'na, Arabian philosopher and physician: b. near Bokhara, 980 A.D.; d. 1037. He completed his studies at the early age of 18, and began to practise as a physician. He settled subsequently at Hamadan, at first as physician to a noble lady, afterward as vizier of the emir. On the death of his patron his son and successor refused to recognize him as vizier, and accordingly he lived in retirement at Hamadan. Going in later life to Ispahan, he passed in quietness the last 14 years of his life, and composed the greater part of his works on medicine, logic, metaphysics, astronomy, and geometry. Avicenna left many writings, mostly commentaries on Aristotle. Of his medical works, the principal is called 'Canon of Medicine,' founded on the Greek writers, and in some parts of the East is still an authority. It has been printed in the original Arabic, and there have been many Latin translations of it. His other works have also appeared in translations.

Av'icen'nia, or **White Mangrove,** a genus of *Verbenaceæ,* consists of trees or large shrubs resembling mangroves, and, like them, growing in tidal estuaries and salt marshes. Their creeping roots, often standing six feet above the mud in crowded pyramidal masses, and the naked asparagus-like suckers which they throw up, have a singular appearance. The bark of *A. tomentosa,* the white mangrove of Brazil, is much used for tanning. A green, resinous substance exuding from *A. resinifera* is eaten by the New Zealanders. The genus is named in memory of the Arabian physician, Avicenna (q.v.).

Avie'nus, Rufus Festus, Latin descriptive poet, who flourished about the end of the 4th century after Christ, and wrote 'Descriptio Orbis Terræ,' a general description of the earth; 'Ora Maritima,' an account of the Mediterranean coasts, etc.

Avignon, ạ've-nyôñ' (ancient *Avenio*), a French city, capital of the department Vaucluse, on the left bank of the Rhone. It consists generally of large antique houses, in narrow, crooked, dirty streets. The principal objects of interest are the large and very ancient cathedral; the papal palace, with lofty massive walls and strong towers, and the chamber of the Inquisition. The silk manufacture is the

principal source of employment at Avignon, and the rearing of silkworms is carried on extensively in the district. The city has also manufactories of velvet, woolen, and other goods, hats, jewelry, etc., with silk dye-works, paper-mills, tanneries, etc., and a trade in wine, brandy, iron, cotton, wool, grain, and other articles, of which it is the entrepôt for Lower Dauphiné, Provence, and all Languedoc. Here Petrarch lived several years; here he saw his Laura, who formed the subject of his most beautiful verses, and whose tomb is still to be found in the Franciscan Church. The fountain of Vaucluse is five leagues from Avignon. It belonged to the papal see from 1348 to 1791, and from March 1309 to September 1376 seven Popes in succession, from Clemens V. to Gregory XI., were compelled to reside in this city. The Catholic historians commonly call this period the Babylonish captivity of the Popes. Pop. about 45,000.

Avila, ä'vẹ-la, **Gil Gonzalez d',** Spanish antiquary and biographer: b. 1577; d. 1658. He was made historiographer of Castile in 1612, and of the Indies in 1641. Most valuable works: 'Teatro de las Grandezas de Madrid' (1623); and 'Teatro Ecclesiastico' (1645–53).

A'vila, Juan de, celebrated Spanish preacher, commonly called the "Apostle of Andalusia"; b. Almodavar del Campo, 1500; d. at Montilla 1569. His missionary labors in Andalusia were prosecuted with singular success, until he arrived at the age of 50, when, with a worn-out constitution, he was obliged to desist. His 'Spiritual Letters' have been translated into most European languages.

Avila y Zuniga, ä'vẹ-lā ẹ thoo'nyẹ-ga, **Don Luis d',** Spanish general, diplomatist, and historian; a favorite of Charles V.: b. about 1490; d. after 1552. His chief work, translated into five or six languages, was on the war of Charles V. in Germany.

A'vila, a town of Spain, the capital of the province of Avila, a modern division of Old Castile. It is the see of the bishop suffragan of Santiago, with a fine cathedral, and was once one of the richest towns of Spain. A university founded here in 1482 by Ferdinand and Isabella continued its existence until the beginning of the 19th century. Saint Theresa and several men celebrated in Spanish history were born here. Principal employment in the town is spinning; in the province, breeding sheep and cattle. Pop. about 12,000.

Av'ison, Oliver R., English physician: b. Yorkshire, 30 June 1860. He removed to Canada in youth, and became professor of materia medica, instructor of microscopy and demonstrator of materia medica in the University of Toronto. In 1893 he went to Korea as a medical missionary; the same year he was appointed to the charge of the Royal Korean Hospital, and in the following year became physician to the royal family.

Avi'tus, Marcus Mæcilius, an emperor of the West. He belonged to a Gaulish family in Auvergne, and gained the favor of Constantius, the colleague of Honorious, and of Theodoric, king of the Visigoths. He served with distinction under Ætius, became Prefect of Gaul, and concluded a favorable treaty with the Goths. He afterward retired into private life until the invasion of Attila, when he induced the Goths to join the Romans against the common enemy. Avitus was proclaimed emperor in 455, took for his colleague Marcianus, and died the year following.

Avitus, Saint, bishop of Vienna from 490 until his death in 523. He was the leading champion of his day in the conflict with Arianism and Semi-Pelagianism. A signal victory in a public disputation gained for him the esteem and confidence of King Gundobald, whose son Sigismund he received into the Catholic Church and who was afterward canonized as a saint. His writings have given him a prominent place in early Burgundian-Roman literature. His chief work is a didactic poem in five books, entitled 'De Spiritalis Historiæ Gestis,' and deals with such subjects as the origin of the world, original sin, etc. Another poem in praise of chastity, while inferior in literary merit to the work just mentioned, contains much of value from a historical standpoint.

Aviz, ä'vesh, **Order of,** a Portuguese order of knighthood, created in 1147 by Alphonso I. The knights were then called Knights of Evora, but took their present title, in 1287, from their gallant defense of the fortress of Aviz against the Moors. The order was changed from an ecclesiastical to a civil institution in 1789. The king of Portugal is grand master.

Avlona, ạv-lō'na, a seaport in Albania, protected by the island of Sasseno, the ancient Saso. It is one of the stations of the Austrian Lloyd steamers, and carries on considerable trade with Brindisi, etc. The Christian inhabitants, chiefly Italians, are engaged in commerce, exporting oil, wool, salt, pitch, and especially some 40,000 tortoise shells yearly. The Turks are employed in the manufacture of weapons and woolen fabrics. Valonia, a material exported to England for tanning, is the pericarp of an acorn grown nearby. Up to 1691 the town belonged to the Venetians. Pop. 6,000.

Avocado (ăv'ō-kā'dō) **Pear,** a tropical fruit. See ALLIGATOR PEAR.

Av'ocet, a shore-bird of the limicoline genus *Recurvirostra,* remarkable for its very slender beak, which curves upward toward the end like a cobbler's awl. It is a near relative of the stilt sandpiper, and various species occur throughout the world. The North American species, *Recurvirostra americana* is found in summer throughout the temperate parts of the country, migrating to the tropics in winter. It is about 17 inches in length, brownish-black above and white below, with the head, neck, and chest light cinnamon. Its general habits are those of sandpipers.

Avoirdupois, ăv'ẹr-dū-poiz' (French *avoir du poids,* to have weight), a system of weights and measures in which a pound contains 7,000 grains or 16 ounces, while a pound troy contains 1,760 grains or 12 ounces. All larger and coarser commodities are weighed by avoirdupois weight. The avoirdupois ounce is less than the troy ounce in proportion of 72 to 79.

Avon, ā'vọn, the name of several rivers in England, the most important of which are the following: (1) The Upper Avon, rising in Leicestershire, runs southwest, and falls into the Severn at Tewkesbury. Stratford-on-Avon,

a town on this river, is the birthplace of Shakespeare; (2) the Lower Avon, which rises near Tetbury, in Gloucestershire, and falls into the Severn northwest of Bristol, being navigable as far as Bath; (3) in Monmouthshire; (4) in Wiltshire and Hampshire, enters the English Channel at Christchurch Bay, in the latter county.

A'vondale, a parish of Scotland, in the county of Lanark. At the battle of Drumclog, fought near this place 1 June 1679, Grahame of Claverhouse, the famous Viscount Dundee, was defeated by the forces of the Scottish Covenant. A graphic description of this battle is found in Sir Walter Scott's 'Old Mortality.'

Avranches, ạ-vränsh' (ancient *Abrincæ*), a town in France, about 3 miles from the Atlantic, and 30 miles east of St. Malo. It is pleasantly situated at the end of a long ride, the summit of which was crowned by a magnificent cathedral; built in the 11th century, and destroyed at the revolution. In this cathedral Henry II. did penance before two of the Pope's legates for the murder of Thomas à Becket. One of its bishops was the celebrated Huet, author of the 'Demonstratio Evangelica.' The manufactures are chiefly lace, white thread, and wax candles, and there is some trade in agricultural produce. Pop. (1896) 7,600.

Avul'sion (Latin, *avulsion,* a tearing off), a term denoting the sudden transfer by natural causes of a portion of one man's land to that of another, as when the course of a river is suddenly changed and former boundaries altered. It differs from accretion, which describes a gradual addition to the property of a riparian owner by the action of the water. See ALLUVION.

Awaji, ạ-wä'jẹ, one of the islands of Japan, situated between the main island and Sikokee. Its area is 218 square miles. Pop. 170,000.

Award' is the judgment or decision of arbitrators or referees, on a matter submitted to them. The award should be consonant with and follow the submission, to be binding. It must be final and certain. It must be possible to be performed, and must not direct anything illegal to be done. At common law an award could be oral or written, but in some of the States an award to be valid must be in writing. The New York Code Civil Procedure provides that an award to be valid must be in writing. See ARBITRATION AND AWARD.

Awata (ạ-wä'tạ) **Ware,** a yellow faience called "egg-ware" by the Japanese, manufactured in the village of Awata, a suburb of Kioto, and largely purchased in the United States.

Awe, â, a narrow Scottish lake in Argyleshire, about 28 miles long, and communicating by the Awe with Loch Etive. It is of great depth, has sloping and well-cultivated shores, terminated by ranges of lofty mountains, among which that of Ben Cruachan, rising to a height of 3,670 feet, at its northern extremity, is most conspicuous. A number of islets are scattered over its surface, and on two of them are some beautiful ruins.

Axayacat, ăx'ạ-yạ-kạt, or **Axayacatl,** a Mexican fly, the eggs of which, deposited abundantly on rushes and flags, are collected and sold as a species of *caviare.* The use of these as an article of diet was learned by the Spanish settlers from their predecessors, the native Indian Mexicans, who called the dish *ahuauhti.*

Axayacatl, ä'chạ-yạ-kä't'l, a Mexican emperor: d. about 1477. He was the father of Montezuma, whom Cortez conquered, and reigned 14 years. He was already famous as a warrior when he became emperor of the Aztecs, and inaugurated his reign by a successful expedition against Tehauntepec, and in 1467, conquered anew the cities of Cotasta and Tochtepec. A little later he repelled the tribes who strove to get possession of the Mexican capital, and maintained a vigorous warfare against his neighbors. The palace of Axayacatl, a gigantic pile of stone buildings, became the barracks of the Spaniards. His treasures were discovered by Cortez, within a concealed door, and the chronicler of the conquest exclaims that "it seemed as if all the riches in the world were in that room." They consisted of gold and silver in bars and in the ore, many jewels of value, and numerous rich and beautiful articles of curious workmanship, as imitations of birds, insects, or flowers.

Axe (apparently an original Aryan word), a long-handled tool for wood-cutting. Its essential feature is the helve, though a certain shape is imposed by the nature of its service. The chipped flint of the oldest Stone Age was a tool of all work, to crush, dig, or cut (rather, bruise off), as occasion demanded, and was too heavy and shapeless to be used except by hand. As soon as one was shaped and sharpened to admit of tying a handle to it for a heavier stroke, the axe came into being, and was probably the earliest implement thus differentiated. So natural a device was separately invented by each race early in its history, and made of the material at hand: flint in England and America; whinstone or granite in Ireland, and by the lake dwellers of the Continent; bone by the American Indians and Eskimos; while stone axes are still used by some of the South Sea Islanders. In all these cases and until the use of metal, the handle was secured with a thong, as piercing with an eye was impracticable. The first copper and bronze "celts" were made in the same way. But when casting had become familiar, it was seen that there was no difficulty in casting a hole to thrust the handle in, making a much surer and heavier stroke; and with this "eye" the modern axe appeared. The bronze axe was lightened and better shaped, and in its turn displaced by iron, for which with the progress of invention has been substituted an iron butt inset with a steel cutting part. The old hand forges have for some generations been replaced by immense establishments with developed machinery. The American process consists of cutting the butt from a piece of white-hot iron, punching the eye, then reheating and shaping it by pressure between concave dies; again heating, cutting in the edge a groove, into which the arched steel edge-piece is set, then welding the two and drawing out the axe to a proper edge by trip-hammers at a white heat. The next process is hammering off the implement by a combination of hand and machine work, and restoring the shape lost in drawing out. It is then ground to symmetry, hung on a revolving table in a furnace, and heated over a small

coal fire, at a peculiar red heat, determined by the eye; cooled in brine and then in fresh water, and removed to another furnace, where it receives the last temper. It is next polished to a finish that shows every flaw, and enables it to resist rust and enter wood easily; then stamped, the head painted to prevent rust, weighed, labeled, and packed for sale. The leading axe establishment of the world is the Collins Company, of Collinsville, Conn., whose processes are largely special inventions for the company. It manufactures 5,000 axes and other edge tools daily, besides other miscellaneous goods; and consumes annually 3,500 tons of iron and 1,200 of steel, and 10,000 tons of coal. Nearly 700 men are employed; 13 water-wheels and four steam engines supply the motive power.

Ax'el, or **Absalon,** Danish prelate, archbishop of Lund: b. near Soroë, Zealand, 1128; d. 1201. His family name was Axel. In 1157 he was chosen bishop of Roeskilde or Rothschild. In that age warlike pursuits were not deemed inconsistent with the clerical office, and Absalon was a renowned warrior by sea and land, as well as a zealous ecclesiastic, his avowed principle being that "both swords, the spiritual and the temporal, were intrusted to the clergy." To his exertions as statesman and soldier Waldemar was largely indebted for the independence and consolidation of his kingdom.

Ax'elsen, a powerful Danish family who flourished in the latter half of the 15th century, and the members of which figured in the wars of Christian I. and John IV. of Denmark, and Karl Knutsen and Eric the Pomeranian, kings of Sweden. Peter Axelsen was the head of the family. Of his nine sons, the eldest, Olaf, made himself master of Gothland; the second, Iver, retained that possession, and became a corsair; the third, Eric, was governor of Stockholm; and the fourth Aage, became a Danish councilor of state.

Axholme, an island in Lincolnshire, England, formed by the rivers Trent, Don, Idle, and Vicardyke. Epworth, the home of the Wesleys, is the principal parish. Its area is 47,000 acres. The soil is exceedingly fertile.

Ax'il, in botany, the angle between the upper side of a leaf and the stem or branch from which it grows. Buds usually grow out from the stem in axils of leaves, and this position is naturally termed axillary. In anatomical terminology, the axilla is the armpit.

Axim, ą-shēng', or ăx'ĭm, an important station and port on the African Gold Coast, near the mouth of the Ancobrah River. Inland from Axim, in the basin of that river, and in the district between it and the Prah, gold-mining operations have been carried on on a large scale. It was ceded to the English by the Dutch in 1872.

Ax'inite (Greek, "like an axe"), a mineral usually occurring in broad, acute-edged triclinic crystals, suggestive, in shape, of an axe. It has a glassy lustre, brown or yellow in color, and is translucent and strongly pleochroic. It has a hardness of 6.5 to 7, and a specific gravity of about 3.28. Its exact composition is still doubtful, but it may be described as a calcium and aluminum borosilicate, containing also varying amounts of manganese and iron. Its most important occurrences are in Dauphiné, France, Mount Skopi, Switzerland, in Japan and at Franklin Furnace, N. J.

Axin'oman'cy, a mode of divination much practised by the ancient Greeks, particularly with the view of discovering the perpetrators of great crimes. An axe poised upon a stake was supposed to move so as to indicate the guilty person; or the names of suspected persons being pronounced, the motion of the axe at a particular name was accepted as a sign of guilt. Another method of axinomancy was by watching the movements of an agate placed upon a red-hot axe.

Ax'iom (an assumption), a universal proposition, which the understanding must perceive to be true as soon as it perceives the meaning of the words, though it cannot be proved. It is, therefore, called a self-evident truth. In mathematics, axioms are those propositions which are assumed without proof, as being in themselves independent of proof, and which are made the basis of all the subsequent reasoning. Euclid has assumed 15 axioms as the basis of geometry. Among these are: "The whole is greater than its part"; "Things that are equal to the same thing are equal to one another"; "Magnitudes which coincide, that is, which exactly fill the same space, are equal to one another in every respect." Bacon calls axiom a general principle, obtained by experiment and observation, from which we may safely proceed to reason in all other instances; and Newton gives the name of axiom to the laws of motion, which, of course, are ascertained by the investigation of nature; he also terms axioms those general experimental truths or facts which form the groundwork of the science of optics.

Ax'is (in crystallography). See Crystal.

Ax'is (Latin, of unknown origin), a white-spotted deer (*Axis axis*) of India and the East Indies, known locally among the Hindus as "chitra," among the English as the "hog-deer." It resembles the European fallow deer in size and color, and as it is easily domesticated, is a favorite in European parks. The slender, sharp-pointed horns are not palmated and only a little branched, while the female is hornless. It is timid and usually goes in small herds, in which females largely predominate. It lives in thick jungles near water, and usually feeds in the night. Colored plates, illustrating its varieties, are given in Lydekker's 'Deer of All Lands' (1898).

Ax'minster, a market town in Devonshire, England, 24 miles east of Exeter, on the side of a hill that rises above the River Axe. The only public building worthy of notice is the parish church, a very ancient edifice, containing some interesting antique monuments. Axminster was at one time celebrated for its woolen cloth, and carpet manufactures, and gave name to a special make of carpet having a thick, soft pile. Brushes are now made here, and there are flour and other mills. Pop. (1901) 4,100.

Axolotl, ăx'ō-lŏtl (Mex., "play in the water"), a larval salamander regarded as edible. They are numerous in the lakes about the City of Mexico, are 6 to 10 inches long, and are prepared by either roasting or boiling, and eaten with vinegar or cayenne pepper. The

most extraordinary thing about them, however, is the fact that they are the young of a species of terrestrial salamander (*Amblystoma tigrinum*), well known over all the warmer parts of the United States and Mexico, which in these lakes never transform into adults, but remain permanently in the larval condition, yet become sexually mature when about six months old, so that they are able to breed. This astonishing fact was long unknown. The axolotl has bushy, external gills similar to those which permanently characterize the mud-puppy. It was regarded as a distinct animal, and named *Siredon lichenoides*. The discovery of the truth was made accidentally in Paris in 1865, when some axolotls in an aquarium in the Jardin des Plantes lost their gills and were transformed into perfected amblystomas. A lady, studying in the University of Freiburg, Frl. Marie von Chauvin, then undertook a series of careful experiments with other captives, and worked out the complete history of metamorphosis, which is dependent (at least in Europe) on a very narrow set of favorable circumstances, but differs in no essential degree from that of other salamanders (q.v.). Why the change never takes place in the Mexican lakes is unexplained. The theories in regard to it, and the detailed history of the observations above mentioned, are given by Gadow in 'Amphibia and Reptiles' (1901), with many references to other books and periodicals.

Ax'on, that part of the nerve cell that carries the nervous impulses, the axis cylinder process, or the nerve fibre proper. See Nerve Cell; Nerve Fibre.

Axum, ax-oom', a town in Abyssinia, once the capital of a powerful kingdom, and at one time the great depot of the ivory trade in the Red Sea. The importance of this city and its kings was first made known to us by a stone (*Axumitic marble*) with a Greek inscription, first explained by Salt, who discovered it, and afterward by Buttmann and Niebuhr. The interest in this inscription was increased by the explanation which it afforded of the second half of the Adulian marble. Axum, the place where it was found, still exhibits many remains of its former greatness. Among its ruins are shown the royal throne, and groups of obelisks, originally 55 in number, one of which Salt declared to be the most beautiful that he had seen. Pop. 5,000. See Bent, 'The Sacred City of the Ethiopians' (1893).

Ayacucho, ä'ya-koo'chō, the name of a department of Peru and also of its capital. The department has an area of about 24,000 square miles, and is traversed by both chains of the Cordilleras and watered by numerous rivers. It produces coffee, sugar, cotton, etc. The capital, situated on the main road from Lima to Cuzco, has a cathedral and a university. It was founded by Pizarro in 1539, and long known as Huamanga. A battle took place here, one of the most celebrated in the history of South America, having been decisive of the independence of upper and lower Peru. See Ayacucho, Battle of. Pop. of town 22,000.

Ayacucho, The Battle of, a decisive engagement in the South American struggle for liberty; was fought on 9 Dec. 1824, at and near the Peruvian town of that name. On the one side was the Spanish viceroy of Peru with nearly all that remained of the Spanish power in its last stronghold upon the continent; on the other Gen. Sucre, second in command to Bolivar (the latter not being present), with Colombian troops, and Peruvians led by Gen. Lamar. The viceroy was taken prisoner; the utter defeat of his army made possible the independence of Bolivia (realized the following year), and strengthened the republican governments in all the neighboring states.

Ayala, a-yä'la, **Adelardo Lopez de,** a Spanish dramatist: b. Gaudalcanal, Badajoz, March 1820; d. 30 Dec. 1879. After studying law in Seville, he went to Madrid, where he devoted himself entirely to poetry and speedily won national fame. His first drama, 'A Statesman' (1851), met with immediate success, and was followed in the same year by 'The Two Noblemen,' and 'Penalty and Pardon.' To the modern comedy of manners, his specific domain, he first contributed 'The Glass Roof,' and in 1861 attained to wide reputation with 'Percentage.' Of his other works the most noteworthy are 'The Modern Don Juan' (1863); and 'Consuelo' (1878), a drama.

Aya'la, Lopez de, Spanish historian and poet: b. 1332; d. 1407. He was a prominent statesman and warrior during the reigns of the Castilian kings Pedro the Cruel, Henry II., John I., and Henry III., and is known as the author of a 'Chronicle of the Kings of Castille' (his contemporaries), in which the crimes of Pedro the Cruel are detailed and drawn in colors said to be sometimes overcharged.

Ayamonte, ä'ya-mōn'tā, a seaport town in Spain, near the mouth of the Guadiana, which here forms the boundary between Spain and Portugal.

Aycock, Charles Brantley, American politician: b. Mahunta, now Fremont, Wayne County, N. C., 1 Nov. 1859. He was educated at the University of North Carolina, studied law and began the practice of his profession at Goldsboro, N. C., in 1881. In 1893 he was appointed United States district attorney for the eastern district, and in 1900 was elected governor of North Carolina by a majority which was the largest ever given to a gubernatorial candidate in that State.

Aye-Aye, äï'äï' (native Malagasy name; from its cry), a lemur (*Daubentonia madagascarensis*), about the size of a rabbit, and with teeth like a bat. It is small and brownish, with a long bushy tail. Arborial and nocturnal in habit, it lives in bamboo jungles feeding on vegetables and the larvæ of certain borers. Its feet, as well as its hands, have opposable thumbs, and exceedingly long, naked, flexible-fingers armed with pointed nails, suitable for extracting grubs out of deep crevices.

Ayeen, ä-yēn', or **Akbery,** a valuable statistical description of the Mogul empire as it was in the reign of Akbar. It was compiled by Abul Fazi, the vizier of the Emperor Akbar. There is an English translation of it by Gladwin.

Ayesha, a-yĕ'shä, the daughter of Abu-Bekr, the favorite wife of Mohammed: b. 610 or 611; d. 677 or 678. After Mohammed's death she opposed the succession of Ali, raised an army against him, and was taken prisoner, but dismissed with that spirit of chivalry which had already arisen among the Arabians.

Aylesbury, ālz'bĕr-ĭ, a market town in Buckinghamshire, England, 38 miles northwest of London, in the centre of the fertile valley of Aylesbury. There are many old houses, irregularly but picturesquely built. The parish church of St. Mary is a fine early English edifice, and there are various other places of worship; a county-hall, market-house, clock tower, and corn exchange. There are also baths, a large county hospital, and the only convict prison for women in England. The chief industries are printing, making condensed milk, and poultry-raising for the London market, Aylesbury ducks being widely known, and there are several breweries and flour-mills. Pop. (1901) 9,244.

Ayles'bury Duck. See DUCKS.

Aylesford, ālz'fĕrd, a town in Kent, England, three miles from Maidstone. In its vicinity is the remarkable monument called Kit's Coty House, a kind of Druidical cromlech.

Ayllon, ī-lyōn, **Lucas Vasquez de,** Spanish adventurer: b. about 1475; d. 1526, who, in 1509, occupied the position of counsel at the supreme court of St. Domingo, and was subsequently employed by Fernando Cortes, on a mission to Velasquez. In 1520, he joined an expedition to Florida, treacherously captured a great number of natives, and proposed to found a new colony, but was unsuccessful, and is supposed to have lost his life while engaged in a second expedition to Florida.

Aylmer, āl'mĕr, **John,** English prelate: b. Norfolk 1521; d. 1594. He was tutor to Lady Jane Grey. On the accession of Mary, he was forced to leave his country, but when Queen Elizabeth came to the throne he returned to England; and in 1576 was made bishop of London.

Ayl'mer, Matthew, Canadian military officer: b. Melbourne, P. Q., 28 March 1842. He entered the British army in 1864; retired from the imperial service and entered the Canadian volunteer militia in 1870; and became adjutant-general of the Dominion militia, the highest military office in Canada next to that of the major-general commanding, in 1896.

Ayl'mer-Gowing, Emilia, English poet and reciter: b. Bath, October 1846. She was educated partly in Brighton, partly in Paris, where she received the attention of Lamartine. After a short career on the stage she successfully produced two dramas, 'A Life Race,' and 'A Crown for Love.' Her 'Ballads and Poems,' and 'The Cithern' have become popular, as well as two novels, 'The Jewel Reputation,' and 'An Unruly Spirit.' In 1891 she published 'Ballads of the Tower and Other Poems.'

Ayl'mer, Lake. (1) A Canadian lake, lying 80 miles north of Great Slave Lake on the margin of the forest area. (2) A Canadian lake in Quebec, about 70 miles south of the city of Quebec.

Ay'loffe, ā'lŏf, **Sir Joseph,** an English antiquary: b. about 1708; d. 1781. He was one of the first council of the Society of Antiquaries, a commissioner for the preservation of state papers, and author and editor of several works, of which the best known is his 'Calendars of the Auntient Charters,' etc.

Aymaras, ī'mą-räz', an Indian race of Bolivia and Peru, speaking a language akin to the Quichua. They are physically characterized by great chest development, caused by the rarefied air of the region they inhabit.

Aymon, ā'mŏn, the surname of four brothers, called respectively Alard, Richard, Guiscard, and Renaud, sons of Aymon or Haimon, Count of Oordogne, who figure among the most illustrious heroes of the chivalric poetry of the Middle Ages; but their historic existence must be considered problematical. Their career furnished rich material to the romantic narratives of Italy in the 15th and 16th centuries. A novel, entitled 'The Four Aymon Brothers,' by Huon de Villeneuve, a French poet of the age of Philip Augustus, details very minutely their exploits, and Ariosto conferred a poetical immortality on the family by the publication of his 'Roland,' in which Renaud, the bravest of the four brothers, plays continually the most distinguished part.

Ay'oubites, or **Ayyubites,** the Saracenic dynasty founded by Saladin, which in Egypt supplanted the Fatimite caliphs, about 1171 A.D. Several of the descendants of Saladin, known as Ayoubites, afterward ruled in Egypt, Syria, Armenia, and Arabia Felix. In the 13th century their power was destroyed by the Mamelukes.

Ayr, ār, a town in Scotland, on the river Ayr, and 34 miles south-southwest of Glasgow. The principal streets of modern Ayr are spacious and well paved, and many of the buildings handsome. The most important edifices are several churches of the various denominations; the town-hall and connected offices, in great part completed in 1881, surmounted by a fine spire of older date, 226 feet high; the county buildings; the academy, a celebrated educational institute, the buildings of which are handsome and commodious; the Wallace tower, 115 feet high on the site of a more ancient tower; the free library; the railway station and hotel; a hospital; etc. There is a handsome esplanade along the sea front 1,500 yards long. Two bridges connect Ayr with Newton and Wallacetown, incorporated in the burgh. One of these, opened in 1879, occupies the place of the "New Brig" of Burns' 'Brigs of Ayr,' the "Auld Brig" (built 1252) being still serviceable for foot traffic. There is now also a third bridge farther up the river, besides the railway bridge. Ayr exports manufactured goods, iron, coal, whetstones, etc.; and imports iron-ore, grain, timber, slates, bricks, etc. The harbor lies within the mouth of the river, and is enclosed and protected by a north and a south pier and a breakwater; there being also a wet dock and a slip dock. Shipbuilding is carried on, also tanning, boot and shoe making, the manufacture of carpets, lace curtains, etc. The poet Burns, as is well known, was born in a house which stands within one and one half miles of the town, between it and the church of Alloway ("Alloway's auld haunted kirk"), and a monument has been erected to his memory on a height between the church and the bridge over the Doon. Pop. (1901) 28,624.

Ayr, a river of Ayrshire, Scotland, which after a course westward of 18 miles, finally loses itself in the Frith of Clyde below the town of Ayr.

Ayrer, ī'rẽr, **Jacob,** German dramatist: b. Nuremberg about 1560; d. there, 26 March 1605. Between 1595 and 1605 he wrote more than 100 plays, of which the 'Opus Theatricum' (Nuremberg 1618) contains 30 tragedies and comedies, and 36 Shrovetide plays and vaudevilles. In his dramas the influence of the English stage is apparent.

Ayres, ārz, **Alfred.** See OSMUN, THOMAS ERMBLEY.

Ayres, Anne, American author: b. England, 1816; d. February 1896. She was the first member of an American sisterhood in the Protestant Episcopal Church. She wrote 'Evangelical Sisterhood' (1867); and 'Life of Augustus Muhlenberg.'

Ayres, Romeyn Beck, American soldier: b. East Creek, N. Y., 20 Dec. 1825; d. New York 4 Dec. 1888. He served in the Federal army during the Civil War, and at its close was brevetted brigadier-general and major-general in the volunteer and regular service.

Ayr'shire, an extensive maritime county of Scotland, about 60 miles in length, with a breadth varying from 10 to 26 miles. Its coast line is about 75 miles in length, has several excellent harbors. The singular rock off the coast, known by the name of Ailsa Craig, belongs to the county, as also do one or two other islets. The surface has no great elevations, the highest summits varying from about 1,200 to 1,900 feet. The principal streams are the Ayr, Stinchar, Girvan, Doon, Irvine, and Garnock.

The mineral riches are very considerable. Coal is abundant, especially in the middle and northern parts of the county, and there are over 100 collieries. Extensive seams also of blackband ironstone exist, and are now being actively worked, Ayrshire having become the great seat of the iron manufactures of Scotland next to Lanarkshire. Plumbago is found in some localities; and lead, antimony, and copper are also met with. Limestone and freestone abound. Millstones, of coarse granite, much esteemed for their hardness and durability, are quarried near the north coast, in the district of Cunningham.

The native sheep are bred in great numbers; their wool is coarse and scanty, but the flesh is excellent. The horses of Ayrshire are of superior breed, being hardy, strong, and of large size. The woolen manufactures are extensive, particularly carpets, bonnets, and worsted shawls, which are produced in great quantities. On the coast is the ancient castle of Turnberry, in which Robert Bruce, king of Scotland, is said to have been born, and where he is known to have spent many of his youthful years. It was here that a fire, accidentally kindled, was mistaken by Bruce for an appointed signal, and caused him to cross the sea from the island of Arran opposite to attempt the deliverance of his country. Of the ecclesiastical ruins the most interesting is the abbey of Crossragruel, founded in 1244. The chief towns are Ayr, Kilmarnock, Irvine, Troon, Saltcoats, Largs, and Ardrossan. Pop. (1901) 254,436.

Ayrton, ār-tŏn, **William Edward,** English electrician and inventor: b. London 1847. He entered the Indian telegraph service, having studied electrical engineering with Prof. William Thomson; became electrical superintendent and introduced throughout India the system of determining the position of a fault by electrically testing one end of a line. In 1873–9 he was professor of natural philosophy and telegraphy at the Imperial College of Engineering in Japan; in 1879 became professor of applied physics in London Technical College, and, in 1884, chief professor of physics at the Central Institute, South Kensington. He was elected president of the Institute of Electrical Engineering in 1892. With Prof. Perry, he invented the ammeter, voltmeter, electric power meter, ohmmeter, and dispersion-photometer; and, with Profs. Jenkin and Perry, the system of telpherage. He has been a voluminous writer and is widely known for his 'Practical Electricity.'

Aytoun, ā'toon, **Sir Robert,** Scottish poet: b. 1570; d. London, March 1630, and studied at St. Andrews. He addressed an elegant panegyric in Latin verse to King James on his accession to the crown of England, which had, no doubt, some influence in securing to the author the favor of that monarch. He was at a later period of his life honored with the appointment of secretary to Henrietta Maria, queen of Charles I. During his residence abroad, as well as at the court of England, he lived in intimacy with, and secured the esteem of, the most eminent persons of his time. The poems of Sir Robert Aytoun, for the first time published together in the Miscellany of the Bannatyne Club, are few in number, but are distinguished by their elegance of diction. Several of his Latin poems are preserved in the work called 'Delitiæ Poetarum Scotorum' (1637).

Ay'toun, William Edmondstoune, Scottish poet and prose writer: b. Edinburgh, 1813; d. Blackhills, Elgin, 4 Aug. 1865. He studied at the University of Edinburgh, and passed as advocate in 1840. His first independent work was the 'Life and Times of Richard I.' (1840). In 1848 he published a collection of ballads entitled 'Lays of the Scottish Cavaliers,' which has continued to be the most popular of all his works, and has passed through numerous editions. It was followed in 1854 by 'Firmilian, a Spasmodic Tragedy'; in 1856 by the poem of 'Bothwell'; and in subsequent years by the novel called 'Norman Sinclair,' and various other original works. In 1858 he issued a critical and annotated edition of the 'Ballads of Scotland.' The translation of the poems and ballads of Goethe which he undertook in conjunction with Theodore Martin was less successful than some of his other works. In 1845 he was appointed professor of rhetoric and English literature in the University of Edinburgh — a position which he held till his death. In 1854 he became editor of 'Blackwood's Magazine.'

Ayuntamiento, ą-yoon'tą-myān'tō, the name given in Spain to municipal councils. Firmly established during the struggles with the Moors, the ayuntamientos acquired great influence and political power, the nobility being admitted to them without their class privileges. The Cortes, in 1812, adopted the leading features of the former system. On the return of Ferdinand VII., the ayuntamientos were abolished, but restored in 1837. The ayuntamientos were empowered to make up the lists of electors and jurors, to organize the national guards, to command the police within their own bounds, to direct the apportionment and raising of taxes, and

to manage the funds of the commune. The municipal law of 1870 deprived them of all political authority, and regulated them as administrative bodies, subject in certain respects to the authorities of the provinces, the law courts, and the Cortes.

Aza'lea, a genus of about 25 species of shrubs of the natural order *Ericaceæ,* natives of the northern hemisphere, principally of eastern Asia and North America. By some botanists the genus is united with rhododendron (q.v.), as may be seen below. The species have deciduous or evergreen leaves and showy, often fragrant flowers, usually in terminal umbel-like racemes. They are commonly divided into two groups: the Indian azaleas and the hardy deciduous azaleas, including the Ghent hybrid forms. The Indian azaleas, mostly imported from Holland and forced in greenhouses, are propagated by grafts or cuttings, rarely by seeds. They are planted in loose, moderately fertile soil; sheltered from the sun and watered freely during the summer; repotted in early autumn; and, by special attention, brought into flower as desired from late autumn until early summer. The leading species of the group is *A. indica* (*R. indicum*), of which two varieties, *amœna* and *kœmoferi* are fairly hardy as far north as New Jersey. The members of the hardy group need some protection in the north and in exposed situations to prevent injury to the flower-buds due to sudden variations of temperature. Named varieties are usually propagated by grafts or by cuttings. Seedlings are often grown for their own merits, but are generally used for stocks upon which to graft choicer varieties. The following are among the best known species of this group: *A. vaseyi* (*R. vaseyi*), an excellent North Carolina species with spotted flowers which appear in early May; *A. nudiflora* (*R. nudiflorum*) pinxter-flower, found from Canada to the Gulf of Mexico, has pink, white, or sometimes purple flowers in mid-spring; *A. calendulacea* (*R. calendulaceum*), found from Pennsylvania to Georgia, has large orange- or flame-colored, particularly handsome blossoms in late spring; *A. occidentalis* (*R. occidentale*), a California species, bears fragrant, white, pinkish flowers in early summer; *A. arborescens* (*R. arborescens*), found in the Alleghany Mountains, has fragrant white or pink flowers in June; *A. viscosa* (*R. viscosum*), clammy azalea or white swamp honeysuckle, is found in swamps from maritime Canada to Florida and westward to Arkansas, and bears fragrant white or pink flowers in June or July. Among the Asiatic members of this group the best known are probably: *A. mollis* (*R. molle*); *A. rhombica* (*R. rhombicum*); and *A. pontica* (*R. ponticum*). Consult: Halliday, ‹Treatise on the Propagation and Cultivation of Azalea Indica›; Van Geert, ‹Iconographie des Azalées›; Bailey and Miller, ‹Cyclopedia of American Horticulture.›

Azari'as, Brother (Patrick Francis Mullany), b. 29 June 1847, near Killenaule, County of Tipperary, Ireland; d. 20 Aug. 1893, Plattsburgh, N. Y. (Cliff Haven). His father emigrated to the United States in 1851, leaving Patrick, his eldest son, in Ireland a few years on account of his health. Deerfield, N. Y., a place near Utica, was the new home, where he attended the public school and later the Christian Brothers' academy in Utica. At the early age of fourteen he decided to become a Brother, and on June 29, 1862, Patrick Francis Mullany received the black habit and white collar of a Christian Brother, and henceforth became known to the world as Brother Azarias. At the age of seventeen he was put in charge of a large class; and at the age of nineteen he was professor of mathematics in Rock Hill College, near Baltimore, Md. Ten years later, he was made head of the college. His first book, ‹An Essay Contributing to a Philosophy of Literature› (1874), won him the respect of scholars. His philosophical articles on literature, published in various magazines, were well received, and he was soon in demand as a lecturer before educational bodies, Catholic and non-Catholic. When in the 80's he went to Europe, he found friends everywhere; scholars who had read his books, men like Cardinal Newman greeted him as a friend. He was a promoter of the Catholic Summer School of America, and of several other educational movements. After finishing his course of lectures at the Catholic Summer School at Cliff Haven, 1893, he was too ill to go home or to any of the other meetings where he was expected. His last days were spent in «Blue Point Hotel,» near the Summer School grounds. His published works are: ‹Aristotle and the Christian Church›; ‹Books and Reading›; ‹Culture of Spiritual Sense›; ‹Development of English Literature›; ‹Development of Old English Thought›; ‹Essays Educational›; ‹Essays Miscellaneous›; ‹Essays Philosophical›; ‹Mary, Queen of May›; ‹Mary, Queen of May and Essays›; ‹Phases of Thought and Criticism›; ‹Philosophy of Literature›; ‹Psychological Aspects of Education.›

Azeglio, ad-zā'lyō, **Massimo Taparelli, Marquis d',** Italian author, artist, diplomatist, and statesman: b. Turin, 1801; d. 16 Jan. 1866. In 1816 he accompanied his father to Rome, and there occupied his time principally with painting and music. He was already favorably known as a painter, when, in 1830, he went to Milan, married the daughter of Manzoni, the great novelist, and wrote several romances. The earliest of these, ‹Ettore Fieramosca,› was received with great enthusiasm. His next romance, ‹Niccolò de Lapi,› became equally popular, and is esteemed by Italian critics the best historical novel in any language. Deeply imbued with the spirit of Italian nationality, in 1842 Azeglio made a tour through the provinces of Italy, awakening the revolutionary spirit which troubled the last years of Gregory XVI. After the revolution of 1848 he supported the cause of the king of Piedmont, and, at the head of the papal troops, fought against the Austrians at Vicenza, where he was wounded. In 1849 Victor Emmanuel appointed him president of the cabinet of ministers, an office which he resigned in 1852 to his political adversary, Count Cavour. In 1859, after the peace of Villafranca, he undertook a confidential mission as ambassador extraordinary to England; and was afterward appointed governor of the city of Milan.

Az'imuth, in astronomy, the arc of the horizon comprehended between the meridian of the observer and the vertical circle passing through the star. It is easterly if the star is

observed before, westerly if after, and zero if at the time of culmination. It is usual to connect with the quadrant a graduated, horizontal circle, called the *azimuth circle.*

Azio, Greece, a village on the gulf of Arta, in the district and promontory of the same name. A German archæologist, Dr. Erlinger, succeeded, in 1857, after several years' investigation, in ascertaining the position of the camps of Antony and Augustus, precisely as it was on the eve of the battle of Actium. He found the camp of the latter surrounded by a cincture of redoubts about 5½ miles in extent, which were constructed in stone, and protected by a ditch. In advance of the camp were external works, consisting of several small forts of observation, one of them serving as a telegraph for communicating with the fleet. In the ruins of one of these forts was discovered a tablet in steel, on which signals are traced, resembling somewhat those of the aërial telegraphs.

Azkar Tuarik, an African tribe of the Tuariks, who inhabit the desert country between Ghat on the north and the tracts of the Kelowi Tuariks on the south, between lat. 21° and 26° N. They were first visited and made known to the European world by the British central African expedition of Barth, Overweg, and Richardson. The country in the north is a barren plain, with scarcely any vegetation, and with isolated granite peaks, and few or no animals. The southern portion, bordering on the Kelowi Tuariks, is the uninhabited central region of the great desert. The inhabitants of Azkar, like the rest of the Tuariks, belong to the Berber and not to the negro race. They are fanatical Mohammedans in religion, hating both Pagan and Christian. They are monogamists. They are a warlike aristocracy, divided into 5 *tiyusi,* or clans, and subdivided into 30 divisions or *fayas,* each of which has a separate chief.

Azmari, the name applied to a set of vagrant beggars in Abyssinia, part of whom form the music bands of the Abyssinian army, while the rest exercise their musical voices in the street, especially on religious holidays.

Azo, or **Azzo,** or **Azzolinus, Portius,** an Italian lawyer, d. in 1200. He professed jurisprudence at Bologna with such éclat that the college could not contain all his auditors, so that he had to take to the public square.

Azoben'zene. See BENZENE.

Az'o Colors. See COAL TAR COLORS.

Azo'ic, the name given to the earliest geological period, before the appearance of life on the earth. It includes the oldest rocks, mostly granites, gneisses, and schists, in which there are no traces of organic remains. The term is practically synonymous with Archæan.

Azores, or **Western Islands,** a Portuguese archipelago, in the mid-Atlantic, between lat. 36° 55′ and 39° 55′ N. and between lon. 25° 10′ and 31° 16′ W. Stretching over a distance of 400 miles, their nine islands are divided into three distinct groups — Sta Maria and Saõ Miguel in the southeast; Terceira, Saõ Jorge, Pico, Graciosa, and Fayal in the middle; and Flores and Corvo in the northwest. Of these, Flores lies 1,176 miles west of Cape Rocca in Portugal, 1,484 miles southwest of Falmouth, and 1,708 miles east-southeast of Halifax. In 1431–53 the Azores were taken possession of by the Portuguese. They were at that time uninhabited; but that they had been visited by the Carthaginians is proved by Punic coins found on Corvo. They seem to have been known to the Arabian geographer Edrisi in the 12th century; and they are marked distinctly on a map of 1351. The Portuguese colonists called the whole group Azores, from *acor* or *azor,* a hawk; and they named two individual islands, Corvo and Saõ Jorge, from Corvi Marini and San Zorze, which, according to a map of 1375, had been previously seen in the western ocean. In 1466 Alfonso V. made a life grant of the island of Fayal to his aunt, the duchess of Burgundy, and from this circumstance many settlers migrated thither from Flanders.

The total area of the group is 919 square miles, and the population (1890) 255,594. The area, population, and the maximum altitude of the different islands are as follows: Sta Maria (38 square miles; 5,880; 1,889 feet); Saõ Miguel (299 square miles; 107,000; 3,854 feet); Terceira (164 square miles; 45,391; 3,435 feet); Graciosa (24 square miles; 8,718); Saõ Jorge (91 square miles; 18,000); Pico (173 square miles; 27,904; 7,613 feet); Fayal (69 square miles; 26,264); Flores (54 square miles; 10,700; 3,087 feet); Corvo (7 square miles; 1,000). The capital is Angra, in Terceira; but Ponta Delgada, in Saõ Miguel, is a larger town. The Azores are of volcanic origin, and with the exception of Corvo, Flores, and Graciosa, are still liable to eruptions and violent earthquakes, the worst of 21 shocks since 1444 having been those of 1591, 1638, 1719, and 1841. Hot mineral springs are numerous; and the baths of Furnas, in Saõ Miguel, are much resorted to by invalids. The coast is generally steep and rugged; the interior abounds in ravines and mountains. Perhaps the greatest want of the group is a good harbor. The Azores are regarded as a province, not a colony, of Portugal, and as belonging to Europe.

Az'ote, a name formerly given to nitrogen; hence substances containing nitrogen and forming a part of the structure of plants and animals are known as azotized bodies. Such are albumen, fibrine, casein, gelatine, urea, kreatine, etc.

Az'otine, a substance procured by decomposing wool by the action of steam at 150° C. under a pressure of five atmospheres; the product, afterward dried by evaporation, contains nitrogen completely soluble in water. Azotine is mixed with dried blood for a fertilizer.

Azov, ä-zōf′, a town in the south of Russia, on the Don, seven miles from its mouth. The sand and mud deposited by the river have choked up the port, so that its trade and shipping have dwindled away, and the inhabitants depend mostly on fish-curing. Azov was built nine miles from the site of the ancient Greek colony of Tanaïs; and when, in the 13th century, it was taken possession of by the Genoese, they altered its name to Tana. They were driven out of it by Timur (Tamerlane) in 1392. In 1471 it was taken by the Turks, and in 1696 by Peter the Great; and it was finally ceded to Russia in 1774. Pop. (1897) 27,500.

Azov′, Sea of (ancient *Palus Mœotis*), an arm of the Black Sea, with which it is united by the Straits of Kertch. Its length, southwest to northeast, is about 168, its breadth about

80 miles; greatest depth, near its north side, not more than 8 fathoms. The western part, called the Putrid Sea, bordering on the Crimea, is separated from the main expanse by a long sandy belt, called Arabat, along which a military road has been formed. The sea teems with fish. Of the islands it contains, Benesch, the largest, has an area of 65 square miles.

Azpeitia, ath-pā'e-tya, a town in Spain, 18 miles southwest of San Sebastian. A mile from it is the famous convent of Loyola, now converted into a museum and built by the Roman architect, Fontana, in 1683. It includes the tower of the Santa Casa, in which St. Ignatius of Loyola, the founder of the Society of Jesus, was born in 1491. Here every year in July a great festival is held in his honor, to which pilgrims flock from all quarters. Pop. about 7,000.

Azrael, ăz'rā-ĕl, in Mohammedan mythology, the angel of death.

Az'rek, the principal stream of Abyssinia, which, after a winding course through Abyssinia and Sennaar, falls into the Nile above Gerri.

Az'tec Club, an organization formed to preserve the memories of the war in Mexico, established in Mexico in 1847.

Az'tec Confederacy. The name Aztecs (properly Aztecas) is currently used for all the Nahua (q.v.) tribes in Mexico at the time of the Spanish conquest. It belongs at most only to the seven more closely cognate tribes which occupied the valley of Mexico, and is by some restricted to the one tribe which built Tenochtitlan, or Mexico City, and is so used for convenience here. The name is from the unidentified place (generally assumed as northward) whence they came, Aztlan, variously interpreted as "heron place," "heron-clan place," "white place," and "seacoast"; the best opinion makes it Jalisco or Michoacan, on the west coast of Mexico. Apparently some time from the 9th to the 11th century they invaded the plateau of Anahuac ("waterside," lake district), where tribes of the same stock were already living, and took possession of several commanding points; the chief pueblo being that of the Aztecs or Toltecs at Tollan (now Tula), some 40 miles north of Mexico City, a leading pass from the north into the valley of Mexico. Driven from this by the warfare of the other natives the Aztecs moved south into the valley, and established themselves in the salt marshes where the outlet of lakes Chalco and Xochimilico flows into Lake Tezcuco, amid which in 1325 (the first absolutely sure date in their history) they built Tenochtitlan, now the city of Mexico. They converted it by dikes and causeways into an island, and gradually made it another Venice, a stone town intersected with canals, the strongest position in Mexico. For more than a century, however, they were tributary to the great pueblo of Azcaputzalco, near them on the western shore of the lake. Gradually they formed a stable military organization and more stable civil society; in 1375 they elected their first "chief of men," war chief and priest in one — Acamapichtli, often styled in books "the founder of the Mexican empire"; and under the fourth chief, Izcoatzin, allied themselves with Tezcuco on the eastern lake shore. The two destroyed Azcaputzalco about 1430 and deported the surviving inhabitants to Tlacopan, near Mexico, which was made tributary to the latter. Tenochtitlan, Tezcuco, and Tlacopan then formed a league (the Aztec Confederacy, formerly termed the "Aztec empire"), purely for plunder and tribute, not at all for government or incorporation. The tribute was not only of food and similar supplies, a certain amount of land being cultivated for the benefit of the confederacy, but what was still more coveted, human victims for their gods, to be afterward eaten by themselves; sometimes of warriors for raids on others. The spoil was divided into five parts, Tenochtitlan and Tezcuco each taking two and Tlacopan one. In its less than a century of life, this league made some 30 pueblo towns tributary, principally to the east toward the gulf and southeast toward the Isthmus of Tehuantepec — a range of 8,000 or 10,000 square miles out of the 750,000 in the present Mexico. Even this was in no sense a military occupation of the country, much less the foundation of a state. Within a few dozen miles were great independent pueblos such as Cholula and Tlascala, the latter a strong and warlike settlement of some 30,000 people, who waged war to the knife with the Aztec confederacy, defeated their plundering assaults again and again, and aided other pueblos in resistance. Montezuma (q.v.), who acceded 1502, was heavily defeated by them and by the towns in Michoacan, but won success on the gulf coast; and when the Spaniards came, the southern Mexican peninsula was a mass of seething savage hatreds and feuds, no two tribes of the natives having any community of feeling or interest that could prompt them to unite with one another rather than with the foreigner. See Cortes; Mexico; Montezuma.

The Aztec tribe was divided into 20 clans or *calpullis,* each clan occupying several contiguous communal houses, each of which held several hundred persons; besides a clan office building where assemblies were held and strangers entertained. It was governed by an elected council, with a civil and a military head as in Rome, the latter being also constable. Each clan had its special rites, priests, and temple. It was divided into four phratries, each having among other duties that of exacting compensation for murders, and each ward had its own precinct, constituting four wards or quarters of the town, its arsenal, and its captain. These captains were called "darthouseman," "man-slasher," "bloodshedder," and "chief of the eagle and cactus," the latter being chief executioner, and not eligible for the chieftainship of the tribe. The supreme government of the Aztecs was by a council of 20, one from each clan, who must not be a sachem, but a member of the clan council; he was called the "speaker," and the tribal council the "speech-place" (parliament, literally). It met every 10 days at least, and oftener if called together. Once in 80 days there was a special session attended by all the leading clan and phratry officials and priests, to reconsider unpopular decisions. The tribe, too, had a dual executive, civil and religious: a sachem who was civil magistrate and chief judge; and a war chief called "chief of men," and also some priestly functions, though there was a high priest also.

He was originally chief only of the Aztecs; but about 1430 (probably on occasion of the destruction of Azcaputzalco), was made chief of the confederate army. He was elected by the tribal council and the clan war chiefs and leading priests, and could be deposed by them. His official residence was in the tribal office. From the time of the first chief, Acamapichtli, the office remained in a single family, like the old Aryan kingship.

The social and religious organization was a peculiar mixture of the lowest barbarism and the beginnings of civilization. There was no private property in land or dwellings; each man could keep a garden plot for his use, but it was his no longer than he used it. Family life had emerged from savage promiscuity: descent was reckoned in the male line, marital infidelity was punished, and remaining unmarried was not permitted except by special dispensation,— contumacy being punished by being made an outcast, a serf if a man and a prostitute if a woman. Slavery had thus begun in a small way; but the habitual use of prisoners of war as slaves had not, it being preferable to sacrifice and eat them. Agriculture was still primitive; but irrigation was practised to some extent, and horticulture was beginning to develop. The roads were only narrow trails; but they facilitated collection of tribute, and served military and trading purposes as well. The houses were generally of adobe brick, but many of the great pueblos were of stone, so that the towns looked like castellated cities. There were tessellated marble floors, finely worked and colored tapestries, and beautiful feather-work, vases, goblets, and censers of fine marbles and precious metals exquisitely wrought. There were regular weekly markets, which, though trade was by barter, indicated a large development of personal property and of superfluity above subsistence. There were elaborate pleasure-grounds, menageries, and aviaries, baths and fountains, and pleasure performances of dramas and singers, acrobats and jugglers. Yet the people were cannibals, and their religion was of the most hideous character, albeit with regularly organized priesthood and temples and altars. On one side the society touched the South Sea Islands, on the other it almost rose to ancient Egypt and was above Homeric Greece.

Az'tec Treasure-House, The, a romance by Thomas A. Janvier. It purports to be a narration of the thrilling adventures of a certain Prof. Thomas Palgrave, Ph.D.; an archæologist who goes to Mexico to discover, if possible, remains of the early Aztec civilization.

Azuay, ä-thoo-ī', a province of Ecuador, with an area of about 11,150 square miles. The cinchona tree is found here in abundance. Pop. (1890) 132,400.

Azulai, ä'zoo-lī, **Hayim David,** 18th century Jewish bibliographer: b. Jerusalem. His life was mainly spent at Leghorn. Of his numerous works, the best known is 'Shem-ha-Gedôlîm' (the names of the great), a bibliography containing the names of over 1,300 Jewish authors and more than 2,200 of their works.

Azuni, äd-zoo'ne, **Domenico Alberto,** Italian jurist: b. Sassari, Sardinia, 1749; d. 23 Jan. 1827. He became judge of the tribunal of commerce at Nice, and in 1795 published a work in which he endeavored to reduce maritime laws to fixed principles, and which appeared in French in 1805, under the title of 'Droit Maritime de l'Europe.' Napoleon appointed him one of the commissioners for compiling the new commercial code.

Az'ure, the heraldic term for the color **blue,** represented in engraving by horizontal lines.

Az'urine, a European cockroach, blue in color.

Azurite, one of the commonest ores of copper, a basic copper carbonate, having the formula $2CuCO_3.Cu(OH)_2$. Its hardness is 3.5 to 4 and specific gravity about 3.8. It is a mineral of rare beauty, its usual color being a rich Prussian to azure blue, from which fact its name is derived. Its color is, however, often so dark as to appear nearly black, this frequently being true of its crystallized forms. These are very varied and complex, and belong to the monoclinic system. They are often transparent and have a most brilliant vitreous to adamantine lustre, and are beautifully striated, while their frequent association with bright green malachite adds much to the beauty of the specimens. These two minerals sometimes occur in stalactitic forms, the one encircling the other. Such specimens have been extensively cut and polished in cross sections and worked up for various ornamental purposes. The finest material of this kind comes from Morenci, Arizona, this locality also yielding exceptionally fine crystallized specimens rivaling those from its other most celebrated localities, Bisbee, Ariz., and Chessy, France. Its occurrence at the latter locality, which has been famous for many years, has led to the frequent use of the name «chessylite» for azurite, especially in Europe. Many other localities yield choice specimens, the copper mines of the western portion of the United States being especially celebrated. In New Mexico curious pseudomorphs of native copper after azurite «balls» occur in large numbers, while pseudomorphs of malachite after azurite are very common.

Az'ymites (Lat. *azymus,* unleavened), a term applied by the Eastern to the Western Church because the latter used unleavened bread in the administration of the Eucharist. In the Western Church the point has never been regarded as of vital importance. The matter was considered at the Council of Florence (1439). The Western Church, called the Greek schismatics Prozymites.

Azzarkal, az'ar-käl', Arabian mathematician and astronomer: b. Cordova in the first half of the 11th century. He was royal astronomer of Al-Mamoun, king of Toledo. He invented divers instruments for making observations, constructed a water-clock of extraordinary dimensions, as well as a planisphere and an astrolabe, upon new principles.

Azzubeydi, a'zoo-bī'dē, **Mohammed Ibn el Hasan,** Arabian lexicographer: b. Seville, 927; d. 982. He was cadi of Seville and preceptor of Hischeam, son and heir of the Sultan. He wrote an abridgment of the great biography of the Spanish grammarians, by Khalil; a treatise on grammar, and a work upon the character of the syntax of the Arabic language.

B

B the second character in our alphabet, holds the same relative place in the alphabet of all European languages except the Russian and two or three others, as Servian and Bulgarian: in these alphabets the symbol B holds the third place, yet it stands not for our mute B but for a labial (not denti-labial) V or W; while in the second place stands a modified form of B with the same phonetic value as our B. The Russian alphabet is derived from the scheme of the monk Cyril, one of the first evangelists of Bulgaria, who translated into the language of the Sclavonians parts of the Bible. To do this it was necessary to contrive new characters for designation of sounds alien to the Greek language, and to modify existing Greek characters. But as in his time,—the 9th century,—and at a much earlier date, the current phonetic value of B was, as it still is, labial V, Cyril retained the symbol B as representing that V sound, while for the mute labial B he devised the symbol Б. With this exception the character B has from immemorial time held the second place in the alphabets of all the Aryan languages of Europe, as well as in Hebrew and Aramaic, Phœnician, Arabic, and Coptic. The most ancient form of this symbol, both in Greek and Latin, was 𐌑 with two angular loops, which were afterward rounded. The most ancient form of the symbol B among the Phœnicians was not unlike the Arabic figure 9, namely, 𐤁. The Greeks not only added a second loop but they reversed the position of the loop by setting it on the right of the upright stem; and they similarly transposed the loop of the Phœnician sign 𐤓 which they made P (rho, our R). The difference between the two labials B and P is that P is an absolute mute, in pronouncing which the voice is completely obstructed before the lips are drawn apart, while B is sonant, though the lips be still compressed: in the effort to pronounce B the voice is heard even before the lips are parted; but in pronouncing P no sound is heard while the lips are compressed; and when they are opened there is emission of breath but no voice. B and P substitute each other in words common to two or more languages and in transmutations of words within one language. Examples: Latin pila is English and German ball. Bretzel is commonly pronounced pretzel; but it is of the same origin as the English word bracelet, from Latin brachiale, an armlet, bracelet; and bretzel means also handcuffs. B is nearly allied also to F, Th, V, and W; thus beech (German buche) is represented in Greek by phegos and in Latin by fagus; whale is from the same source as Greek phalaina and Latin balaena; habere in Latin becomes in French avoir; caballus, Latin, is French cheval; German liebe, English love; Latin labium, French lèvre. V and B are little discriminated in Spanish and we have in one of the epigrams of Martial proof that in his day natives of Vasconia (Navarre) pronounced B as V and *vice versa* when he wittingly scores the bibulous habits of that people by saying that for them not without reason vivere (to live) is bibere (to drink): so that one of that nature might say vivimus ut bibamus, and the meaning would be either, we live to drink or we drink to live. In the Roman catacombs in sepulchral inscriptions of the 2d and 3d centuries of our era, vixit (lived), is in very many instances written bixit; and the name of a virgin martyr of that age is written Bibiana, and that form is retained in the Roman martyrology instead of the correct form Viviana.

B. A. C., the abbreviation used by astronomers in referring to 'The Catalogue of Stars of the British Association for the Advancement of Science,' by Francis Baily, London, 1845.

Baader, bä'dėr, **Benedict Franz, Xaver von,** German physician and philosopher: b. Munich, 1765; d. 1841. He studied engineering, became superintendent of mines, and was ennobled for his services. He was deeply interested in the religious speculations of Eckhart, St. Martin, and Böhme, and in 1826 was appointed professor of philosophy and speculative theology in the University of Munich. The main purpose of his life as revealed in his lectures, books, and correspondence, seems to have been a reconstruction of society along ethical religious lines, not entirely in harmony with conventional ideas. To the allied princes he addressed a memorial in 1814 upon the necessity of a closer union between politics and religion.

Baal, bā'ăl, a Semitic word denoting lord or ruler, and used to designate the Supreme Deity, by the Phœnicians and Chaldæans, and most of the Oriental nations, in the time of the Exodus. Baal seems to have been the sun-deity and was the same as Bel or Belus of the Babylonians and Assyrians, whose language was cognate to the Syriac and Phœnician. Collateral with these, may be placed the Osiris and Isis of Egypt, and the Gad and Meni, so frequently mentioned in the Scriptures, whom the Jews worshipped in the days of Jeremiah, having incorporated them into their own cultus from that of the Phœnicians or the Carthaginians.

The Scriptures give us an account of the facility with which the Jews embraced, and the tenacity with which they retained, the worship of Baal, who was identical with Moloch. Manasseh, the 16th king of Judah, set up altars to Baal in groves and high places, prepared for the purpose, and made his children pass through the fire to that god. Israel also was no less involved in this departure from the monotheism of the Mosaic system, to the duo-theism of Chaldæa. In Samaria, the capital of Israel, after the revolt of the 10 tribes, Baal was extensively worshipped, until the time of Jehu, who destroyed the altars of Baal, and tore down the high places of his worship. When the Jews were reproved by the prophet for their idolatry, they insisted that ever since they had left off sacrificing to the queen of heaven, they had been consumed by sword and famine. As early as the times of the Judges, the whole Jewish people served Baal and Ashtoreth, and the vocabulary of Palestine geography attests the domestication of Baal-worship among the inhabitants, in the frequency with which the word Baal appears as a component part of the names of towns and cities, as Baalath, Baal-meon, Baal-peor, and Baal-tamar. Remnants of Baal-worship have descended either through the Jews or the Gentiles even to our own time, and exist to-day in nearly all Christian countries. In Sir John Sinclair's statistical account of Scotland, he describes a ceremony which used to be celebrated in Scotland on 1 May (O. S.), in which the inhabitants of a district, having assembled in a field, dug out a square trench in which they built a fire and baked a cake, and cutting it into as many pieces as there were persons, and blacking one piece over with charcoal, threw them into some convenient receptacle, when each one, blindfolded, drew a piece. He who drew the black piece was sacrificed to Baal, to propitiate his favor for the coming year. The same ceremony was long observed in some parts of Scotland and Ireland, except that the person who drew the black piece was made to leap three times through the flames, instead of being sacrificed, a similar substitution to that instituted by Manasseh, who "made his sons pass through the fire to Moloch." This ceremony is known by the name of Beltane, or Baal-tine.

Baal-zebub, bā-ăl'ze-bŭb. See BEELZEBUB.

Baalbek, bäl'bĕk, a locality in Syria, in a fertile valley at the foot of Antilibanus, 40 miles from Damascus, famous for its magnificent ruins. Of these, the chief is the temple of the Sun, built either by Antoninus Pius or by Septimius Severus; a rectangular building 290 by 160 feet. Some of the blocks used in its construction are 60 feet long by 12 thick; and its 54 columns, of which 6 are still standing, were 72 feet high and 22 in circumference. Near it is a temple of Jupiter, of smaller size, though still larger than the Parthenon at Athens, and there are other structures of an elaborately ornate type. Originally a centre of the sun-worship, it became a Roman colony under Julius Cæsar, was garrisoned by Augustus, and under Trajan acquired renown as the seat of an oracle. Under Constantine its temples became churches, but after being sacked by the Arabs in 748, and more completely pillaged by Tamerlane in 1401, it sank into hopeless decay. The work of destruction was completed by an earthquake in 1759. See Franberger, 'Die Akropolis von Baalbek' (1892); Baedeker, 'Syria and Palestine' (1894).

Baanites, bā-ă-nīts. See RELIGIOUS SECTS.

Baar, bär, a plateau in Germany, in the province of Baden and Würtemberg, formerly constituting a county of the Furstenberg principality. It contains the sources of the Danube.

Bab Ballads, The, a collection of humorous verses by W. S. Gilbert (q.v.) published in 1868. They form the source of several of the librettos of the Gilbert and Sullivan operas.

Bab-el-Mandeb, bäb'ĕl-män'dĕb (Arabic, the gate of tears, so called from the danger arising to small vessels from strong currents), the name of the strait between Arabia and the continent of Africa, by which the Red Sea is connected with the Gulf of Aden and the Indian Ocean. The Arabian peninsula here throws out a cape, bearing the same name as the strait, rising to the height of 865 feet. About 20 miles distant stands the wall-like coast of Africa, rising in Râs es Sean to the height of over 400 feet. Within the strait, but nearer to Arabia, lies the bare, rocky Island of Perim, since 1857 occupied by the British as a fort; its guns commanded the entrance to the Red Sea. The strait on the east side of this island is called the Little Strait, and that on the west the Great Strait.

Baba, bä'bạ (the old), in Slavonic mythology, a thunder-witch (the devil's grandmother), represented as a little, ugly old woman, with a monstrous nose, long teeth, and disheveled hair, flying through the sky in an iron mortar. By the Czechs she is called now the iron, now the golden, Baba. It is also a Turkish word, signifying father, originating, like our word papa, in the first efforts of children to speak. In Persia and Turkey it is prefixed as a title of honor to the names of ecclesiastics of distinction, especially of such as devote themselves to an ascetic life; it is often affixed in courtesy, also, to the names of other persons, as Ali-Baba. A cape near the northwest point of Asia Minor is known as Baba.

Bába Búdan, bä'bạ boo'dăn, a spur of the West Ghâts, Mysore, India, extending east for 15 miles, leaving a narrow opening at its west end for the passage of the Bhadra, and then south in an unbroken line for 20 miles, enclosing between itself and the main chain of the Ghâts a rich, but unhealthy valley. To this spur belong three peaks above 6,000 feet high, among these Mulaina-giri, 6,317 feet, the highest in the West Ghâts. On the slopes of Kalhatti, one of these peaks, is a hill station, a resort of Europeans during the heat. Coffee was first planted in India on another part of this spur toward the close of the 17th century, by a Mohammedan saint named Bába Búdan.

Bab'bage, Charles, English mathematician and inventor of a calculating machine: b. near Teignmouth, England, 26 Dec. 1792; d. 18 Oct. 1871. He was educated first at the Totnes Grammar School, and Peterhouse College, Cambridge, where he became closely associated with Herschel (afterward Sir John) and Mr. Peacock, then tutor of Trinity College. Being in possession of an independent fortune, Babbage was in a position to devote all his time and

energies to his favorite studies — mathematics and mechanics. In 1822 we find him broaching the idea of a difference engine, by which intricate arithmetical calculations could be correctly and rapidly performed. Through the recommendation of the Royal Society he received, in 1823, a grant from the government of £1,500 for the construction of such a machine. After a series of experiments lasting eight years, and an expenditure of £17,000 (£4,000 of which was sunk by the originator of the scheme, the balance voted by the government), Babbage abandoned the undertaking in favor of a much more complicated work, an analytical engine, worked with cards like the jacquard loom. The government, alarmed at the probable demands, refused to support Babbage in his new adventure, and as a quarrel ensued with his engineer, who withdrew his tools, the pet project was never completed. The machine, along with some 400 or 500 plans, was presented in 1843 to the King's College Museum, London. Among the many treatises he published on subjects connected with mathematics and mechanics, the most valuable and interesting are: 'On the Economy of Machinery and Manufactures'; 'The Decline of Science'; and an autobiographic sketch, 'Passages in the Life of a Philosopher.' In 1828 he was appointed Lucasian professor of mathematics in his university, an office he held for 11 years. In 1832 and 1834 he stood for Finsbury in the Radical interest, but was unsuccessful. He was one of the founders of the Royal Astronomical Society, and a Fellow of the Royal Society.

Bab'bitt, Isaac, American inventor: b. Taunton, Mass., 26 July 1799; d. 26 May 1862. He learned the goldsmith's trade; early became interested in the production of alloys; and in 1824 manufactured the first britannia ware in the United States. In 1839, he discovered the well-known anti-friction metal which bears his name, Babbitt metal (q.v.). For this discovery, the Massachusetts Charitable Mechanics' Association awarded him a gold medal in 1841, and subsequently Congress voted him $20,000.

Bab'bitt Metal, an alloy of copper, tin and antimony, invented and patented in 1839, by Isaac Babbitt (q.v.) of Boston. It is soft and nearly white, and is widely used as an anti-friction metal. The proportions of the constituent metals vary considerably in modern practice. Babbitt's original alloy contained 24 parts of tin, 4 parts of copper, and 8 parts of antimony. Many engineers prefer a larger proportion of tin, and the following mixture is recommended as giving a tough and very serviceable metal: Tin, 96 parts; copper, 4 parts; antimony, 8 parts. Lead is also added, in many cases, on account of its cheapness. In small amounts it is not usually objectionable, but the Babbitt metal that is sold in the market, ready-mixed, usually contains a considerably larger proportion of lead than its price would indicate. The alloy is usually melted and run, while fluid, directly into the bearings on which it is to be used, a space from an eighth to half an inch thick being left for it between the box and the shaft that is to be supported.

Bab'cock, Earle Jay, American educator: b. St. Charles, Minn., 11 June 1865. After working extensively with the United States Geological Survey he was appointed in 1902 director of the State School of Mines of North Dakota, and professor of chemistry and geology in the State University. He is the author of many special scientific articles and of geological reports.

Bab'cock, James Francis, American chemist: b. Boston, 23 Feb. 1844; d. Dorchester, Mass., 20 July 1897. He studied at Lawrence Scientific School, and became an analytical chemist and chemical expert. He was State assayer and inspector of liquors in Massachusetts, 1875–85, and city inspector of milk in Boston, 1885–89. While state assayer he brought about the insertion in the liquor statutes of the definition of the term "intoxicating liquor," known as the 3-per-cent limit. He is the inventor of the fire extinguisher which bears his name; a popular lecturer on scientific subjects; and has appeared as an expert chemical witness in important trials. He has published several reports on sanitation and the chemistry of food.

Bab'cock, Maltbie Davenport, American Presbyterian clergyman: b. Syracuse, N. Y., 3 Aug. 1858; d. Naples, Italy, 18 May 1901. He was graduated from Syracuse University in 1879, and Auburn Theological Seminary in 1883. He filled most successful and popular pastorates at Lockport, N. Y., Baltimore, Md., and at the Brick Presbyterian Church in New York. While on a visit to the Levant in 1901 he was seized with the Mediterranean fever and died in the International Hospital at Naples. A posthumous volume of his prose and verse, edited by his wife, appeared in 1901, entitled 'Thoughts for Every-Day Living.'

Bab'cock, Orville E., American military officer: b. Franklin, Vt., 25 Dec. 1835; d. 2 June 1884. He served with distinction in the Civil War, was a member of Gen. Grant's staff, and was made a brigadier-general of the regular army at the close of the war. When Grant was elected President, Babcock became his private secretary, and the superintending engineer of several important public works. He was indicted in 1876 for taking part in revenue frauds, but on his trial was acquitted.

Bab'cock, Stephen Moulton, American educator: b. Bridgewater, N. Y., 22 Oct. 1843. He was educated at Tufts College, Cornell University, and at Göttingen, Germany; and was graduated from Tufts College in 1866. He gave special attention to the chemistry of milk and its products, and was the inventor of the Babcock milk-tester. He was instructor of chemistry at Cornell University in 1875–6; professor of agricultural chemistry at the University of Wisconsin; and chemist to the New York State Experimental Station in 1888–1900. He is the author of numerous articles on the composition of milk and butter, and joint author with G. C. Caldwell of 'A Manual of Qualitative Chemical Analysis.'

Bab'cock, Washington Irving, American shipbuilder: b. Stonington, Ct., 21 Sept. 1858. He was graduated at the Brooklyn Polytechnic Institute in 1876, and at Rensselaer Polytechnic Institute in 1878. He was employed at the Roach Shipyard, Chester, Pa., in 1878–85, and with the Providence and Stonington Steamship Co., New York, in 1885–7; was superintendent of the Union Dry Dock Co., Buffalo, N. Y., in 1887–9; manager of the Chicago Shipbuilding Co., in 1889–99, becoming president of the latter in 1900.

Ba'bel, Tower of, the name of a structure in the Plain of Shinar, Mesopotamia. According to the 11th chapter of Genesis, it was begun by the descendants of Noah subsequent to the deluge, but not allowed to proceed to completion. It has commonly been identified with the great temple of Belus or Bel, one of the chief edifices in Babylon, and the huge mound called Birs Nimrud is generally regarded as its site, though another mound, which to this day bears the name of Babil, has been assigned by some as its site. Babel means literally "gate of God." The meaning "confusion" assigned to it in the Bible really belongs to a word of similar form. See BABYLON.

Babenberg, bä'bĕn-bĕrg, a princely Franconian family, whose castle occupied the site of the later Bamberg Cathedral. They were most prominent in the wars of the 10th century. The Austrian dynasty of 976–1246 was formerly believed to be sprung from them.

Baber, bā'bẽr (or "The Tiger"), the historical surname of Zehir-ed-din-Mohammed, the conqueror of Hindustan and founder of the so-called Mogul dynasty: b. 14 Feb. 1483; d. 26 Dec. 1530. Baber was of mixed Turkish and Mongol origin, but in feeling, as in personal characteristics, he was a Tartar (Turk), and often in his memoirs speaks most contemptuously of Mongols or Moguls. Yet Hindu ignorance has designated the throne which he established in India as that of the Great Mogul. At the age of 12, on his father's death, he ascended the insecure throne of Ferghana in Turkestan; soon after he was attacked on all sides by his uncles and other neighboring princes, which obliged him, in his turn, to assume the aggressive. Accordingly, at the age of 15, Baber seized on Samarcand, the capital of Timour, but, while thus engaged, a revolution at home deprived him of his sovereignty. After many years of an adventurous and romantic career, he raised an army, entered Hindustan, and was met by Ibrahim, the ruling Sultan of that country. The two armies fought the battle of Paniput, which decided the fate of India, on 21 April 1525. Baber, with his army of 12,000 men, completely overthrew that of Ibrahim, numbering 100,000, and entered Delhi in triumph. Difficulties and fresh foes had still to be encountered and mastered, but in the battle of Sakri, in February 1527, Baber utterly defeated the opposing Hindu princes, and then proclaimed himself Padishah, or emperor of Hindustan.

Babeuf, bä-bẽf', or **Babœuf, François Noel,** French communist, who called himself Caius Gracchus: b. Saint-Quentin, 1760; d. 28 May 1797. He founded in Paris a journal called the 'Tribune of the People' (1794), in which he advocated his system of communism, known as Babœuvism, and contemplating absolute equality and community of property. His followers were called Babœuvists. Betrayed in a conspiracy against the directory, aiming to put his theories into practice he was guillotined in Paris. His principal works were 'Perpetual Register of the Survey of Lands' (1780), and 'On the System of Population (1794). See Advielle, 'Histoire de Babeuf et du Babouvisme' (1884).

Bâbi, bä'be, the name of a modern Persian sect, derived from the title, Bâb-ed-Din (gate of the faith), assumed by its founder, Mirza Ali Mohammed, a native of Shiraz, who, in 1843 undertook to establish a new religion from a mixture of Mohammedan, Christian, Jewish, and Parsee elements. His controversies with the *mollahs* shortly led to his confinement to his own house, where he formulated his doctrines, privately instructed his disciples, and increased his pretensions. The sect soon became numerous; but on the accession of Nasir-ed-Din in 1848, apprehending persecution, they took up arms, proclaiming the advent of the Bâb as universal sovereign. The insurgents were reduced by famine, and most of them executed (1849–50). The Bâb had held aloof from the revolt, but was arrested and put to death, after a long imprisonment, in 1850. His successor was recognized in the youthful son of the governor of Teheran, who retired to Bagdad, where he afterward lived quietly. An attempt of three believers to assassinate the Shah, in 1852, led to a persecution of the sect; numbers were tortured and burned, among them Gurred-ul-Ain. Bâbism is at present widely diffused in Persia; its members live in apparent conformity to orthodox Mohammedanism, but privately holding the Bâb's doctrines, which are contained in an Arabic treatise, 'Biyan' (the exposition), written by the founder himself. They form essentially a system of Pantheism, with Gnostic and Buddhistic additions. All beings are emanations from the Deity, by whom they will ultimately be reabsorbed. Bâbism enjoins few prayers, and those only on fixed occasions; encourages hospitality and charity; prohibits polygamy, concubinage, and divorce; discourages asceticism and mendicancy; and directs women to discard the veil, and share as equals in the intercourse of social life. See Andreas, 'Die Babis in Persien' (1896); Browne, 'A Traveler's Narrative Written to Illustrate the Episode of the Bâb' (1892).

Bab'ington, Anthony, English Roman Catholic gentleman: b. Dettrick, Derbyshire, 1561; d. 20 Sept. 1586. He associated with others of his own persuasion to deliver Mary, Queen of Scots, but the plot being discovered, the conspirators were executed.

Bab'ington, Churchill, English philologist: b. Leicestershire, 1821; d. 13 Jan. 1889. He was educated at St. John's College, Cambridge, and was Disney professor of archæology there in 1865–80. He was a voluminous writer on ornithology, botany, archæology, numismatics, etc.; and a contributor to Smith's 'Dictionary of Christian Antiquities.'

Bab'ingtonite, a native, anhydrous silicate of calcium, iron and manganese, associated with an iron silicate having the composition $Fe_2(SiO_3)_3$. It is greenish-black in color, with a vitreous lustre, and crystallizes in the triclinic system. It occurs in Norway, Italy, and the British Isles, and in the United States has been found at Gouverneur, N. Y., and perhaps also at Athol, Mass. Its hardness varies from 5.5 to 6, and it has a specific gravity of about 3.36. The mineral was named for Dr. William Babington.

Babirussa, bäb'ĭ-roo'sa, a wild hog of the East Indies, remarkable for the long, exposed, canine teeth of the male. The upper tusks, instead of growing downward in the usual way, turn and grow upward through the skin on each side of the snout and curve backward until, in old animals, they may be 8 or 10 inches long,

and reach nearly to the eye. These hogs, which inhabit Celebes and Bouru, are almost hairless, long-legged, and active, and feed upon fallen fruits instead of rooting in the ground. One cannot see that the great tusks are of any present use, but Wallace suggests that they were useful to the ancestors of these pigs under different conditions, and were then kept worn down by service.

Babism, bäb'ĭzm. See BABI.

Babo, bä'bō, **Josef Marius von,** German poet: b. Ehrenbreitstein, 14 Jan. 1756; d. 5 Feb. 1822. He was professor of fine arts at Munich in 1778, and of æsthetics at Mannheim, and later became director in the Munich Military Academy, and superintendent of the theatre. He was the author of 'Otto of Wittelsbach,' a tragedy (1781); 'Oda' (1782); 'Dagobert, the Frankish King' (1787); 'The Pulse,' a comedy (1804), etc.

Baboo, bä'boo, or **Babu,** a Hindu title of respect equivalent to Sir or Mr. It is usually given to wealthy and educated native gentlemen, especially when of the mercantile class.

Baboon, băb-oon', a large, long-haired, terrestrial monkey of Africa or Arabia, belonging to the genus *Cynocephalus,* of the family *Cercopithecidæ.* All are of large size, have elongated, blunt muzzles, with nostrils at the extreme end, and great canine teeth which together give the face, when seen in profile, a dog-like aspect. The naked parts of the face, as well as the great callosities upon the buttocks, are often brilliantly colored. Some also have shaggy manes, and all add to their repulsive appearance a fierceness of disposition which makes them more feared than perhaps is necessary, for they rarely, if ever, have attacked human beings. All of the species go about in troops under the guidance and protection of several old males. They are rare in wooded regions, preferring rocky and bushy districts, like those in northern Africa, in Arabia, and in southeastern Africa. As their fore and hind limbs are of nearly equal length, and very stout, they go mostly on all fours, galloping swiftly and climbing rocks with agility. Their food is principally vegetable — fruits, berries, young sprouts, etc; but they also eat insects, worms, snails, and such young birds or small animals as they are able to catch. They do great damage to the plantations of the native Africans, ruthlessly spoiling much more than they are able to eat. The ancient Egyptians seem to have trained them to pick fruits, but within recent times their confinement in menageries, where they live and breed well, is the extent of their domestication. There is nothing attractive about any of them, either in appearance or disposition.

Among the best known is the great Arabian or sacred baboon, or *hamadryad* (*Cynocephalus hamadryas*), the one represented upon Egyptian monuments, and venerated by the primitive Egyptians. It is supposed that their habits of noisy activity at sunrise, as though adoring the sun-god, is the basis of this very ancient form of worship. Mummies of baboons are commonly found in tombs in the Nile valley; and the species itself is still abundant from the Sudan to southern Arabia. It is ashy gray in color, and has a heavy mane. The great baboon of South Africa, common in the wilder mountains of Cape Colony, is the chacma (*Cynocephalus porcarius*), which is dark-brown and has long hair but no mane, and a tail about half the length of the body, terminated by long, black tufts. This is the one most commonly seen in menageries. The mandril (*Cynocephalus mormon*) is still larger, exceeding a mastiff in size. It has short legs, a mere stump of a tail, and an enormous head, with a crest of greenish hair upon the forehead, and a beard which is orange-yellow; while the naked parts of the face consist mainly of a huge nose, light-blue in color, the skin of which is folded into ridges. The naked buttocks are bright scarlet. This ugly brute is one of the most ferocious and justly dreaded animals of the Congo forests. In the same region lives a second similar species called the drill (*Cynocephalus leucophæus*), which differs mainly in lacking the bright colors and ribs of the nose of the mandril. Several other baboons live in West Africa, but are not well known, although one reddish-brown species, the Guinea baboon (*Cynocephalus sphinx*) is commonly seen in the hands of showmen. A large monkey of southern Abyssinia, looking like a black, clipped French poodle, is substantially a true baboon, although it belongs to another genus; it is the gelada (*Theropithecus gelada*). Consult 'Cassell's Natural History,' Vol. I. (1885).

Ba'brius, a Greek fabulist whose fables in verse are variously referred to the time immediately preceding the Augustan age, and to the 3d century of our era; his name also shows variants, as Babrias, Gabrius. Till 1842 only a few fragments of Babrius were known to be extant; but in that year, in the Laura of Mount Athos was discovered a manuscript containing 123 of his fables. In 1846 Sir George Cornewall Lewis published them together with the pre-existing fragments, and in 1859 or 1860 appeared a good English version by James Davies. The fables have also been edited by W. G. Rutherford (1883) and by Crusius (1897).

Babuyanes, bä'boo-yän'ez, or **Madjicosima Islands,** a number of islands lying about 30 miles north of Luzon, and generally considered the most northern of the Philippines. The chief islands are Kamiguin, area 54 square miles; Babuyan Claro, 36 square miles; Calayán, 37 square miles; Fuga, 21 square miles; and Dalupiri, 20 square miles. They are subject to the Loo-Choo Islands; aggregate population about 12,000.

Bab'ylans or **Babyllus, Saint,** a bishop of Antioch between 237 and 250. He declined to admit to public worship the Emperor Philip, who had murdered his brother Gordianus in order to gain the throne. In the Roman calendar his day is celebrated on 24 January; in the Greek on 4 September.

Bab'ylon, See BABYLONIA.

Babylon, N. Y., village in Suffolk County, Long Island, 37 miles east of New York; popular as a summer resort on account of its fine beach, and as a rendezvous for sportsmen by reason of its opportunities for fishing. Pop. (1900) 2,157.

Babylonia. Discoveries of the recent decades seem to confirm the idea that Babylonia is the cradle of civilization. The country, which is nearly enclosed by the Tigris and Euphrates from Bagdad to the Persian Gulf, is bounded on the north by Mesopotamia; on the east by the

1. Bearded Ape (Cynocephalus silenus).
2. Chacma (Cynocephalus porcarius).
3. Tufted Baboon (Cynopithecus niger).
4. Hamadryad (Cynocephalus hamadryas).
5. Gelada (Cynocephalus gelada).
6. Mandrill (Cynocephalus mormon).

plain of Elam; on the south by the Persian Gulf; and on the west by the Arabian desert. It constitutes the largest portion of the country now known as "Irâq el Arabi." A considerable part of this alluvial plain has been made through deposits by the river. This land-making process continues at the present time at the rate of about 70 feet per year.

At one time the plain was covered with a perfect network of canals which carried agricultural prosperity to every part of the land. The neglect of these has changed the conditions of the country so completely that instead of a fertility which was once the wonder of the ancient world, a cheerless waste now presents itself. Some months of the year the country is partially covered with swamps and marshes, while the remaining portion is a desolate plain.

Here and there throughout the land are to be seen mounds of débris, every one of which covers the remains of a long-forgotten civilization. About the middle of the last century a number of English explorers, Loftus, Layard, and Taylor, visited the ruins of some of the important cities. Through their tentative investigations Nuffar (Nippur or Calneh), Warka (Uruk or Erech), Senkera (Larsa), Muqayyar (Ur), Abu Shahrain (Eridu), besides Babylon, Borsippa, and other cities were located. A few decades later Rassam, also an Englishman, discovered that the ruins known as Abu-Habba represented the ancient Sippara; and decided definitely also that Tell-Ibrahim was Kutha (Cutha). The ancient names of most of these cities were known through the Old Testament.

The first methodical and extensive excavations in the country were begun by the French, under De Sarzec, at Tello (Shir-pur-la), in 1876. These were followed in 1889 by those of the Americans, representing the University of Pennsylvania, under Peters, for about six months, followed by Hilprecht and Haynes. For a few months in 1894 Scheil, a Frenchman, in the interest of the Turkish government, excavated at the ruins of Abu-Habba (Sippara). The Germans under Koldewey and Moritz devoted several months to the exploration of two sites known as El-Hibba and Surghul; but in 1900 Koldewey began systematic excavations among the mounds of ancient Babylon. It is expected that the Germans at Babylon, the French at Tello, and the Americans at Nuffar will continue their operations for many years.

The excavations at Tello and Nuffar have been exceptionally fruitful in important results, especially those conducted at the latter place by the University of Pennsylvania. At Tello were uncovered the remains of an ancient civilization of the 3d and 4th millenniums B.C., representing the Sumerian people. The Nippur excavations yielded antiquities of the Semitic race as well as the Sumerian. At this city the excavators were able to examine the remains of the longest period of occupation known up to the present time. The lowest stratum of débris yielded antiquities which belong to the 7th millennium B.C., while the city continued to be inhabited until about 1000 A.D.

The earliest inhabitants of the country, which was known in the early period as Shumer (Biblical Shinar), are called Sumerians. By the aid of the statues and inscriptions discovered, the physiognomy and customs of this people become comparatively well known. The remains of their civilization as regards sculpture, engraving, etc., are of an exceptionally highly developed character as revealed by the antiquities, some of which are remarkable for their beauty and the fineness of their execution. They show that the flower of art in this country belongs to about the 4th millennium B.C. Their writing also, instead of being primitive, is so far removed from the original hieroglyphs that in many instances the pictorial outline can no longer be recognized. These things demonstrate the fact that back of that which is now known as the earliest there must be a long period of development covering many centuries.

The Sumerians spoke an agglutinative tongue which belongs to that great unclassifiable group of languages known as Turanian. Clay was principally used as their writing material. The impression made by the stylus upon the soft clay has the appearance of a wedge, for which the Latin word *cuneus* is used; hence cuneiform writing. The characters, having ideographic and phonetic values, are made up from one to a dozen or more wedges. There are over 500 characters, some of which have many values. For the different characters and combinations of two or more, about 20,000 values are already known.

It has not been ascertained whence the Sumerians or Semites came. In 4500 B.C. the latter had already entered the land. They gradually conquered their predecessors, the Sumerian people, and adopted their script for their own language. Side by side these two people lived in the country until the amalgamation known to us as Babylonian was more or less complete; at least the Semitic population succeeded in superseding the Sumerian, whose identity seems to be practically lost in the later period. The Sumerian language, however, continued to be used by the Babylonians until the close of their history, especially for official, legal and liturgical purposes.

The number of inscriptions, small and large, discovered in Babylonia up to the present time, number fully 150,000. At Tello, De Sarzec unearthed a library containing about 30,000 tablets belonging to the time of Gudea 3000 B.C. The temple library at Nippur, although only one twelfth part excavated, has yielded to Prof. Hilprecht over 20,000 tablets belonging to the 3d millennium B.C. It contained mathematical, astronomical, medical, historical, linguistic, religious, etc., texts, arranged and classified according to subjects. Besides the clay tablets, cylinders, and prisms, most important documents in stone have been found, which have furnished the data upon which the knowledge of the early period is largely based.

Through other sources, particularly the Babylonian duplicates found in Ashurbanapal's library at Nineveh, considerable is known concerning the literature of this people. Notably might be mentioned the Creation and Nimrod epics, the Deluge story, which greatly resemble the Biblical accounts; Ishtar's descent into Hades; the Etana legend; Adapa and the South Wind, etc. Here properly should be mentioned also the codes of laws upon which the decisions of the kings and judges were made, particularly the code of Hammurabi (Amraphel, Gen. xiv.), discovered by the French, in Susa, under De Morgan. It consists of 282 laws written on a stela which stands over seven feet high. This had been carried away by the old national enemy

of Babylonia, the Elamites. Very extensive also is the knowledge of the customs and manners of the people gained through the thousands of contract tablets dated in the reigns of kings of all periods. Practically every kind of legal and domestic contract imaginable, mortgages, deeds of sale, promissory notes, guarantees, etc., the archives of business firms, notably the Egibi House of Babylon, and the Murashu Sons of Nippur have been found. Most valuable for the decipherment of the inscriptions have been the syllabaries, or sign lists, in which the different values of characters are given. Commentaries; lists of gods, names, places, temples, animals, stones, etc.; incantations, hymns, penitential psalms, prayers, etc., are included among the tablets discovered.

The earliest inscriptions reveal a polytheism in a developed state. Most of the gods have Sumerian as well as Semitic names. Until the religion of the Sumerians, or of the Semites, prior to their occupation of this country is known, it will be impossible to ascertain with which people the different gods and religious conceptions originated. The pantheon, which was practically different in every period of Babylonian history, is exceedingly large. Some of the gods mentioned most frequently in the inscriptions are: Anu, Bêl, and Ea, the important triad of the early period; Merodach, Shamash, Sin, Ishtar, Nergal, Nebo, Nusku, Ninib, Gula, etc.

Each city had its temple, which was dedicated to some particular god; for example, Ekur, at Nippur, was sacred to Bêl; Esaggil, in Babylon, to Merodach. In addition to the patron deity, shrines to other gods were found in each sanctuary. At Nippur, besides Bêl, 24 other gods were worshipped, for whom shrines were set up within the temple precincts. Through the researches of Prof. Hilprecht in the trenches at Nippur, and in connection with the inscriptions discovered, the real conception of a Babylonian temple and its tower is made known for the first time. The temple had an inner and outer court, both of which were nearly square, the latter being somewhat smaller than the former. The prominent feature of the temple architecture was the *ziggurrat*, or storied-tower, which occupied nearly one third of the area of the inner court. In close proximity to the tower stood the temple proper, where the sacrifices were offered. The ziggurrat consisted of quadrangular platforms, one superimposed upon the other, on the top of which was to be found the shrine. The number of platforms varied according to the period and ability of the builder. In the 3d millennium B.C. the number generally appears to have been three. The ziggurrat had its origin in the earliest pre-Semitic period, when it was regarded as the tomb of the god. At that time it was the central feature of a fire necropole, or cemetery. The Sumerians cremated their dead. In an early stratum at Nippur one of their crematoriums was found. The remains of the incineration were placed in jars, thousands of which were found buried around the ziggurrat. It is not known what the Semites did with their dead, but when they became the dominant people of the land the conception of the temple and ziggurrat seems to have been changed, for thereafter no burials are found within the courts of the temple.

In their cosmology the Semitic Babylonian conception of the earth was a mountain over which the god Bêl ruled. This they believed extended down into Ea's region (subterranean waters), and also that it reached up unto that of Anu (Heaven). They regarded the ziggurrat as symbolical of the earth, the dominion of Bêl. In their inscriptions, therefore, concerning the building or restorations of these towers, the following expression is repeatedly found: «I laid the foundations of the ziggurrat in the breast of the earth and built it up that its head was in the heavens» (compare the story of Babel, Gen. xi.), thus showing that the ziggurrat was a representation of Bêl's kingdom, the earth.

In connection with the temple library at Nippur a school or department of instruction was found. Within its rooms were discovered textbooks, and exercises of the students. At Sippara a school similar in character was also found. The complete excavation of all important Babylonian cities will doubtless bring to light a temple, a library, and a school in each.

Recent investigations show that in a general way the Babylonian chronology coincides fairly well with the Hebrew from about the time of Abraham. A great many rulers prior to Hammurabi (Abraham's co-temporary, about 2200 B.C.) are known through their inscriptions. King Nabonidus, the historian and archæologist (556–538) stated that Naram-Sin had founded the temple of Shamash at Sippara 3,200 years before his time. This in round numbers would make his father, Sargon's date 3800 B.C. Sargon was a powerful ruler; having conquered all the city kingdoms of his land, he extended his conquests as far as the Mediterranean. Many pre-Sargonic rulers are also known, of whom notably may be mentioned Lugalzaggisi, about 4500 B.C., who conquered the ancient world from the Persian Gulf to the shores of the Mediterranean. A number of important rulers of Tello also belonging to this period are known. Between Sargon and Hammurabi several dynasties are more or less completely filled out. Among the important rulers whose names are known should be mentioned Gudea about 3000 B.C., who held sway over the whole of Babylonia; Ur-Gur about 2700 B.C., who erected temples in Ur, Nippur, Erech, and other cities; and also his son Dungi, who extended his rule over parts of Elam and Syria. Hammurabi about 2200 B.C. inherited a throne which was subject to Larsa, but this mighty sovereign overthrew its king and also Elam's, and succeeded not only in uniting the petty principalities under one rule, but he reorganized them in such a way that the kingdom had an uninterrupted history for several centuries. Hammurabi was the sixth king of the first dynasty of Babylon. This was followed by the so-called second dynasty of Babylon; the foreign dynasty of Cassite rulers; 1580–1180 B.C., the dynasty of Pashi 1177–1043, and other rulers. During the period which followed, Babylonia was subject to Assyria until the powerful Neo-Babylonian rule began with the Chaldæan Nabopolassar, 626–605, and his son Nebuchadrezzar II. 605–562. These were succeeded by Evil-Merodach, 562–560; Neriglissar, 560–556; Labosoarchod, 556; and Nabonidus, 555–538. With the overthrow of the latter and his son Belshazzar, the Achæmenian rule began, which continued until the time of Alexander the Great. This

Upper—Excavating the entrance of the Temple of Bêl, at Nippur, 4500 B. C.
Lower—Mounds covering the Temple of Bêl.

great conqueror was followed by the Seleucid and Arsacid kings. Under the Parthians all that remained of Babylonian culture died out, when the knowledge of the language and writing was entirely lost. Jews continued to live on some of the mounds of Babylonia until about 1000 A.D., when finally the country was given up to the Bedouin and the Arab.

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Bab'ylo'nian Exile, or **Captivity.** It seems to have been part of the statecraft of the ancient Assyrians to remove the people of conquered nations and plant them in unoccupied parts of the dominion, as far distant as possible from the home country of the victims. This custom grew out of civil and geographical conditions. The degree of national intercourse requisite for maintaining a proper ascendency over the subjugated nation could not be maintained if they were allowed to remain in their own land. Consequently, deportation was necessary — a process which has come to be designated in our language by the word captivity. Anciently, deported nations were not treated with that cruelty we are in the habit of associating with the captive. The captivity of the Jews, who are more especially to be treated in this article, demand the preceding remarks in order to aid in a proper understanding of the frequent notices we find in the Scriptures of the consequence to which these people attained in their foreign residences. There are two Babylonish captivities of the Jews, having their beginnings at different times, although their endings were synchronous. In the civil dissensions following the death of Saul, and culminating at the death of Solomon, the tribes north of the mountains of Ephraim, and those east of Jordan, separated from the rest, leaving Judah and Benjamin in the naturally fortified province of the south. To the north of the revolted tribes lay the kingdom of Syria, then powerful and extensive. Syria had an old feud with Israel, ever since David had made Damascus, the Syrian capital, tributary to himself. Rezon had regained the city under Solomon, but was "an adversary to Israel all the days of Solomon." The attention of Syria was now turned to the defenseless condition of the revolted tribes. They had no longer the fortifications and fastnesses from which David had sallied forth to the northern plains at the foot of the Anti-Lebanon. Judah had, meanwhile, made a treaty, in the reign of Asa her third king, with the Syrian power, who, by his counsel and stratagem, had been induced to break a former league with Israel (1 Kings xv.). Judah also, fearing inroads from the north, had built two new fortifications in the passes of Benjamin (Geba and Mizpeh), and used all her arts to keep herself in favor with Syria, and on the other hand turned her pampered ally against the revolted and unprotected tribes at the north. Israel, tired at length of the continual exposures to Syrian invasion, and exasperated at the immunity and prosperity of the rival Judah, formed a conspiracy with Syria (during the reign of Pekah in Israel and Ahaz in Judah) against her southern antagonist. In the emergency Judah appealed to the Assyrian power, and Tiglath Pileser came against Israel, carried captive a portion of its inhabitants, and then marched upon Syria, slew its king, subdued its capital, and absorbed it into the Assyrian empire, from which it reappears only in the time of Alexander the Great. The successor of Pileser, exasperated by an attempted conspiracy of Hoshea with the king of Egypt, took Samaria, and subdued Israel to a tributary relation, taking away to Babylon the people whom Pileser had left in the first deportation. Thus was accomplished the first captivity of the numerically most powerful branch of the divided house of Israel (721 B.C.). They were first in the subjugation to foreign power from purely geographical considerations. A little more than a hundred years after, Judah, from her mountain fastnesses, followed Israel into the Assyrian empire, in the second great Babylonish captivity. Disregarding some chronological differences, Judah seems to have been progressively carried into captivity, like Israel, by at least two, and perhaps three successive deportations. The first was 598 B.C., and was probably made with the direct object of colonizing the city of Nineveh, which the Assyrian monarch was then endeavoring to restore. The second was in the reign of Zedekiah. Judah had for three successive reigns been heavily tributary to Assyria. Zedekiah rebelled against the tribute, and, like Israel, further exasperated her master by calling upon Egypt in her extremity. In revenge, Nebuchadnezzar burnt the temple and city, put out the eyes of Zedekiah, and led away the people to Babylon, and so ended the Jewish kingdom (588 B.C.), never again to be restored to a national existence; for when, 70 years after the second captivity, the permission to return was given, only a very small part of the Jewish people were in a condition to desire a removal, having become thoroughly naturalized in their foreign dwellings; and even if they had desired it, it would have been only a return to a Medo-Persian satrapy, not to the glory of their ancient kingdom and temple-worship. They remained by the rivers of Babylon and wept. See Daniel; Ezekiel; Ezra; Jews.

The term "Babylonish Captivity" is frequently applied by writers of Church history to the residence of the Popes at Avignon for nearly 70 years.

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Bacacay, ba-kä'kī, Philippines, a town in the province of Albay, Luzon Island. It is situated on the Gulf of Albay. Pop. 10,550.

Bacalao, bä'ka-lä'ō. See Cod.

Bacara, ba-kär'ra, Philippines, a town of Luzon in the province of Ilocos Norte. Pop. 13,735.

Baccanarists. See Jesuits.

Baccarat, bä-ka-ra', a town of France, in the department of Meurthe-et-Moselle, having the most important plate glass works in France. Pop. (1900) 6,772.

Baccarat', a game of Italian origin played with ordinary playing cards; very simple in details and freer from complications than most games at cards. Any number of players may participate, and as many packs of cards may be used as necessary, the number being increased to correspond with the number of players. The member of the party selected to act as banker deals out the cards from a box, after they have been shuffled. The face cards each count 10, and the others according to the numbers of their spots. After the bets have been made, the banker deals two cards to each of the players, including himself, but the other players must receive their cards before the banker is served. The aim of the players is to make the numbers 9, 19, 29, or as nearly those as possible, as 8, 18, and 28. Any player is at liberty either to "stand" or to be "content" with the two cards at first dealt, or to call for more, at the risk of exceeding 29, when his stake is forfeited to the dealer. If, after the first distribution of two cards to each, any player has a "natural,"—that is, a sum making 9, or next in value, 19,—he declares it wins, and the banker pays all who hold superior hands to his own, and claims from those holding inferior hands. The players stake their money separately, there being, in fact, as many separate games in progress as there are players, and the spectators may wager their money on any one of them, all of which must be accepted by the banker. Prior to the banker making a start, he names the amount of the bank. Any one sitting down at the table has the right to call the whole of the bank, selecting the left or the right on which to pick up the cards. Previous to the banker dealing the cards, it is the duty of two croupiers, one on the right and the other on the left, to count up the stakes deposited on either side, and then make up the bank. Thus the banker knows, to the smallest coin, the exact amount of his liabilities.

Bacchanalia, bäk'ka-nā'lĭ-a, feasts in honor of Bacchus, or Dionysos, characterized by licentiousness and revelry, and celebrated in ancient Athens. In the processions were bands of Bacchantes of both sexes, who wandered about rioting and dancing. They were clothed in fawn skins, crowned with ivy, and bore in their hands *thyrsi,* that is, spears entwined with ivy, or having a pine cone stuck on the point. These feasts passed from the Greeks to the Romans, who celebrated them with still greater dissoluteness till the Senate abolished them, 186 B.C.

Bacchante, bäk-kän'tē, a person taking part in revels in honor of Bacchus.

Bacchiglione, bäk'kē-lyō'nē, a river of northern Italy. It rises in the Alps, passes through the towns of Vicenza and Padua, and enters the Adriatic near Chioggia, after a course of about 90 miles.

Bacchus, bäk'kŭs, or **Dionysos,** the god of wine. His history is one of the most perplexing in the Greek mythology. Semele was pregnant with him by Zeus, but became a victim of the craft of Hera. Zeus hastened to save the unborn fruit of his embrace, and concealed it till mature in his own thigh. He afterward committed the infant to Hermes, who carried him to the nymphs of Nysa in India, where he grew and prospered. His teacher was Silenus, afterward his constant companion.

In the vales of Nysa Bacchus invented the preparation of a beverage from grapes, and taught the planting of vines. To spread the knowledge of his invention he traveled over almost the whole known world, and received in every quarter divine honors. Drawn by lions he began his march, which resembled a triumphal pomp, with a great suite of men and women, Sileni, Satyrs, and Mænades. Inspired by the presence of the god, rejoicing, brandishing the *thyrsus,* and crowned with vines and ivy, they danced around him, shouting, "*Evoe! Eleleus!*" over hill and valley, accompanied by the tones of Phrygian flutes and timbrels. The Thebans would not acknowledge his divinity, and Pentheus armed himself against him. Bacchus resolved to punish the crime, and inspired the women with a fury which drove them from their dwellings to wander on Mount Cithæron. Pentheus himself was torn in pieces by his own mother and her sisters, to whom he appeared a wild beast. Bacchus punished the daughters of Mynias, who derided his feasts, with frenzy and transformation. At Naxos some Tuscan sailors attempted to carry him off to Italy, supposing him from his purple robe to be the son of a king. They fettered him; but the fetters fell off, vines and ivy entwined the vessel, and kept it fixed in the midst of the sea: the god transformed himself to a lion, and the seamen, seized with madness, leaped into the waves, where they were changed into dolphins. On the other hand, he rewarded such as received him hospitably and rendered him worship, as, for instance, Midas, who restored to him the faithful Silenus.

His love was shared by several; but Ariadne, whom he found deserted upon Naxos, alone was elevated to the dignity of a wife, and became a sharer of his immortality. To confer the same favor on his mother, Semele, he descended into the realms of Pluto, and conducted her to Olympus, where she was henceforth called Thyone. In the dreadful war with the giants he fought heroically, and saved the gods from impending ruin. During the rejoicing for victory Zeus joyfully cried to him, "*Evan, evoe!*" (Well done, my son!), with which words Bacchus was afterward usually saluted. We find him represented with the round, soft, and graceful form of a maiden rather than with that of a young man. An ornament peculiar to him is the tiara. His long waving hair is gathered behind in a knot, and wreathed with sprigs of ivy and vine leaves. He is usually naked; sometimes he has an ample mantle hung negligently round his shoulders; sometimes a fawn skin hangs across his breast. The earlier bearded Bacchus is properly of Indian or Egyptian origin. His head is sometimes shown with small horns (the symbol of invincible force). In his hand is borne a *thyrsus,* or a drinking cup. The bull, panther, ass, and goat were symbolically associated with this god.

Upper—Excavating around the Ziggurrat of the Temple of Bêl to virgin soil, 6500 B. C.
Lower—Excavations in the Temple area. Pavement of Ur-Gur, 2700 B. C. Pre-Sargonic strata in the foreground.

The feasts consecrated to Bacchus were termed *Bacchanalia, Dionysia,* or in general *Orgia.* They were celebrated with peculiar solemnity in Athens, where the years were universally reckoned by them, and during their continuance the least violence toward a citizen was a capital crime. The great Dionysia were celebrated in spring. The most important part of the celebration was a procession representing the triumph of Bacchus. This was composed of a train of Bacchantes of both sexes, who were masked, clothed in fawn skins, crowned with ivy, and bore in their hands drinking cups and rods entwined with ivy (*thyrsi*). Amidst this mad crowd marched in beautiful order the delegated bodies of the *phratria* (corporations of citizens). They bore upon their heads consecrated baskets, which contained first-fruits of every kind, cakes of different shape, and various mysterious symbols. This procession was usually in the night-time. The day was devoted to spectacles and other recreations. At a very early hour they went to the theatre of Bacchus, where musical or dramatical performances were exhibited. Thespis, known as the inventor of tragedy, is said to have introduced into the Bacchic performance an actor who carried on a dialogue with the *coryphæus* (leader) regarding the myths narrated of Bacchus or some other divinity. The chorus surrounding its leader, stood on the steps of the altar of Bacchus, while the actor occupied a table. Some regard this as the origin of the stage. The vintage festivals in rural districts were celebrated by Bacchic processions, ruder in form than those of Athens, but characterized by the same wild license and ribaldry. Coarse ridicule of individuals was a marked feature of these occasions.

Bacchylides, băk-kĭl'ĭ-dēz, Greek poet who flourished about 470 B.C.; a native of Julis, a town on the Island of Cos. He was a cousin of the still more famous lyric poet Simonides, with whom he remained for some time at the court of Hiero in Sicily. He traveled also in the Peloponnesus, and is said to have been a rival of Pindar. Until recently, this poet was known to the modern world only in fragments of beautiful versification. In 1895, however, a well-preserved text was discovered and published, and Bacchylides has now taken permanent place as a master of Greek verse. An English translation of the poems appeared in 1897.

Bacciocchi, bä-chŏk'kē, **Felice Pasquale,** Corsican captain: b. Corsica, 18 May 1762; d. Bologna, 27 April 1841. In 1797 he married Maria Elisa Bonaparte. In 1805, when Napoleon made his sister Princess of Lucca and Piombino, Bacciocchi was crowned with his wife. After the emperor's fall, he lived quietly and in reduced circumstances at Bologna.

Bacciocchi, Maria Anna Elisa Bonaparte, the eldest sister of Napoleon Bonaparte: b. Ajaccio, Corsica, 1777: d. 7 Aug. 1820. She married Felice Bacciocchi, and was created by her brother, in 1805, Princess of Lucca, Piombino, Massa, and Carrara, and in 1809 Grand Duchess of Tuscany. She shared her brother's fall and spent her last years in Austria, dying on her estate near Trieste. Her only son died in 1833, and her only daughter, the Countess Camerata, in 1869.

Bach, bäH, **Alexander von.** Austrian statesman: b. Loosdorf, 4 Jan. 1813: d. 15 Nov. 1892. He was minister of justice in 1848, of the interior in 1849–59; and, subsequently, ambassador to Rome. In 1855, he negotiated the concordat with the papacy which brought Austria into submission to the Roman Church.

Bach, Heinrich, German musician: b. 16 Sept, 1615; d. 10 July 1691. He was the father of Johann Christoph and Johann Michael Bach; organist at Arnstadt.

Bach, Johann Christian, German musician: b. Erfurt, 1640, d. 1682. He was a son of Johannes Bach, the great uncle of Johann Sebastian Bach.

Bach, Johann Christian, German musician: b. Leipsic, 1735; d. 1782. He was a son of Johann Sebastian Bach, and was organist in the Cathedral of Milan 1754–9, and in London, 1759–82, from which residences he was surnamed "the Milanese" and "the English." He composed operas, masses, *Te Deums,* etc.

Bach, Johann Christoph Friedrich, German musician: b. Leipsic, 1732; d. 1795. He was a son of Johann Sebastian Bach, and was for a long period music master to Count Schaumburg at Bückeburg.

Bach, Johann Michael, German composer and instrument maker: b. 1648; d. 1694. He was a son of Heinrich Bach and the father-in-law of Johann Sebastian Bach.

Bach, Johann Sebastian, German musician and composer: b. Eisenach, 21 Mar. 1685; d. Leipsic, 28 July, 1750. Bach was the most profound and original musical thinker the world has ever seen. He is the master of masters; from him most of the great composers have drawn inspiration. When Mozart heard one of his pieces at Leipsic, in 1788, he exclaimed: "Thank Heaven! here at last is something new that I can learn from." "Not Bach (brook) but 'Ocean' should be his name," Beethoven exclaimed. Mendelssohn made enthusiastic efforts to revive the interest in Bach. Schumann helped to found the Bach Society and urged students, if they would become thorough musicians, to make Bach their daily bread. Chopin confessed that before giving a concert he locked himself up a fortnight with nothing but Bach to play. Franz devoted a great part of his life to adapting this master's works for use in modern concert halls. Liszt and Rubinstein adored and played him. Wagner, as he grew older, played Bach more and more; his vocal compositions he pronounced the most perfect ever written; and he said that the proper interpretation of them was the noblest task for contemporary musicians. The only dissenting voice in this chorus of praise was that of Berlioz; but, as Saint-Saëns (one of the principal worshipers), has pointed out, this was due solely to the fact that Berlioz was not familiar with the works of Bach. His pre-eminence is the more remarkable when we remember that he was born as early as 1685; but it seems perhaps a trifle less astonishing when we bear in mind that Johann Sebastian inherited the accumulated musical gifts of a long line of ancestors. "Throughout six generations," says Forkel, "there were hardly two or three members of this family who did not inherit a natural talent

for music, and make the cultivation of this art the principal occupation of their life." For more than a century there were so many representatives of this widely-scattered family that in one place, at any rate (Erfurt), town musicians came to be called "Bachs," even when that family did not happen to be represented among them. After the culmination had been reached, however, in Johann Sebastian, the family-tree soon withered, although some of his sons play a quite considerable rôle in musical history.

At the age of 10, Johann Sebastian was left an orphan, in care of his older brother, John Christoph, who appears to have been jealous of the boy's musical gifts. Christoph had got together a collection of the best German organ music of the time, which Sebastian was very eager to get at and study. Denied access to it, he managed to smuggle it into the garret, where, for six months, he busied himself making a copy of it on moonlit nights. But the brother at last discovered his secret and took away from him both the copy and the original. This is only one instance of many showing how Sebastian was determined to educate himself in face of all obstacles. Several times he went on foot to Hamburg — a distance of twenty-five miles — to hear the famous organist Reinken; subsequently he made a similar trip to hear the illustrious organist Buxtehude at Lübeck. This happened when he himself was already busy as organist and choirmaster at Arnstadt. Previously to that he had, as a boy, helped to support himself by joining a choir of boys who sang at funerals and weddings, as well as in church and in the street. He missed no chance to practice on the violin, the organ, and the piano — or, rather, the harpsichord and clavichord, which were the predecessors of the pianoforte. To these tasks, and to his efforts at composition, he often devoted whole nights. He got his first salaried position (as violinist) in 1703 at Weimar, but left this post after a few months for that of organist at Arnstadt. It was thence that he made the trip (a foot tour of over 200 miles) to Lübeck, already referred to, to hear Buxtehude. He had obtained a four weeks' leave of absence, but was so delighted with his opportunities for improvement at Lübeck that he remained four months, until peremptorily called back. The church consistory of Arnstadt took this occasion to reprimand him, not only for prolonging his leave of absence, but for neglecting rehearsals, going to a wine cellar during the sermon, allowing a strange maiden to make music in the choir, and for "having made extraordinary variations in the chorals, and intermixing many strange sounds, so that thereby the congregation were confounded." Yet, with all his faults, they loved him still and allowed him to remain at his post, till he left of his own accord, having secured a position as organist at Mühlhausen. Here, too, however, he did not remain long, as still better opportunities presented themselves to him at Weimar, where the Duke Wilhelm Ernst had his court. This duke was deeply interested in the religion of the German Protestant Church and was glad to avail himself of the services of Bach, who was destined to become the chief representative of the music of that church, as Palestrina was of the Catholic Church. Here Bach remained nine years, during which time he wrote many of his master works for organ and church choir. In 1717 he accepted a position in Köthen which involved a complete change in his activity. Instead of having an organ and a choir to occupy his time he had the duty, as Kapellmeister, of writing and rehearsing works for the orchestra as a whole or for groups of orchestral instruments (chamber music). In 1720 he was a candidate for the post of organist at the Jacobi Kirche in Hamburg; but, although he was at this time already famous as an organist, he failed to get the place, an obscure young man having secured it after paying $1,000 for the office. Three years later Bach became the cantor of the Thomasschule at Leipsic and director of the music in the two principal churches; this position he held twenty-seven years, till his death, 28 July 1750, at the age of 65.

Bach was twice married and became the father of 20 children; 5 sons and 5 daughters died before him, while 6 sons and 4 daughters survived him. His first wife was also a Bach — a cousin; she died in 1820, while he was on a concert tour. Eighteen months after her death he married a girl of 21 who was also musical; yet none of the 13 children by this second marriage attained as high a rank as some of the seven by the first wife. The second wife helped him copy his MSS. (which he was constantly revising) and in course of time her handwriting came to resemble his so closely that the two were hard to distinguish. In no way did Bach differ more widely from his great contemporary, Handel, than in his family life; Handel died a bachelor. There were times when Bach found it difficult to bear the material burden of his large family, but he was not so poor in his lifetime as is usually supposed. His income from various sources was, it is true, only about $500 at the best; but the purchasing power of that sum was equal to $3,000 in our day. It was after his death that the pinch of poverty was felt; his widow died in an almshouse; he himself was buried in a pauper's grave. For more than a century no one knew the exact place of this grave; the circumstances of its discovery read like a detective story. Some years ago it became necessary to rebuild the old Johannis Church in Leipsic, and, in connection with this, to remove the bones from that part of the adjoining cemetery in which Bach was believed to have been buried. The director of the archives, Wustmann, took this opportunity to search for Bach's grave. He had found in the books of the Johannis Hospital an item stating that $4 had been paid for Johann Sebastian Bach's oak coffin, which gave him his principal clue, for oak coffins were seldom used in those days. Near the place where Bach was believed to have been buried he found two oak coffins, one containing the remains of a young woman, the other the bones of a man, whose skull was so unique as to arouse the suspicion at once that it was Bach's. It was placed in the hands of the famous anatomist, Prof. His, who, after a long series of comparative investigations, came to the conclusion that there could be no doubt whatever that the skull was Bach's. He embodied his argument in a brochure, "Forschungen über Bach's Grabstette und Gebeine." The fact that Bach's con-

temporaries thus took no note of his burial place is disgraceful evidence that they never dreamed he was destined to rank as the greatest of all musical geniuses. Further evidence of this lies in the circumstance that he really brought about his death by his efforts to save some of his unappreciated MSS. from destruction by engraving them on copper plates. This led to serious trouble with his eyes; two operations by an English surgeon were followed by total blindness, which made it impossible for him to complete his great work, "The Art of Fugue". He dictated for its final number a choral, "When we are overwhelmed by Woe," and died not long afterward.

The thematic catalogue of his works contains 1,110 instrumental and 1,936 vocal numbers. All of them combined probably never brought him in as much as the $1,175 paid at a Berlin auction sale a few years ago for three of his MSS. Until 1829, when Mendelssohn, after overcoming a good deal of opposition, succeeded in producing the wonderful 'Saint Matthew's Passion' in Berlin, for the first time since its composer's death, the great Leipsic Cantor was looked on, in Mendelssohn's words, as "a mere old-fashioned big-wig stuffed with learning." That work opened the eyes of the musicians to their colossal stupidity, and from that year to the present time Bach's fame has been growing in a steady crescendo. In 1851 a Bach Society was formed at Leipsic for the printing of a monumental edition of Bach's works by Breitkopf and Härtel. For nearly half a century (up to 1896) a huge folio volume was issued every year, and after its completion the Bach Society began to make efforts for multiplying performances of these works, the majority of which constitute even now an unsurveyed Klondike. Bach himself does not appear to have been chagrined by the neglect of his works during his lifetime. "We find in him," writes Abdy Williams, "little of that desire for applause, for recognition, which is usually one of the strongest motives in an artist. He was content to labor as few men have labored, in a remote corner of Germany, simply for art and art alone." To cite Bach's own words: "The sole object of all music should be the glory of God and pleasant recreation." At the same time, it is obvious that he would have been gratified if he had won, as composer, some of the honors which fell to him abundantly as player. Of the esteem in which he was held as organist and clavichordist, two anecdotes give the best illustration. In 1717, while on one of his concert tours, he happened to be in Dresden at the same time as the famous French organist and harpsichord player Marchand. The Dresdeners thought this was a good chance for an international contest, and Bach was induced to offer the Frenchman a challenge. It was accepted, and all the details had been arranged; but when the hour arrived there was no Marchand. He had taken "French leave" that morning on the fast coach! Many years later, in 1747, Bach accepted a repeatedly given invitation to visit Frederick the Great at Potsdam. The king was delighted to see him. Without allowing him to take off his traveling clothes, he made him improvise on all his pianos and organs in his palace, and again and again he exclaimed: "There is only one Bach!"

It has been said of Bach that music owes almost as much to him as a religion does to its founder. This is true especially of two branches — the organ and choral music. Both as a writer for the organ and a player he has had no equal. The best account of this phase of his art is contained in Pirro's 'Bach, the Organist, and his Works for the Organ;' the author's aim being to make it easier to play Bach "in the Bach spirit." He refers to the great composer as "the man who suddenly surpassed all that had been done before him while at the same time anticipating all that was to be written in the future." The organ works are contained in vols. XV, XVII, XXXVIII, and XL of the Breitkopf and Härtel edition. Some of them are best known to music lovers through their superb arrangements for pianoforte by Liszt, Busoni, and others. Quite as striking is Bach's pre-eminence in choral music. The vocal works make up more than 30 vols.; among them there are 4 of chamber music with voice, 9 of passions, oratorios, and masses; and no fewer than 17 of church cantatas. It is known that he wrote 5 complete sets of these cantatas for all the Sundays and holidays in the year; probably there were about 350 in all, but of those only about 200 have been preserved. The greatest choral works in existence are Bach's 'Saint Matthew Passion' and his Mass in B minor. Schumann preferred the 'Saint John Passion' even to the Saint Matthew. Three other passions written by Bach are lost. Concerning this class of works Wagner exclaimed: "What opulence, what fullness of art, what power, clearness, and withal simple purity, speak to us from these unrivaled masterworks!" They are made up of arias, recitatives, chorals, and other choruses, beside the instrumental accompaniment. The arias are sometimes embroidered after the fashion of the time, but usually they are simple, chaste, and delightfully melodious. Indeed, Bach was so full of melody that it overflows into his recitatives, which are, at the same time, often highly dramatic and emotional, foreshadowing Wagner's. If Bach had written operas they would have been more dramatic than Handel's; but the opera was (apart from the *Lied,* or lyric art song, which had not yet been created), the one form of music which Bach avoided. As for the choruses in his works, they are of incomparable grandeur, and at the same time of great difficulty. All the parts are melodious; indeed there is in these works little practical difference between the chorus singers and the soloists. Many of the choruses are stately chorals — the hymns introduced into the Church by Luther and perfected by Bach. These were sung by the trained choir, the harmonies being too elaborate for the congregation. In his own churches Bach found the means of execution lamentably inadequate. The singers and students could barely master the technique; of the inner spirit they had no conception.

Of Bach's orchestral scores, also, it may be said that all the players are, in turn, soloists. His harmony is "a manifold melody;" it forms the bridge between the mediæval polyphonic and the modern harmonic styles. In his orchestral accompaniments, a favorite device is an *obligato* part for some string or wind instrument playing a duet with the solo voice. His

works for orchestral instruments alone comprise three overtures and six concertos. Among his compositions for violin there are three suites and three sonatas that are unique, inasmuch as they have no pianoforte accompaniment but are complete in themselves, the polyphonic or harmonic accompaniment being played together with the melody by the violinist; for the violincello, also, there are six sonatas and suites of this kind. While it is true that in all of his works the organ style prevails more or less, there is nevertheless a keen instinct (far ahead of the time in which he lived) for what is idiomatic, or peculiar to each instrument. This is particularly true in regard to the pianoforte compositions. In these, Bach is more modern than Haydn, Mozart, or even Beethoven. While writing for the imperfect clavichords and harpsichords of his time he had in his mind a prophetic vision of the modern grand piano; on that alone can justice be done to his superb compositions of this class. His preludes and fugues, his inventions, suites, toccatas, fantasias, etc., are the fountain head of modern music. Of special importance is the 'Well-tempered Clavichord,' a collection of 48 preludes and fugues, two in each key, arranged in the order of chromatic ascent. Hans von Bülow called this "the Old Testament in music." It is indispensable to every student; but it is infinitely more than a group of studies. "We find these fugues," wrote Rubinstein, "of a religious, heroic, melancholy, grand, serious character; in one respect only are they all alike — in their beauty! And then the preludes, whose charm, variety, perfection, and splendor are simply incomparable! That the same composer who wrote those organ compositions of overwhelming grandeur could also write such delightfully humorous gavottes, bourrées, gigues, such melancholy sarabandes, short piano pieces of such charming simplicity, transcends belief. These remarks refer to his instrumental works alone, but if we add to them his gigantic vocal compositions, we are led to the conclusion that the time will come when it will be said of Bach as of Homer: 'This was not written by one man but by several.'" Rubinstein's reference to the gavottes, etc., calls attention to the fact that Bach was not above writing dance music; a great deal of it, in fact. He also did much to improve the technique of pianoforte playing, especially in the matter of fingering (use of thumbs). He would have been the first to adopt all modern improvements, and in playing him, therefore, the pedal, for instance, should be used as freely as in playing Chopin. And while it was not customary in Bach's day to write expression marks, it is idiotic to suppose that he played his pieces without changes in loudness and pace. Here students should follow the guidance of Liszt and Bülow. The more Bach's works are studied from this point of view, the more does he seem a modern romanticist, and his works music of the future, even more than music of the past.

Bibliography.— Spitta's 'Bach,' in 2 vols. (English by Bell & Maitland) is the most elaborate and authoritative work. Of shorter books the most serviceable is that by Abdy Williams, which also contains a classified list of Bach's works and a bibliography. Consult also Parry: 'The Evolution of the Art of Music;' Apthorp: 'Musicians and Music Lovers;' and vol. IV of the 'Oxford History of Music;' 'The Age of Bach and Handel' by Fuller Maitland.

HENRY T. FINCK,
Musical Critic 'Evening Post,' New York.

Bach, Karl Philipp Emanuel, German musician: b. Weimar, 14 March 1714; d. 14 Dec. 1788. He was the son of Johann Sebastian Bach and was court musician in the service of Frederick the Great in 1740–67. He wrote on the theory of piano playing and was a voluminous composer of piano music, oratories, etc.

Bacharach, bäH'a-raH, a town of Germany, situated on the Rhine, 12 miles south of Coblenz. The vicinity produces excellent wine, which was once highly esteemed. The view from the ruins of the castle is one of the sublimest on the Rhine. Pop. (1900) 1,904.

Bache, bāch, **Alexander Dallas,** American scientist: b. Philadelphia, Pa., 19 July 1806; d. 17 Feb. 1867. He was graduated from the United States Military Academy, at the head of his class, in 1825; became professor of natural philosophy and chemistry at the University of Pennsylvania in 1828; was the organizer and first president of Girard College, 1836, where he established a magnetical and meteorological observatory, and was appointed superintendent of the United States Coast Survey, in 1843. In the last office he performed services of lasting and invaluable character. He was regent of the Smithsonian Institution in 1846–67; an active member of the United States Sanitary Commission during the Civil War; and president of the National Academy of Sciences in 1863. Besides a long series of notable annual reports of the United States Coast Survey, he published a report on 'Education in Europe' (1839), and 'Observations at the Magnetic and Meteorological Observatory at the Girard College' (3 vols. 1840–47).

Bache, Benjamin Franklin, American surgeon: b. 1801; d. 1881. He was great grandson of Benjamin Franklin. He established a laboratory in New York which during the Civil War was of great service to the Federal army.

Bache, Franklin, American chemist: b. Philadelphia, 25 Oct. 1792; d. 19 March 1864. He was appointed professor of chemistry at the Philadelphia College of Pharmacy in 1831, and at the Jefferson Medical College in 1841. He published 'System of Chemistry for Students of Medicine' (1819), and was one of the authors of Wood & Bache's 'Dispensatory of the United States' (1833).

Bache, George M., American naval officer: b. in the District of Columbia, 12 Nov. 1840; d. 11 Feb. 1896. He was graduated at the United States Naval Academy, in 1860, and commanded the ironclad Cincinnati in the various engagements on the Mississippi River, until she was sunk by the Vicksburg batteries, 27 May 1863. He was highly commended by Admiral Porter, Gen. Sherman, and Secretary Welles for his conduct in the last engagement. Subsequently, he took part in both attacks on Fort Fisher, and, in the second one, 15 Jan. 1865, led the naval assault on the fort. He was retired with the rank of commander, 5 April 1875.

Bache, Hartman, American military engineer: b. Philadelphia, Pa., 3 Sept. 1798; d. 8 Oct. 1872. He entered the United States

Topographical Corps; and for 47 years was constantly employed on surveys and on works of hydrographic and civil engineering. On 13 March 1865 was appointed brigadier-general, and 7 March 1867 was retired. His most notable achievements were the building of the Delaware breakwater and the application of iron-screw piles for the foundation of lighthouses upon sandy shoals and coral reefs. He retired from active service, 1867.

Bache, Sarah, American philanthropist: b. Philadelphia, Pa., 11 Sept. 1744; d. 5 Oct. 1808. She was the only daughter of Benjamin Franklin, and the wife of Richard Bache. During the Revolutionary War she organized and became chief of a band of patriotic ladies who made clothing for the soldiers, and in other ways relieved their sufferings, especially during the severe winter of 1780.

Bache, Walter, English pianist: b. Birmingham, 19 June 1842; d. London, 26 March 1888. In 1858 he studied music in the Leipzig Conservatorium under Hauptmann, Richter, Plaidy, and Moscheles. In 1862 he went to Rome, and from that time till 1865, when he returned to London, studied with Liszt, of whose style and compositions he became an ardent admirer and advocate. Upon his return to London he instituted annual concerts, at which he put forward Liszt's music, and lived long enough to see the indifference of the public toward his master change to open admiration. For several years prior to his death Bache was professor of the pianoforte at the Royal Academy of Music, and it was mainly due to his efforts that the Liszt scholarship was established in that institution.

Bachelder, Nahum Josiah, American statesman; b. Andover, N. H., 3 Sept. 1854. Educated at Franklin Academy, Taunton Hill School, Andover; and became prominent farmer. Was nominated by the Republicans and elected governor of New Hampshire in 1902.

Bacheller, Addison Irving, America novelist: b. Pierpont, Saint Lawrence co., N. Y., 26 Sept. 1859. He was graduated at the Saint Lawrence University in 1882, from 1882–3 was a member of the staff of the *Daily Hotel Reporter* of New York city, and in 1884 became a reporter for the Brooklyn *Times*. In the latter year he established the Bacheller Syndicate for the purpose of supplying literary matter to periodicals, and for 14 years was a director of that syndicate. He was for a short time editor of *The Pocket Magazine,* and subsequently joined the editorial staff of the *New York World,* but remained in that capacity for a short time only. His novels, the scenes of which are laid in northern New York, include: 'The Master of Silence' (1890); 'The Still House of O'Darrow' (1894); 'The Unbidden Guest;' 'Eben Holden' (1900); 'D'ri and I' (1901); 'Darrel of the Blessed Isles' (1903); 'Candlelight' (1903); 'Virgilius' (1904); etc.

Bach'elor, a term anciently applied to a person in the first or probationary stage of knighthood who had not yet raised his standard in the field. A knight bachelor is one who has been raised to the dignity of a knight without being made a member of any of the orders of chivalry such as the Garter or the Thistle. It also denotes a person who has taken the first degree in the liberal arts and sciences, or in divinity, law, or medicine, at a college, or university; or a man of any age who has not been married, the most usual meaning of the term. Taken as a class in a community, bachelors have, from the earliest times, been the subjects of much and varied legislation. In nearly every country, at some period in its history, penalties have been imposed upon male celibates through the legislative branch of the government, the general basis for such legislation being the principle that the citizen was under moral obligation to the State to rear up a family of legitimate children, at least should he be capable, morally, physically, and financially. The old Jewish command to "be fruitful and multiply" was faithfully carried out by the Hebrews who regarded marriage as a duty.

In such nations as Sparta, where individual interests were always subservient to those of the State, the laws were more severe, and criminal proceedings were instituted, under the laws of Lycurgus, both against those who for any unreasonable excuse failed to marry, and against those who through marriage in late life made probable children of unhealthy constitution. At Athens, though formerly regarded as a crime by the laws of Solon, celibacy was not severely punished, and later, though the practice was discouraged, interference with the inclinations of individuals in this respect gradually became of little practical value, and the laws finally fell into disuse.

In Rome, the imposition of heavy penalties upon male celibates was instituted at a very early period, and later even women were subjected to the same rigid laws. According to the *Lex Julia et Papia Poppæa,* penalties were imposed on those who failed to marry after a certain age, and an unmarried person could not come into possession of a legacy unless he be married within a hundred days after the testator's death. The provisions of the law allowed widows a year in which to comply, and divorced women six months from the date of divorce, but these periods were later changed and extended to two years, a year and six months, respectively. This law did not apply, however, to men above 60 years of age, and women above 50 years. In cases of childless persons (males from 25 to 60 years of age, and females from 20 to 50 years) who should become beneficiaries under a legacy, one half of the value of such legacy was forfeited. In later years, especially in England, France, and the United States, taxes upon bachelors have been imposed more for purposes of State revenue than to compel marriage, but though such legislation has been pushed in some instances with great vigor, the success of the movement in later years has not been marked.

Bach'elor, a local name in the Mississippi valley for the small bass, more usually called crappie (q.v.).

Bachelor's Button, the double yellow buttercup (*Ranunculus acris*). Similar forms, as *R. aconitifolius,* are often called white bachelor's buttons. The name is also given to *Centaurea cyanus* (see CORNFLOWER) and to *Gomphrena globosa.*

Bachian, băch-yän', one of the Molucca Islands, immediately south of the equator, and southwest of Gilolo; area, 800 square miles. It is ruled by a native sultan under the Dutch.

Bachman, bäk'man, **John,** American clergyman and naturalist: b. Dutchess County, N. Y., 4 Feb. 1790; d. 25 Feb. 1874. He became pastor of a Lutheran church in Charleston, S. C., and published among other works, 'Characteristics of Genera and Species as Applicable to the Doctrine of the Unity of the Human Race' (1854). He is best known by reason of his association with Audubon in the making of the 'Quadrupeds of North America,' he writing the principal part of the text, which Audubon and his sons illustrated.

Bachmut, bach-moot', a town of southern Russia, in the government of Ekaterinoslav, with a trade in cattle and tallow. It has coal mines and salt wells, and soda is extensively manufactured. The salt produced here is of a very high grade of excellence. Pop. (1897) 19,400.

Bacil'lus. See BACTERIA.

Back, Sir George, English explorer: b. Stockport, 6 Nov. 1796; d. London, 23 June 1878. He entered the British navy in 1808, and in 1817 was in the expedition to Spitzbergen. He accompanied Sir John Franklin to the Arctic regions in 1819 and again in 1825, and in 1833 led a party in search of Sir John Ross, then in the Arctic Ocean, and in 1836, in command of the Terror, made his last trip to the north. The Geographical Society awarded him a gold medal in 1837, and in 1839 he was knighted. He became admiral in 1867. Among his works are 'A Narrative of the Arctic Land Expedition' (1836); a 'Narrative of the Expedition in Her Majesty's Ship Terror' (1838).

Back Bay, a fashionable residential district in Boston, made by filling in an enlargement of the Charles River, formerly called the Back Bay. See BOSTON.

Back Land, name applied to the region around the Arctic Circle, in British North America. It was explored by Capt. Back in 1831.

Back-Staff, an instrument invented by Capt. Davies, about A.D. 1590, for taking the altitude of the sun at sea. It consisted of two concentric arcs and three vanes. The arc of the longer radius was 30°, and that of the shorter one 60°; thus both together constituted 90°. It is now obsolete, being superseded by the sextant.

Back'bite, Sir Benjamin, an evil-minded, sharp-tongued character in Sheridan's comedy, 'School for Scandal.'

Back'gam'mon is a game in which two opposing players move symbolic men into or out of each other's territory on a board, according as they are respectively entitled to do so by the throw of a dice. Without question a game of that nature was played among the Aztecs of Mexico centuries before the landing of Cortez, and it is probable that it was brought from Asia to the Pacific coast by the original immigrants. Francisco Lopez de Gomara described it in 1552, and Joan de Torquemada in 1616 gave additional details of the game, mentioning that the little stones of each contestant varied in color. The Iroquois Indians had a dice game of a somewhat similar sort.

Modern backgammon is played by two players who have between them a board, each side of which has alternate black and white angular marks projecting like rays from the rim. Each player has 15 flat tablets (similar to those with which drafts is played) called men. One player's men are black, the others are white. Each player has a dice box for his own use but the two dice are used alternately by them both. Each dice has a number on each face numbered from one spot to six. Each player throws the dice in turn on to the centre of the board: and moves two men, one man according to the distance indicated by one of the dice and the other according to the number on the second dice. So the game proceeds in the usual manner, the players throwing and moving their men alternately into and out of each other's territory, until one player has carried all the men from the opposite home (or inner table) into the outer table: and thence into his own outer table and finally into his own home or inner table. The simplest text-book on the subject is that of A. Howard Cady.

Backhuysen, bäk'hoi-zen, or **Bakhuysen, Ludolf,** celebrated painter of the Dutch school, particularly in sea pieces: b. Emden 18 Dec. 1631; d. 1709. His most famous picture is a sea piece which the burgomasters of Amsterdam commissioned him to paint as a present to Louis XVI., and which is still at Paris.

Bäckström, bĕk'strėm, **Per Johan Edvard,** Swedish dramatist and lyric poet: b. Stockholm, 27 Oct. 1841; d. 13 Feb. 1886. His principal work is 'Dagvard Frey' (1876), a tragedy; besides this, the dramas 'A Crown' (1869); 'Eva's Sisters' (1869), and 'The Prisoner of Kallö' (1870), met with success. His lyrics were published in three collections (1860, 1870, 1876).

Back'us, Azil, first president of Hamilton College, Clinton, N. Y.: b. Norwich, Conn., 13 Oct. 1765; d. 9 Dec. 1817. After graduating at Yale in 1787, he served the Church at Bethlehem, Conn., until he became president of Hamilton College in 1812.

Back'us, Isaac, Baptist clergyman and author: b. Norwich, Conn., 9 Jan. 1724; d. 20 Nov. 1806. He was ordained 13 April 1748 and became pastor of a Congregational church in Middleborough, Mass. Some of his congregation sympathizing with the Baptists he united with them and formed a Baptist church in 1756. Throughout his life he was a persistent advocate of the widest religious freedom, holding open communion for many years. For 34 years he was a trustee of the present Brown University, then Rhode Island College. As a delegate to the convention that adopted the Federal constitution, he voted in its favor. Of his numerous writings the most important is 'A History of New England with Special Reference to the Baptists' (3 vols. 1777–96; new ed. by D. Weston, 2 vols. 1871), a partisan but valuable work. His 'History of Middleborough' is in Massachusetts Historical Society Collections (Vol. III., 1st Series, 1794; repr. 1810).

Back'us, Truman Jay, American educator: b. Milan, N. Y., 11 Feb. 1842; was graduated at the University of Rochester in 1864; was professor of English literature at Vassar College, 1867–83; then became president of the Packer Collegiate Institute in Brooklyn, N. Y. After going to Brooklyn, he served on

several state commissions. His publications include 'Great English Writers,' 'Outlines of English Literature,' and a revised edition of Shaw's 'History of English Literature.'

Ba'con, Alice Mitchell, American educator: b. New Haven, Conn., 26 Feb. 1858; was educated privately and took the Harvard examinations in 1881; taught at the Hampton Normal and Agricultural Institute in 1883-8, and in Tokio, Japan, in 1888-9; returned to the Hampton Institute in 1889, and founded the Dixie Hospital for training colored nurses in 1890. In 1900 she again began teaching in Tokio. She published 'Japanese Girls and Women,' 'Japanese Interior,' etc.

Bacon, Augustus Octavius, American legislator: b. Bryan County, Ga., 20 Oct. 1839. He was graduated from the University of Georgia in 1859, from the law department of the university in 1860; entered the army of the Confederate States at the beginning of the Civil War, and was adjutant of the 9th Georgia regiment in the Army of Northern Virginia, and later promoted captain and assigned to general staff duty; and in 1866 began the practice of law at Macon, Ga. In 1880 he was president of the State Democratic convention, and in 1884 a delegate from the State at large to the national Democratic convention. He was a member of the Georgia house of representatives in 1871-82, 1892, and 1893, and for the greater part of the time its speaker. Elected to the United States Senate in November 1894, he was re-elected in 1900.

Ba'con, Benjamin Wisner, American educator: b. Litchfield, Conn., 15 Jan. 1860; studied in Germany and Switzerland; and was graduated at Yale College in 1881; held several Congregational pastorates; and in 1896 became professor of New Testament criticism and exegesis in Yale University. Author of 'Genesis of Genesis'; 'Triple Tradition of the Exodus'; 'Introduction to the New Testament'; 'The Sermon on the Mount' (1902); 'The Story of Saint Paul' (1904); etc.

Ba'con, Delia Salter, American author: b. Tallmadge, O., 2 Feb. 1811; d. 2 Sept. 1859. She was eminent in her day as a teacher, and wrote several stories, but is now remembered only as an eloquent advocate of the theory that the plays of Shakespeare were written by Lord Bacon. She herself did not originate the idea, but was the first to give it any currency, in her 'Philosophy of the Plays of Shakespeare Unfolded' (1857). The book had the honor of a preface from the pen of Nathaniel Hawthorne, and the theory has been accepted by a few persons in both England and the United States, who have wasted not a little ingenious reasoning in its advocacy.

Ba'con, Edwin Munroe, American author: b. Providence, R. I., 20 Oct. 1844. He received an academical education; was on the staff of several Boston papers; and wrote 'King's Handbook of Boston'; 'Boston Illustrated'; 'Historic Pilgrimages in New England'; 'Literary Pilgrimages in New England'; 'Boston of To-day'; 'Bacon's Dictionary of Boston'; 'Walks and Rides in the Country Round About Boston'; 'Walks on the North Shore'; 'Massachusetts Bay' (1903); etc.

Bacon, Francis, English statesman, philosopher, and essayist: b. London, 22 Jan. 1561; d. Highgate, London, 9 April, 1626. Bacon was commonly called Lord Bacon in accordance with long literary tradition, though his exact titles in the peerage were Baron Verulam and Viscount Saint Alban. He was the youngest of eight children of Sir Nicholas Bacon, the Lord Keeper, six of whom were by a former marriage. His mother was Ann, daughter of Sir Anthony Cooke, and her sister married Sir William Cecil (Lord Burghley). The family thus stood in a position of exceptional influence at the court of Elizabeth, but Bacon profited little by the fact in his official career. He entered Trinity College, Cambridge, in 1573 and was admitted to Gray's Inn in 1575. In 1576 he went to France as a member of the embassy of Sir Amias Paulet, and remained there until the death of his father in 1579. It then became necessary for him to return to England and take up his legal studies with a view to professional practice. In 1582 he was admitted utter barrister. Already before this time he had entertained hopes of a political career and had made unsuccessful appeals to Lord Burghley for support; and in 1584, being elected to Parliament from Melcombe Regis, he began a long and conspicuous service in the House of Commons. He produced at once a political document, entitled 'A Letter of Advice to Queen Elizabeth,' in which the religious situation, and particularly the Catholic question, was discussed with wisdom and moderation. In 1589 he wrote a second paper, 'An Advertisement Concerning the Controversies of the Church of England,' reiterating his policy of moderation with more especial reference to Puritanism. Bacon's natural instinct, in both religious and political controversies, was conciliatory, and he exerted himself in favor of moderate measures throughout Elizabeth's reign and after the accession of James. He manifested also, at the beginning of his career, some power of acting with disinterested independence,—a capacity which was less evidently displayed in his later life. In 1593 he led the opposition of the Commons to the proposal of the Lords for a joint settlement of a question involving subsidies and thus falling within the prerogatives of the Lower House. In his prolonged resistance to the subsidy legislation he earned the disfavor of both Burghley and the Crown. His opposition, which was apparently conscientious, may have been the cause of his failure to obtain the vacant attorney-generalship in 1594 and the solicitor-generalship in 1595, though in the former instance his claim was urged by Essex and in the latter by both Essex and Burghley. The attorney-generalship was given to Sir Edward Coke, who was repeatedly a rival and enemy of Bacon's in later years.

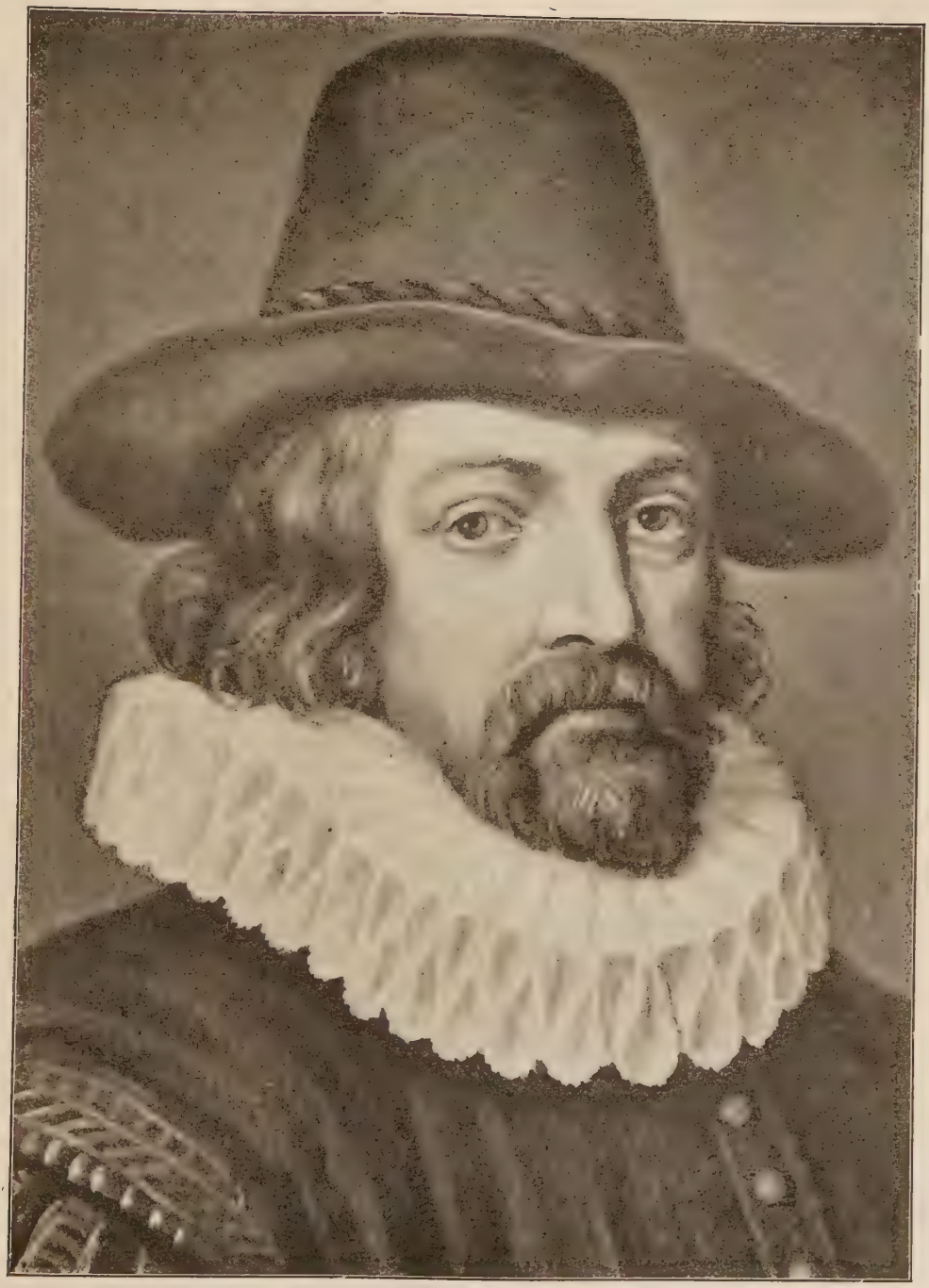
Bacon's association with Essex, which constituted one of the most important of his personal relations, began in 1591. He attached himself to the rising young nobleman in the hope of obtaining political advancement. But it is not necessary to deny him all sentiment of personal attachment or all real belief in the availability of Essex for the public service. He received from Essex earnest patronage, as has been already shown, and when recommendations

failed, Essex gave his follower a valuable estate by way of consolation. In 1597 Essex tried to arrange a marriage between Bacon and Lady Hatton, but Coke again proved a successful rival. Bacon, on his side, undertook to advise Essex and to manage his career at court. In 1598 he appears to have urged him (though he afterward denied it) to attempt the suppression of Tyrone's Irish rebellion,—an undertaking which led to the dismissal of Essex from office in disgrace. Bacon's conduct in the investigation is hard to trace, but he may perhaps be granted to have acted in the interests of Essex, though he was formally one of his prosecutors. Later, however, in 1601, when Essex rebelled openly against the throne, Bacon helped to secure his conviction, and after his execution prepared the official declaration of his treasons. For this active, and apparently unnecessary, participation in the prosecution of his friend Bacon has probably received more blame than for any other act of his life. It may be urged in extenuation that Essex was actually a dangerous person to the state, and that Bacon steadily warned him that he would not prefer the claims of friendship to the public good. It is true, too, that Bacon's position was difficult as between such a reckless friend and the jealous and imperious queen whose favor he desired both for his friend's interest and his own. Yet in the last analysis there is little defence to be made for Bacon's willingness to profit by the ruin of Essex.

After the accession of James I. Bacon continued his active service in Parliament. He published papers on the religious situation and on the union of the English and Scottish crowns, and he served on a commission to arrange the terms of the union. In 1603 he was knighted, and in 1604 given a pension of £60. In 1605 he offered to King James the very important treatise on the 'Advancement of Learning,' which will be more particularly discussed below among Bacon's writings. In 1606 he married Alice Barnham, a London alderman's daughter, who brought him a substantial dowry. He had no children. Little is known of his domestic life except that it ended unpleasantly. In his last will he revoked "for just and grave causes" such provisions as he had made earlier for his wife's benefit. In June, 1607, Bacon's long-deferred advancement came and he was made solicitor-general. At this period the unfortunate estrangement between the King and the Commons was steadily progressing, and Bacon, who clearly saw the danger that attended upon this breach of sympathy, took an earnest part in the struggle. Quite apart from his personal aims, he seems to have been genuinely distrustful of the governmental capacity of the Commons and consequently to have espoused the cause of the monarchy, becoming, as he described himself, a "peremptory royalist." His policy was doomed to failure; but it is only just to recognize that it had elements of moderation and statesmanship, contemplating to be sure the royal prerogative, yet aiming at religious toleration, the amelioration of the lot of the humbler classes, and a friendly relation with parliament. After the death of Salisbury in 1612 he undertook to manage the King's interests, and in the parliament of 1614 he continued his efforts to reconcile the crown and the people by the policy to which in his 'Commentary' he gives the name "e Gemino." But his attempt was unsuccessful; the parliament was dissolved, and the King and the people took different courses. From this time forth Bacon seems on the whole to have relinquished his higher political aims and to have given himself over to the struggle for personal advancement. In politics, as in friendship, he was incapable of serious self-sacrifice; or at least he always persuaded himself that he could best serve the public good by having due regard to his own interests.

In 1613 he had been promoted to the attorney-generalship. In 1615 he prosecuted Saint John for denouncing benevolences, and in the same year he consented to the torture of Edmund Peacham, who was charged with having written a treasonable sermon. He came in the latter case into conflict with his old enemy, Coke, who denied Peacham's guilt, and who also objected to the separate consultation of the judges by the attorney-general. In 1617 Bacon helped to secure Coke's removal from the King's Bench for insufficient subserviency to the Crown. Coke's personal independence throughout the controversy has been often praised, and stands in favorable contrast with Bacon's self-seeking policy. At the same time it should be remembered that there was involved a real issue between the legal and the political powers, and that Bacon, in resisting Coke's effort to make the court an arbiter of the constitution, was fighting for the principle which actually prevailed, though under changed conditions, in English government.

Bacon took part in 1616 in the prosecution of the Earl of Somerset for the murder of Sir Thomas Overbury, and after Somerset's fall he attached himself with ardor to George Villiers, the King's new favorite, in whom he seemed, along with many others, to be for the time genuinely deceived. Through Villiers (afterwards Earl and Duke of Buckingham) Bacon received a succession of royal favors. In 1616 he was made Privy Councillor, in 1617 Lord Keeper, and in 1618 Lord Chancellor. In July 1618 he was elevated to the peerage as Baron Verulam, and in 1621 he was made Viscount St. Alban. But his adherence to Buckingham, who was growing steadily unpopular, led at last to disaster. In 1621 the Commons, led by Coke, would have called Bacon to account for defending Buckingham's increase of monopoly patents, if the King had not interfered. Thereupon they sent to the Lords a formal accusation that Bacon had taken bribes from suitors in his court. Bacon at first treated the charges with unconcern. Then, when he found that the Lords meant to investigate them seriously, he collapsed and offered no defense. He was fined £40,000, imprisoned, and banished from parliament and the court. In June, 1621, he was released from the Tower, and retired to his family residence at Gorhambury; and in September of the same year the King pardoned him, though without restoring him to parliament and the court. Bacon begged both James and Charles without avail for a further remission of his penalty. While admitting the justice of his condemnation, he protested that there had been no juster judge in England for 50 years; and there is of course



FRANCIS BACON.

an important difference between corruption and perversion of justice. Although he constantly accepted gifts from suitors while their cases were pending, it does not appear that he ever perverted justice for money, and some of the cases urged against him were those in which the suitors had lost after giving him gifts. But this record is not so clear in cases where Buckingham interposed to ask favor for his friends, and in at least one instance he allowed a decision of his court to be practically set aside at the Favorite's request.

Forbidden to re-enter the field of politics, Bacon devoted the last years of his life to the literary and scientific labors which had always divided his time and which he had professed to regard as his real and proper work; and he met his death as a result of a scientific experiment. In March, 1626, he caught cold while stuffing a fowl with snow in order to observe the effects of refrigeration on the preservation of meat. On 9 April he died of what is now known as bronchitis at the house of Lord Arundel, where he had been carried at the time of his attack. He was buried in Saint Michael's church, Saint Albans.

Bacon's Writings.—From early youth, if tradition can be trusted, Bacon showed extraordinary mental powers and a keen interest in philosophical pursuits. Throughout his life his labors in authorship kept pace closely with his political work, and prone as he was to yield to the temptations of wealth and power, he seems really to have accorded the first place in life to what he called his "contemplative aims." His strictly philosophical writings may therefore properly claim first attention among his works. At the age of 23 he produced an essay which bore the ambitious title, 'The Greatest Birth of Time, or the Great Renewal of the Empire of Man Over the Universe.' The work is now lost, but the title shows that the young author had already conceived some notion of a "great instauration." The 'Partus Masculus Temporis' ("The Male Birth of Time"), a fragment which is also of early date, is perhaps a modification of previous work. It contains little more than an attack on the false fancies ("idols") of the older philosophies, and is Bacon's first plea for a lawful wedlock between the mind of man and the universe. The 'Conference of Pleasure' (written for Essex in 1592), 'Gesta Grayorum' (1594), and the 'Device on the Queen's Day' (1595) are not primarily philosophical works, but they contain many expressions of Bacon's intellectual ideals; and in the 'Gesta Grayorum' there is an elaborate proposal for the endowment of libraries, museums, and establishments of research. 'Valerius Terminus, of the Interpretation of Nature, with the Annotations of Hermes Stella' (written about 1603) is a fragmentary treatise anticipating some of the most familiar matter in the later philosophical works. In it Bacon defends the study of science from the charge of impiety, urges the importance of an encyclopædic survey of human knowledge, and mentions for the first time (though without explaining them) the four classes of "idols" which were afterward discussed in the 'Novum Organum.' In 1605 Bacon presented to King James an English treatise of enduring value, 'The Advancement of Learning.' This was a splendid attempt to defend and magnify the pursuit of learning and then to survey the existing state of human knowledge. Part of the argument of the first part has lost its cogency, or even its relevancy, to-day. But in breadth of view and fertility of suggestion the work is extraordinary. As a statement of intellectual ideals, and a programme, or even a prophecy, of their accomplishment, it stands among the most significant productions of the Renaissance. When Bacon sketched a few years later the plan of his 'Great Instauration,' he designated the 'Advancement of Learning,' as a temporary filling of the first place on the "partitiones scientiarum," and in his last years he made a greatly amplified Latin translation of it ('De Augmentis et Dignitate Scientiæ') to be incorporated in the great work. In 1606-7 he published the 'Outline and Argument' ('Delineatio et Argumentum') of the second part of the Instauration, giving a brief general account of his new induction. In 1607 the 'Cogitata et Visa de Interpretatione Naturæ, sive de Scientia Operativa' were published as an introduction to some investigations on motion. The 'Cogitata' cover most of the ground afterwards traversed in the first book of the 'Novum Organum.' The 'Redargutio Philosophiarum' (1609), one of the best specimens of Bacon's Latin style, contains an imaginary speech of a French philosopher to his disciples, and sets forth anew the author's ideas about the fruitlessness of the older philosophies. The 'De Sapientia Veterum,' though it lies outside the immediate scheme of the 'Instauration' and might perhaps be mentioned rather among Bacon's literary works, is a very characteristic production containing an exposition of his theory of ancient mythology as an allegorical embodiment of moral and scientific wisdom. This primitive wisdom he was fond of extolling to the disparagement of the later philosophy of Aristotle, against which he was in revolt. In 1611 and 1612 fall a number of scientific treatises of less importance. Not until 1620, after his long struggle to political power and on the eve of his fall, did Bacon publish the 'Novum Organum,' though much of its material had been anticipated in his earlier writings. Prefixed to the work is a "distributio operis" for the whole 'Instauration,' which was planned to contain the following parts: 1. Partitiones Scientiarum (represented temporarily by the English 'Advancement of Learning'); 2. Novum Organum (the new instrument or inductive method); 3. Phænomena Universi; 4. Scala Intellectus (by which fanciful title he meant to indicate the operation of the new method in passing gradually from less general to more general principles "per scalam veram"); 5. Prodromi Philosophiæ Secundæ (to contain such tentative discoveries as Bacon had made without using the new method); 6. Philosophia Secunda, sive Scientia Activa (a final embodiment of the results of the new philosophy). The first book of the 'Novum Organum' was still introductory in character, discussing the uselessness of the older philosophies, the traditional errors of mankind, and the grounds of hope in the future of science. Bacon's optimistic devotion to science has been not ineptly compared with that of the young Renan. His classification of the "idols" (phantasms or delusions) of the tribe, the cave, the market-

place and the theatre, has become a literary commonplace. In the second book the new induction itself is finally expounded and illustrated by a study of the nature of heat. The exposition is incomplete and falls short, as in the nature of things it was bound to, of what Bacon himself apparently hoped to achieve, namely a mechanical method of invention. Bacon never pursued the theory further, and in his later works he turned from the new method, or instrument, toward other parts of his great scheme. The 'Parasceue ad Historiam Naturalem' (1620) is a brief and incomplete preparation for the third part of the Instauration, and was followed in 1622 by the 'Natural and Experimental History for the Foundations of Philosophy, or Phenomena of the Universe, being the Third Part of the Great Instauration.' This treatise which was to take up winds, density and rarity, gravity, sympathy and antipathy of things, and a variety of other topics, was also left in a fragmentary state. In 1623 appeared the 'De Augmentis,' which was to supersede the English 'Advancement of Learning' as the first portion of the Instauration. Probably about 1624 Bacon wrote the 'Syl a Sylvarum' (published in 1627), an ill-classified collection of materials for natural history. Its contents belong in considerable degree to the realm of folk-lore and superstition, and Bacon's detractors have found in the work some of their best grounds of attack on his character as a man of science. It was his belief, however, stated in the 'Advancement of Learning,' that a collection and comparison even of the erroneous opinions of mankind might give useful guidance in the pursuit of truth. Under the titles 'Scala Intellectus' and 'Prodromi sive Anticipationes Philosophiæ Secundæ' Bacon wrote at a later, but uncertain, date two mere prefaces which filled the fourth and fifth gaps in the 'Instauration.' They were his last philosophical writings.

Bacon's position in the history of science and of philosophy has been very differently estimated. He constructed no philosophical system, and one would search his writings in vain for much discussion of the great problems which have divided the schools of metaphysics since Descartes. As a man of science his shortcomings are still more notable. He was commonly unsuccessful in his own investigations and ill-informed about the best work of his contemporaries. He was hardly possessed at all of what is now understood by the scientific mind. Yet there is much justification for the traditional view of him as the father of modern philosophy and the primary instigator of modern scientific progress. If not the originator, he made himself at least the leading exponent of the revolt against the Aristotelian, or more properly the scholastic, tradition, and he profoundly influenced the English realists of the next generations. In ethics his distinction between «individual or self-good» and «good of communion» points forward to the doctrine of the later utilitarians. And science certainly owed him a large debt for the formulation and urgent presentation of the «new induction.» No one, of course, will maintain that Bacon invented induction. Macaulay, in his familiar account of the plain man and the minced pies, has made some sport of his claims to originality in this matter. But a more judicious estimate would recognize the high and lasting educational value of the 'Novum Organum.' And Bacon's broad outlook and fertile imagination enabled him to lay down the lines of scientific progress and to win recruits for the work. He furnished his followers not only with an improved method, but also with a more vital aim,—that of practical service. In his revolt against Aristotle and the schoolmen he constantly dwelt upon th fruitlessness of the earlier philosophies, and one of the most eloquent passages in the 'Advancement of Learning' sets forth the ideal of human service as the goal of scientific effort. This aim has come to be called Baconian, so much so that Bacon is often charged with having ignored or denied the more purely intellectual purposes. But the charge is extreme. He thought it wise, in view of the sentiment of his time to emphasize particularly the practical aim; but he recognized *veritas* and *utilitas* ('Novum Organum' I, Ap. 124) as coordinate ends of study. Finally, in spite of his deficiencies in investigation, Bacon made some noteworthy discoveries in pure science. His explanation of heat as a mode of motion is quoted by Tyndall as a striking anticipation of the modern doctrine. On the whole, however, it was as a prophet or leader, rather than as a productive scholar that Bacon served learning best.

By far the greater part of Bacon's writings (apart from his state papers, legal works, and copious personal memoranda) dealt with philosophy and science, and bore directly or indirectly upon the construction of the 'Great Instauration.' Some of his more important state papers have been already mentioned in the account of his life. His strictly professional writings (treatises on English law) will be found in the seventh volume of the Spedding and Ellis edition of his collected works. His personal memoranda, which permit an intimate view of his life and character, are published in Spedding's 'Letters and Life' (the highly characteristic 'Commentarius Solutus,' of the year 1608, in the fourth volume). Besides all these productions of his scholarship and his professional life he made eminent contributions to history and to pure letters. His 'History of Henry VII.' (1621), which has been accepted by later scholars as essentially sound, ranks with the best historical writing of its age in England. Bacon wrote also a memorial of Elizabeth ('In Felicem Memoriam Elizabethæ' (1607), another of Henry, Prince of Wales, who died in 1612, and fragments on the reign of Henry VIII. and on the accession of James I.

In pure literature Bacon's reputation rests chiefly on three works: the 'Advancement of Learning' (which has been already discussed), the 'Essays,' and the 'New Atlantis.' The first two of these, curiously enough, he translated, or had translated, into Latin in order to secure them a wider and more permanent public. The 'New Atlantis' (first published by Rawley in 1627, but probably written between 1622 and 1624), is a fragmentary sketch of an ideal commonwealth, and in particular of an ideal «palace of invention» called «Solomon's House,»—a great establishment of scientific research such as Bacon longed to see founded. The book, which expresses the idealistic spirit of the Renaissance,

shows Bacon at his best. The description of Solomon's house is said to have led to the establishment of the Royal Society. The 'Essays,' which were designed to "come home to men's business and bosoms," are better known than anything else that Bacon wrote. They deal with many subjects and are characterized by ripe reflection and consummate mastery of style. Bacon had them in hand during the greater part of his mature life. He published the first edition in 1597, and twice revised and enlarged the collection (in 1612 and 1625). The title is supposed to have been suggested by the 'Essais' of Montaigne, and there are occasional resemblances between the two works in subject-matter; but Bacon was not largely indebted to any source, and his conception of the essay was totally different from the personal and leisurely discourses of Montaigne. "Brief thoughts, set down rather significantly than curiously," was his own characterization of them in the dedication of the second edition; and although some of the later essays contain passages of adorned and sustained eloquence such as were lacking in the earlier ones, the general type was maintained to the end.

A small number of religious works, in elevated thought and style, remain to be mentioned: the 'Meditationes Sacræ' (published in 1597), the 'Confession of Faith' (written before 1603), several prayers, and Bacon's only accredited verse, 'A Translation of Certain Psalms into English Verse' (1624). A poem on 'The World,'—"The world's a bubble, and the life of man less than a span,"—is sometimes ascribed to him, but is of doubtful authorship.

Bibliography.—The dates of Bacon's chief works have been mentioned in the body of the article. The standard collected edition is that of Spedding, Ellis and Heath (London 1857-59). Single works have in several cases been published separately with more elaborate annotation; among the best of such editions being the 'Novum Organum' by T. Fowler (Oxford 1878), the 'Advancement of Learning' by W. A. Wright (Oxford 1896), the 'Essays' by Archbishop Whately (London 1856), E. A. Abbott (London 1896), and S. H. Reynolds (Oxford 1890), and the 'New Atlantis' by G. C. Moore Smith (Cambridge 1900). A useful reprint of the three editions of the 'Essays' has been published by Edward Arber, English Reprints, No. 27 (1871). For the life of Bacon the great source of original materials is Spedding's 'Letters and Life of Bacon' (7 vols., 1861). A brief digest of the material was issued in two volumes, 'The Life and Times of Francis Bacon' (Trübner 1878). Short biographies of value have been written by R. W. Church, 'Francis Bacon' (London 1884), Thomas Fowler, 'Francis Bacon' (New York 1881), E. A. Abbott, 'Francis Bacon, an Account of His Life and Works' (London 1885), S. R. Gardiner (in the 'Dictionary of National Biography'), and John Nichol, 'Francis Bacon, His Life and Philosophy' (London 1898-9). Macaulay's essay on Bacon furnishes a brilliant though by no means just or satisfactory estimate of the man and his work. On Bacon's philosophical doctrines and influence one should consult, besides the standard histories of philosophy, Ellis's general introduction to the philosophical works, Kuno Fischer's 'Francis Bacon of Verulam: Realistic Philosophy and Its Age' (Engl. translation by John Oxenford 1857), Fowler's elaborate commentary on the 'Novum Organum' and his 'Francis Bacon.' The history of Bacon's reputation and influence is treated with some fulness in Dr. Fowler's introduction to the 'Novum Organum.' An idea of the arguments of Bacon's adverse critics can be derived from Joseph de Maistre, 'Examen de la Philosophie de Bacon' (Paris, 1836), Sir David Brewster, 'Memoirs of the Life, Writings, and Discourses of Sir Isaac Newton' (Edinburgh, 1855), and Justus von Liebig, 'Ueber Francis Bacon von Verulam und die Methode der Naturforschung' (Munich, 1863).

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Ba'con, Henry, American painter: b. Haverhill, Mass., 1839. He served in the Civil War, studied art in Paris under Cabanel and Edward Frere, and painted, among others, 'Boston Boys and Gen. Gage' (1875); 'Paying the Scot' (1870); and 'The Farewells' (1878).

Ba'con, John, English sculptor: b. Southwark, 24 Nov. 1740; d. 4 Aug. 1799. In early life he was employed in modelling small porcelain ornaments, and while yet an apprentice he formed a project for making statues of artificial stone. In 1763 he began to work in marble; and shortly afterward, invented an instrument for transferring the form of the model to the marble. In 1768 he became a student of the Royal Academy, and next year he obtained the first gold medal for sculpture given by that society, the following year he was chosen an associate, and in 1778 was made a full member. His chief works are two groups for the interior of the Royal Academy, the statue of Judge Blackstone for All Souls' College, Oxford; another of Henry VI. for Eton College; the monument of Lord Chatham in Westminster Abbey; and the statues of Dr. Johnson and the philanthropist Howard in Saint Paul's Cathedral.

Ba'con, John Edmund, lawyer: b. Edgefield, S. C., 3 March 1832; d. Columbia, S. C., 19 Feb. 1897. Graduated at South Carolina College, 1851; Litchfield (Conn.) Law School, and admitted to the bar, 1854. He was secretary of the United States legation at St. Petersburg, and married a daughter of ex-Gov. Pickens, then minister to Russia. He resigned in 1860, entered the Confederate army, and rose to the rank of major. He was one of the negotiators for the restoration of South Carolina to the Union, 1866; and to him was chiefly due the reopening of South Carolina College by act of the legislature in 1873. In 1886 he was appointed chargé d'affaires in Uruguay and Paraguay.

Ba'con, John Mosby, American military officer: b. Kentucky, 17 April 1844; served in the Union army through the Civil War; was appointed captain in the 9th United States Cavalry, in 1866, and colonel of the 8th cavalry in 1897. On 4 May 1898, he was appointed brigadier-general of volunteers and placed in command of the Department of Dakota. Subsequently, he was assigned to duty in Cuba, till 8 May 1899. He was retired in 1902.

Ba'con, Leonard, American clergyman: b. Detroit, Mich., 19 Feb. 1802; d. 24 Dec. 1881; graduated at Yale in 1820, after which he studied theology at Andover, Mass. In 1825 he became pastor of the First Congregational Church in New Haven, a post which he held officially, though not always actively, until his death. He was professor of didactic theology in Yale (1866–71). He was throughout his life an active opponent of slavery. In 1847 he joined with Drs. Storrs and Thompson to found the New York *Independent,* in the joint editorship of which he continued for 16 years. Besides a vast number of reviews and pamphlets, he published 'Views and Reviews' (1840); 'Slavery Discussed in Occasional Essays' (1846); and 'Genesis of the New England Churches.'

Ba'con, Nathaniel, American insurrectionary leader: b. Friston Hall, Suffolk, England, 2 Jan. 1647; d. 26 Oct. 1676. His great-grandfather was cousin to Lord Bacon; his mother, a Brooke, was daughter of a Suffolk knight. He entered St. Catherine's College, Cambridge, in 1660; took M.A. 1667; studied law at Gray's Inn, London, and traveled on the Continent. He found life too straitened in England on the income his father allowed him, and the latter gave him £1,800 outright to emigrate to Virginia, where his cousin, Nicholas Bacon, had been living since 1650. He arrived in the latter part of 1673 with a young wife, daughter of Sir Edward Duke, and soon became a member of the governor's council, as was his cousin; and settled on a plantation some 20 miles below Richmond, on the James, called «Curle's Wharf.» He also had another on a part of the site of Richmond, the attack on which by the Indians was part of the raid that brought on the imbroglio known as «Bacon's Rebellion,» which see for his career and fate.

Ba'con, Roger, English monk and philosopher: b. near Ilchester, about 1214; d. 1294. He first entered the University of Oxford, and afterward went to that of Paris, where he seems to have distinguished himself much by successful study and teaching, and received the degree of doctor of theology. About 1250 he returned to England, where he entered the order of Franciscans, fixed his abode at Oxford, and devoted himself to his studies, chiefly in natural philosophy. Means were furnished him by generous friends of science, whose contributions enabled him to purchase books, to prepare instruments, and to make the necessary experiments. In examining the secrets of nature he made discoveries and deduced results which appeared so extraordinary to the ignorant, that they were believed to be works of magic. There is clear evidence in his writings that he accepted the Aristotelian theory of stellar influence on the minds and wills of men, not indeed directly, but through the medium of the body. Such views brought him into conflict with the teachings of the Church on free will, and in 1257 he was sent to Paris, where he was kept in confinement for the long period of 10 years. In 1267, Bacon wrote a work under the title of 'Opus Majus,' giving a connected view of the different branches of human knowledge, supplemented soon after by two other works, namely, 'Opus Secundum' and 'Opus Tertium.' Under Clement's successor, Nicholas III., the general of the Franciscans, Jerome of Ascoli, declared himself against Bacon, forbade the reading of his writings, and issued an order for his imprisonment, which was confirmed by the Pope. This new confinement lasted 10 years; and when Jerome of Ascoli was elected pope, under the name of Nicholas IV., Bacon vainly endeavored to convince him of the innocence and utility of his labors, by sending him a treatise 'On the Means of Avoiding the Infirmities of Old Age.' After the death of Nicholas IV. he regained his liberty, and returned to Oxford, where he wrote a 'Compendium of Theology.'

Though an extraordinary man, Bacon could not entirely free himself from the prejudices of his time. He believed in the philosopher's stone and in astrology. There are to be found in his writings new and ingenious views on optics; for example, on the refraction of light, on the apparent magnitude of objects, on the magnified appearance of the sun and moon when in the horizon, etc. He describes very exactly the nature and effects of convex and concave lenses, and speaks of their application to the purposes of reading, and of viewing distant objects, both terrestrial and celestial; and it is easy to prove from his writings that he was either the inventor or improver of the telescope. He also gives descriptions of the *camera obscura,* and of the burning-glass. He made, too, several medical discoveries. The discovery of gunpowder has been attributed to him. His writings contain the chemical formula for it, but it is generally supposed that he obtained it from the Arabs, from whose writings he derived other suggestions. He was acquainted with geography and astronomy, discovered the errors of the calendar and their causes, and made a corrected calendar. In moral philosophy also, Bacon laid down some excellent precepts.

Ba'con, Roger, his Opus Majus (1267 A.D.). Newly edited and published, with introduction and full English analysis of the Latin text, by J. H. Bridges (2 vols. 1897). An adequate publication, after 630 years, of one of the most remarkable productions of the human mind.

The work is an exhortation addressed to Pope Clement, urging him to initiate a reform of Christian education, in order to establish the ascendancy of the Roman Catholic Church over all nations and religions of the world. Its central theme was the consolidation of the Roman Catholic faith as the supreme agency for the civilization of mankind. Its author wished to see recognition of «all the sciences,» since all are parts of one and the same complete wisdom. He first gave experiment the distinct and supreme place which was later revived by Descartes, and carried out in modern science. He formed a clear conception of chemistry, in his day not yet separated from alchemy; and of a science of living things, as resulting with chemistry from physics. In the part of his work dealing with moral philosophy, Bacon makes the first attempt ever made at the comparative study of the religions of the world. His protests against the intellectual prejudices of the time, his forecasts of an age of industry and invention, the prominence given to experiment, alike as the test of received opinion and the guide to new fields of discovery, render compari-

son with Francis Bacon unavoidable. In wealth of words, in brilliancy of imagination, Francis Bacon was immeasurably his superior. But Roger Bacon had the sounder estimate and the firmer grasp of that combination of deductive with inductive method which marks the scientific discoverer.

Ba'con, Thomas Scott, American theological writer: b. Saratoga, N. Y., 1 Feb. 1825. Originally a lawyer, he became an Episcopal clergyman (1854). Besides sermons, addresses, reviews, etc., he has written 'Both Sides of the Controversy Between the Roman and the Reformed Church' (1858); 'The Reign of God, not the Reign of Law' (1879); 'The Beginnings of Religion' (1887); 'Primitive and Catholic Doctrine as to Holy Scripture'; 'It is Written.'

Ba'con, Philippine Islands, a town in the province of Albay, Island of Luzon. Pop. about 13,000.

Ba'con, the name given the sides of a pig which have been cured or preserved by salting with salt and saltpetre, and afterward drying with or without wood smoke. By the old process of rubbing in the saline mixture, the curing occupied from three to four months. The method now adopted on a larger scale is to place the prepared flitches in a fluid pickle. The pickling, drying, and smoking now occupy not more than six weeks. Bacon may be called the poor as well as the rich man's food. By the former it is prized as a necessary of life; by the latter, for its exquisite flavor. The nitrogenous, or flesh-forming matter in bacon is small, one pound yielding less than one ounce of dry, muscular substance, while the amount of carbon compounds, or heat givers, is large, exceeding 60 per cent. Its digestibility, however, owing to the large proportion of fat it contains, is not less than that of beef or mutton.

Ba'con Bee'tle (*Dermestes lardarius*), an insect, the larva of which destroys bacon, lard, and furs.

Baco'nian Philos'ophy, the inductive philosophy of which it is sometimes said that Lord Bacon was the founder. This, however, is an exaggerated statement. What Lord Bacon did for this mode of ratiocination was to elucidate and systematize it; to point out its great value, and to bring it prominently before men's notice; lending it the support of his great name at a time when most of his contemporaries were satisfied with the barren logic of the schools. The triumphs of modern science have arisen from a resolute adherence on the part of its votaries to the Baconian method of inquiry.

Ba'con's Rebel'lion, in Virginia, 1676. The English Navigation Acts of 1651 and 1660, restricting colonial trade to English vessels, had produced universal distress in Virginia, forcing it to buy and sell to the home monopolists at their own price; tobacco, not only the chief product, but the chief currency, became almost worthless. In 1667 the smaller landholders were reported on the brink of rebellion, and in 1673 there were meetings to refuse payment of taxes. Meantime the corrupt civil service of the colony, place-hunters sent over by Charles II. to be rid of them, were plundering the planters by means of the export dues, in collusion with the governor, Sir William Berkeley (q.v.); and the latter was fattening on a fur trade with the Indians. To save himself from the opposition or criticism of the masses, whom he hated and despised, and perpetuate the oligarchy of the small group of rich planters who formed his council, he kept his legislature of 1662,— strongly royalist from the enthusiasm of the Restoration,— in office till 1676 by annual adjournments without new elections; he had also abolished universal suffrage and substituted a property qualification. This built up a strong opposition, including some of the solidest citizens. In 1675 a terrible Indian war broke out, wrapping the frontier in fire and blood; 36 whites were murdered in one day of January 1676. Berkeley, implored to protect the settlements, ordered out a force under Sir Henry Chicheley, then suddenly dissolved it, recalled Chicheley's commission, and refused to do anything more till the Assembly met in March. The result was frightful: within 17 days 60 of the 71 plantations in Rappahannock parish were destroyed, and by the time of the March meeting, over 300 victims had perished, a large part by fiendish tortures. Even then, under Berkeley's orders, the «Long Assembly» (so called in allusion to the Long Parliament) merely committed another outrage: instead of authorizing an army, they authorized frontier forts, to have a garrison of 500 soldiers (from the seaboard counties, not the frontier one which suffered from the Indians, and hated the governor). No attack on the Indians was to be permitted except under specific orders from the governor. Two million pounds of tobacco more were added to their taxes for this mockery of protection, and most of that was embezzled and the forts built so as to be worthless, even for the little service they could do. The people petitioned for leave to form expeditions at their own charge under any leader Berkeley might appoint; he forbade any further petitions of the sort under heavy penalties. It was the universal belief that his one solicitude was to save his Indian trade monopoly from harm. Finally the people of Charles City County petitioned once more for leave, in face of actual ravages then going on; and once more the obstinate and avaricious old man refused it. Men could bear no more; they raised 300 volunteers on their own risk, and by acclamation placed at their head Nathaniel Bacon (q.v.), a planter of 29, recently from England, and one of the governor's council. He accepted it and wrote to Berkeley for a commission; Berkeley returned an evasive answer, and Bacon started on his expedition without it. Berkeley hearing of it, sent an order for the company to disperse; all but a few, however, kept on and dispersed the Indians. Berkeley collected a troop of horsemen, and set out to arrest Bacon, when he heard that the colony was all in revolt behind him; and he hurried back to Jamestown, dissolved his 14-year-old Assembly, and issued writs for a new one. Despite his suffrage restriction, there was a heavy majority against him; Bacon being one of the new members. As the latter approached Jamestown, he was arrested and brought before Berkeley, who, in view of the uprising, did not dare proceed to extremities, but paroled him, and on Bacon's making submission for attacking the Indians without license allowed him to take his seat, with a tacit agreement to give him his commission to finish

the Indian war. The new legislature, besides restoring universal suffrage and making other reforms very distasteful to Berkeley, provided for raising an army of 1,000 men for Indian service. But Bacon, still refused the commission, and privately warned that his life was in danger, fled, shortly returned with 600 men, and forced Berkeley to sign his commission as major-general for the Indian campaign, and also a memorial to the king in his favor and reciting the colonial grievances. This later was sent off with a secret note from Berkeley, disavowing it. Bacon within a month had nearly put down the Indian outbreak, especially by a crushing victory at Bloody Run (near Richmond), when he heard that the governor had proclaimed him and his party rebels, and to escape popular wrath had fled across the peninsula to Accomac. Bacon marched back to Middle Plantation (the site of Williamsburg), launched a manifesto against Berkeley, and drew around him a gathering of some prominent men and a vast number of penniless ones (for the movement was largely a democratic revolt against an overweening aristocracy). They agreed to stand by him even against a royal army; feeling that they were compromised beyond retreat at best, and hoping to hold out till the king could be correctly informed and pardon them. Bacon carried on the Indian campaign till September, thoroughly stamping out the danger to the colony; meantime sending an expedition to capture Berkeley, which was itself captured. Berkeley gathered about 1,000 militia by promising them the confiscated estates of the rebels, and reoccupied Jamestown; Bacon marched against him, drove him to Accomac once more, and burnt Jamestown to the ground. But he had taken malaria there, and while invading Gloucester County to attack Major Brent, was stricken down, and died 1 October. The rebellion at once collapsed, and Berkeley wreaked a frightful vengeance upon Bacon's adherents. See BERKELEY, SIR WILLIAM. For authorities, besides new documents published in 'Virginia Magazine of History' (1893–8), see the 'Century Magazine,' Vol. XL., under "Nathaniel Bacon," by Edward Eggleston; and John Fiske's "Old Virginia and Her Neighbors," 1897, Vol. II.).

Bacoor, bä'kō-ōr', Philippine Islands, a town of the province of Cavite, on the Island of Luzon. Pop. about 14,000.

Bacsanyi, Janos, Hungarian poet: b. Tapolcza, 11 May 1763; d. 12 May 1845. His first work, published in 1785, procured him an appointment in a public office, but a liberal poem cost him this in 1793, as well as his liberty the year after. In 1796 he went to Vienna, and there he married a few years later the German poet, Gabrielle Baumgarten — an unhappy match. In 1809, Bacsanyi translated Napoleon's proclamation to the Hungarians, and was afterward obliged to take refuge in Paris. After the Peace of Paris, he lived at Linz, where he died. His collected poems appeared at Budapest in 1827.

Bacteræ'mia, a form of poisoning due to bacterial products. This poisoning is usually due to the absorption of toxins from bacteria situated either on the surface of the body, the intestinal canal, or in some confined space. See PYÆMIA.

Bacteria. Literally the word bacterium, bacteria being its plural, means a tiny rod or stick. As understood, however, by biologists, bacteria constitute a genus of lowly organized microscopic plants having forms other than that indicated by the literal meaning of the word. Briefly defined, bacteria are unicellular vegetables that multiply by the simple process of transverse division — they are, therefore, schizomycetes. In size they are all of microscopic dimensions requiring in most cases to be magnified from 600 to 1,000 diameters before becoming visible and even then they appear in many instances as scarcely more than tiny points. As encountered in nature they assume a variety of forms which may be conveniently arranged into three principal groups, namely: the spherical, the rod-like, and the spiral. To the spherical forms the name *cocci* or *micrococci* (*coccus,* singular) is given, and, according to the manner in which these tiny spheres develop and their progeny adhere to one another, they are further severally designated as *staphylocci,* that is, cocci clustering irregularly together like grapes in a bunch; *streptococci,* that is, cocci adhering together like beads or pearls in a strand; *diplo-cocci,* that is, cocci occurring in pairs; *tetracocci,* that is, cocci clustered in fours, etc.

To the rod-like group — that is, those which are straight, having one diameter longer than another — the designation *bacilli* (*bacillus,* singular) is given. While the structure and mode of multiplication of many of the bacilli is as simple as is that of the micrococci — that is, one cell divides into two, two into four, and so on *ad infinitum,* without variation, it is nevertheless in the group of bacilli that we encounter a number of species provided by nature with a more highly organized and complicated means for propagation and perpetuation. It is here that we encounter species in the course of whose life cycle there develops within each rod a single tiny, oval, highly resistant body, a spore as it is called, which may be fairly compared to the seeds of higher plants and which, like the seed, may be gathered and kept for almost indefinite periods, without losing their power of germination. Since such spores of bacteria are markedly tenacious of life even under the most unfavorable of circumstances it is obvious that the power to form spores is an important provision for the preservation of the species. It is of passing interest to know that the ability to form spores is possessed by some, but not all, of the disease-producing bacteria, a fact that serves to explain in part the difficulties experienced by the sanitarian in eliminating certain types of infection. For it must be remembered that the infective species capable of entering the spore stage are by virtue of that property much less vulnerable to the action of disinfectants and disinfecting processes than are the species not so endowed.

The spiral forms, *spirilla, spirochaeta,* as they are called, comprise those bacteria having one or more curves in their long axis, that is, those that are twisted like a corkscrew. They are sometimes seen as homogeneous, long spiral threads without segmentations, while again they may consist of short curved segments adhering end to end. Spore formation is not a characteristic of the spiral bacteria.

In structure bacteria are non-nucleated masses of protoplasm surrounded by an en-

veloping zone appearing in some instances to be but a condensation of the central protoplasm, while in others it partakes somewhat of the nature of mucin. Many of the bacteria exhibit no evidence of independent motility, while others, by virtue of special locomotive apparatus (*flagella*) move themselves about in fluids in a most energetic manner. As their structure is exceedingly simple, in so far as formed elements are concerned, their mode of nutrition is, physically speaking, correspondingly simple — that is, the nourishment is absorbed and their waste products discharged directly through their enveloping membranes by the process of osmosis. This being the case it is obvious that bacteria can multiply and perform their physiological functions only under conditions of moisture. Unlike the more highly organized plants bacteria are apparently without special provisions for gaseous exchange, that is, they are devoid of chlorophyl. They obtain their oxygen as such from the free air or from easily decomposable oxygen compounds. In the course of his early investigations in this field Pasteur discovered a group of bacteria that have ever proven to be of the greatest interest — a group that, paradoxical as it may seem, not only does not require free oxygen for its life processes but to the growth of which free oxygen is actually prohibitive. To these species he gave the designation *anaerobic* to distinguish them from the majority, the *aerobic* varieties, to which free oxygen is essential. In their relations to higher life bacteria may be regarded as allies or as enemies, according to the nature of the species under consideration. Contrary to notions that have been more or less prevalent the majority of bacteria have nothing to do with disease production. Their natural role is that of scavengers. They are concerned in nature's great laboratory, the soil, in working over dead organic matters into forms appropriate to the nourishment of growing vegetation. Since in the course of this conversion dead bodies that would otherwise encumber the earth are caused to disappear they must from both the æsthetic and economic standpoints be regarded as, in the main, benefactors. In this group of *saprophytic* bacteria, as they are called, that is, those that live on dead matters, we encounter species of the greatest interest and importance. It is here that we perceive the omnipresent forms concerned in the reduction of dead animal and vegetable tissues into such simple forms as carbon dioxid, ammonia and water to be used by higher plants. It is in this group that we find the ever-present nitrifying species — that is, those peculiar ferments that assist the leguminous plants in assimilating free atmospheric nitrogen; that oxidize the ammonium of decomposition to the nitrous and nitric acids so essential to plant life; that convert the objectionable organic matters of sewage and polluted waters into an inert inorganic form and that, through their specific activities supply, where circumstances are favorable, the entire commercial world with its supply of saltpetre.

The saprophytic group also comprehends many species used in the arts and industries — such, for instance, as those concerned in the production of certain organic acids; those employed in the manufacture of indigo by the fermentation process and in the preparation of hemp; and those utilized in the manufacture of cheese and butter. In the study of this large group one constantly encounters other species presenting most engaging characteristics — some of these, the *chromogenic* varieties, have the property of producing during the course of their growth pigments of great beauty — brilliant reds, delicate pinks, rich purples, yellows ranging from the palest lemon to the deepest orange, are those most often encountered. In another group, the *photogenic*, we meet with species having the emission of light as their most singular peculiarity. When growing these forms glow with a peculiar phosphorescence, and it is significant to note that these luminous varieties have been most frequently encountered in the sea and upon articles from the sea. The evil odors of putrefaction are the results of saprophytic bacterial development. In the *parasitic* group of bacteria we encounter those species that exist always at the expense of a living host, either animal or vegetable, and in doing so not only appropriate materials necessary to life, but give off in return waste products that may act as direct poisons to the host. Fortunately this is a much smaller group than is the saprophytic mentioned above. In no particulars, save for their ability to exist at the expense of a living host and cause disease, are the disease-producing bacteria distinguishable from the innocent varieties. The essential difference between the disease-producing and the innocent bacterial species is that the former possess as their most striking physiological peculiarity the power of elaborating poisons, *toxins*, technically speaking, that have a direct destructive action upon the tissues of their host. In some cases the poisons may be properly regarded as secretions of the bacteria, and, under artificial conditions of cultivation, may easily be separated from the living bacteria elaborating them. This is especially true of the poisons of diphtheria and of tetanus or lock-jaw. When thus separated such poisons, entirely independent of the living bacteria, retain the specific property of causing the symptoms and many of the pathological changes that characterize the growth of the living bacteria in the tissues. In other cases the poisons cannot be so readily separated; they appear to be an integral constituent of the protoplasm of which the bacteria are composed. This is especially the case with the toxins of *bacillus typhosus, bacillus dysenteriæ,* and *spirillum choleræ Asiaticæ* — the organisms concerned in the causation of typhoid fever, epidemic dysentery, and Asiatic cholera, respectively. In the case of still other pathogenic species there is little doubt that specific intoxicants are in one way or another elaborated during infection, but as yet they have not been satisfactorily demonstrated. Nevertheless, it may be said that, in general, infection by bacteria is to-day regarded as essentially a chemical phenomenon — that is, as a reaction between the poisons elaborated by the bacteria and the tissues with which they come in contact; the result of the reaction being the partial or complete death of the host in which the phenomenon is in operation.

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Bactericide, any agent capable of killing bacteria. The older terms, antiseptic, germicide, etc., cover too broad a field, and the word bactericidal has come to mean something more definite and exact than the older terms. Heat is one of the best bactericidal agents. Cold is not bactericidal. Even the lowest temperatures do not destroy the life of these plants. The metallic salts and the phenols are the bactericidal agents most in use. The aldehydes, formaldehyde, benzyaldehyde are also efficient. See ANTISEPTIC; GERMICIDES.

Bacteriology. Though generally considered a modern science, and perhaps properly as regards certain of its most important developmental aspects, bacteriology in reality dates from the observations of the Dutch investigator Leeuwenhoek in the latter part of the 17th century. With simple lenses ground by himself, Leeuwenhoek discovered in the mouth, in the excreta, in water, and in other matters examined by him, the presence of countless bodies of smaller dimensions than anything hitherto seen. These "animalcules," as he called them, were often observed to move themselves about in a remarkably energetic manner, and, judging from his text and illustrations, they were doubtless the bodies we now recognize as bacteria. Leeuwenhoek's observations were immediately seized upon by the philosophers of the day as offering an explanation for many hitherto unexplained phenomena. So general became the belief in a causal relation between the "animalcules" and all manner of disease conditions that for a time, we are told, there prevailed almost a "germ mania."

To the investigators of the time the question of greatest fascination in connection with this newly-discovered world was as to its origin. Many believed and stoutly maintained that the "animalcules" were the products of metamorphosis of either living or dead tissues of more highly organized beings; others that they arose *de novo* in "putrescent atmospheres"; many suspected them of spontaneous generation in some other mysterious way; while a few maintained, on experimental evidence, that they were probably the descendants of pre-existing creatures of the same kind. Singular as it may seem it took nearly two centuries to close finally that debate and to prove that the dictum of Harvey "*omne vivum ex ovo*" or better, its appropriate modification "*omne vivum ex vivo*" was as applicable to the microscopic as to the world of higher beings. In its modern aspect bacteriology dates from the epoch-making investigations especially of Koch and of Pasteur conducted during the eighth decade of the 19th century. During that period observations were made and methods of work devised that went far toward starting the subject on its career as a science. In the study of bacteria, as of all other forms of life, it is essential to a correct interpretation of form and physiological function that the observations be made upon isolated species. Prior to the period mentioned this was not possible, for the methods in vogue were insufficient for the separation of these minute creatures from one another. For the development of the science probably the most important step was, therefore, the introduction by Koch of trustworthy methods for the separation of individual bacterial species from mixtures of them, and for the more or less complete determination of their specific morphological and physiological peculiarities; that is, for the isolation and study of bacteria in "pure cultivation," as it is technically called. Up to the time of Koch's classical research upon the methods of investigating bacteria, their study had been conducted in fluid materials; that is, in infusions of either vegetable or animal matters, in which most bacterial species develop with remarkable activity. Since many totally distinct species are indistinguishable from one another by their size, shape, and general appearance, it was obviously impossible, by the older methods of study, either to be certain if one were dealing with one or more species in the fluids in which they were growing, or to separate the one from the other in case of confusion. Koch appreciated this defect and suggested the use of solid materials as culture media, hoping thereby to reproduce the conditions so often seen when such organic matters as bread, potato, cheese, etc., become moldy on exposure to air. Here one sees the mold not always as an inextricable mixture of different species, but often as sharply isolated islands of beginning growth — as mold colonies — so to speak. These, on examination, are usually found to consist of single species, and on a slice of moistened bread one may often observe several colonies of distinct species growing side by side without, for a time at least, encroaching one upon another. By appropriate methods it is easily possible to transplant such colonies, free from admixture with other forms, and study them as "pure cultures." But such substances as bread, potato, etc., are not in general as well adapted to the study of bacteria as to that of molds. Appreciating this Koch demonstrated that the addition of gelatin to the infusions employed for the successful cultivation of bacteria converted them into practically solid culture media without robbing them of any of their useful properties; and that by the appropriate employment of such solid media it was easily possible to separate as pure cultures the individual species composing the mixtures of bacteria that one desired to analyze. Thus, for example, if a tube of gelatinized beef tea, freed from all living bacteria by heat, be gently warmed until liquefied, and be then inoculated with a mixture of several species of bacteria, growth at once begins, and if left in the test-tube progresses in about the same manner as if the beef tea did not contain gelatin; but if while still warm and fluid the contents of the tube be poured out upon a flat, cold surface, the increased area causes the bacteria to become more widely separated from one another and the lower temperature results in the solidification of the gelatin, so that each bacterium is fixed in its new position. It at once begins to germinate, and presently a "colony" results; the surface ultimately becoming studded with such colonies. As the colonies from the different species differ from one another in many ways — in outline, texture, color, effect of their growth on the gelatin, etc. — it is easily possible, after a little practice to distinguish them by the naked eye, and by transplanting them to tubes of sterile culture media to study them without the disturbing presence of other species; that is, in pure culture.

The introduction of this method for the isolation and study of bacterial species in pure cultivation certainly constitutes the most impor-

tant stimulus to the development of modern bacteriology. By it results were placed upon a more secure basis than ever before, and a confidence in the work such as had never existed was awakened in the minds of all students of the subject.

The studies that had been made by Pasteur upon fermentation; upon the souring of wines; upon the maladies of silk worms, and upon certain fatal epizootics of fowls and domestic cattle; together with Koch's fundamental studies upon the infections of wounds and the appropriate methods of analyzing them were rich in suggestion to the pioneers in this new field. Within a comparatively brief period after the adoption of the new methods our knowledge of the exciting causes of many hitherto obscure diseases was greatly extended; it was shown to be possible to determine the modes of their transmission and the channels through which infection occurred. The conditions most favorable to the successful action of a host of substances employed for the purpose of disinfection were accurately determined. And early in the work observations were made that indicated the possibility of successful vaccination against disease through the use of attenuated (weakened) living cultures of specific disease-producing bacteria. One of the most important outgrowths of modern bacteriology has resulted from its application to the problems of the sanitary engineer. As a result of these studies we know that sewage, polluted waters, and polluted soils tend naturally to revert to a state of purity if their pollution be checked and that this progressive purification is due in large part to the activities of the bacteria located within them. It has been found that by the appropriate adjustment of conditions the normal activity of the bacteria may be so greatly accentuated as to constitute them the most important factors in the purification of polluted waters and sewage. The utilization of these facts is conspicuously illustrated in the purification of water by the process of natural sand filtration and in the purification of sewage by irrigation; by the septic tank process, etc. In these methods the living bacteria, and they alone, are the instruments through which the results are attained. The sand grains in the filters and the particles of soil in the irrigation fields serve only as objects to which the bacteria can attach themselves and multiply. By the normal life processes of the bacteria the polluting organic matters in the fluids to be purified are used up and inert matters given off as a result.

In the study of agricultural phenomena from the bacteriological standpoint knowledge has been equally extended. At one time it was taught that atmospheric nitrogen — representing roughly 80 per cent of the air by volume — was of no direct biological significance. This view has in late years been entirely revised. We have learned that the leguminous plants when assisted, symbiotically, by certain soil bacteria, are enabled to make up their nitrogen deficit in large part from the free nitrogen of the air; a fact that sheds important light upon the significance of plants of this type in the practice of "rotation of crops." Under normal conditions instead of impoverishing the soil, the legumens — clover, peas, beans, etc., — with the aid of the bacteria attached to their roots, may actually enrich it. The application of bacteriological methods to the study of dairy processes has revealed the interesting fact that the delicate flavors to which butters and cheeses owe their commercial value are directly due to the products of growth of certain species or groups of species of bacteria and more highly organized molds. A number of such species have been isolated and are kept in pure cultivation — so that by purposely inoculating the fresh cream with them butter of uniform flavor may with comparative ease be produced.

Probably the most important results of applied bacteriology are those in connection with preventive medicine. Early in the course of the work it was discovered by Pasteur that certain virulent pathogenic bacteria when kept under particular conditions gradually lost their disease-producing power, wholly or in part, without their other life properties being conspicuously disturbed. If injected into animals when in this attenuated state the result was a mild, temporary, and modified form of infection usually followed by recovery. With recovery the animals so treated were immune from the activities of the fully virulent bacteria of the same species; in other words, they had been protected from the fatal injection by vaccination with an attenuated species. The subsequent developments growing out of this observation have resulted in the annual saving of millions of money through the successful vaccination of sheep, horses, and bovines against the fatal infection known as splenic fever or anthrax, and, though less successfully, of other domestic animals against other infections also. In the closer analysis of the means by which infective bacteria cause disease it soon became evident that it is through the elaboration of specific poisons; sometimes easily separated from the bacteria, at others so intimately associated with the bacterial tissues as to make their separation difficult or impossible. The question arose as to the effect of the poisons, separated from the living bacteria, upon the animals susceptible to infection by the bacteria themselves, and it was found that fatal intoxications often accompanied by the same constitutional symptoms and pathological lesions followed the use of the poisons, just as would follow inoculations with the bacteria by which they were produced. In pursuance of this topic it was discovered that if very small, only mildly intoxicating doses of these specific poisons of bacterial origin were repeatedly injected into susceptible animals that after a while the latter acquired not only a sort of tolerance to them, but a tolerance that was accompanied by the presence in the circulating blood of an antidote for these poisons — an "antitoxin," as it is called. This reaction has been shown to be possible for a number of specific infections, and in the case of diphtheria has met with such practical success as to be deservedly regarded as the triumph of modern medicine.

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Bacteriolytic, an agent capable of destroying bacteria and usually applied to some product of the human body, or of an animal body, notably blood serum, which when injected into an animal is capable of destroying some form of micro-organism in that animal. The production of specific bacteriolytic sera is one of the great advances in modern medicine and its extension promises much hope for the future treatment of many of the bacterial diseases. Bacteriolytic sera have been made for a number of micro-organisms. See Immunity.

Bacterium, a genus of bacteria of the family *Bacillariaceæ,* characterized by rod-shaped forms and absence of flagella. They are thus non-motile. A large number of pathogenic bacteria belong to this genus. See Bacteria; Bacillus.

Bac'tria. See Bactriana.

Bactriana, băk-trī-ā'na, or **Bactria,** a country of the ancient Persian empire, lying north of the Hindu Kush Mountains, on the Upper Oxus. It corresponded pretty nearly with the modern Balkh. Here many scholars locate the original home of the Aryan or Indo-European family of nations. Its capital, Bactra, or Zariaspa, was also the cradle of the Zoroastrian religion. Originally a powerful kingdom, it maintained its independence until its subjugation by Cyrus about 540 B.C., when it became a satrapy of the Persian empire. It was included in the conquests of Alexander, and formed a part of the kingdom of the Seleucidæ until the foundation, about 256 B.C., by Diodotus, of the Greek kingdom of Bactria, which extended to the Indus, and which, after a long struggle, was overthrown by the Parthians. Numerous coins with Greek legends have been found in the *topes* or burial places to the northeast of Kabul.

Bac'trian Cam'el. See Camel.

Bac'tris, a genus of American palms, numbering more than 50 species. The genus is of commercial importance, a tough thread used for net weaving, being made from the fibres of *Bactris acanthocarpa,* and walking-sticks are manufactured from the long slender stems of *Bactris maraja.* The fruit of the latter is considered a delicacy.

Bactrites, băk-trī'tēz, a genus of fossil ammonites, with a straight shell, and indented, but not ramified septa. The genus ranges from the lower Silurian to the Devonian.

Bac'trus, the ancient name of a river in the province of Balkh, central Asia, upon which Bactria was situated.

Baculites, băk'ū-lī'tēz, a genus of fossil ammonites, characteristic of chalk formations, having a straight, tapering shell.

Bacup, băk'ŭp, England, a town of Lancashire, 18 miles north from Manchester. There are a number of churches, chapels, and schools, a mechanics' institute, court-house, market-hall, large co-operative stores, etc. The chief manufacturing establishments are connected with cotton spinning, and power-loom weaving; there are also iron and brass foundries and machine-shops, dye-works, etc., and in the neighborhood coal-pits and vast stone quarries. Its charter of incorporation was granted in 1882. Pop. (1901) 22,505.

Baczko, băts'kō, **Ludwig von,** German historian and scholar: b. Lick, Prussia, 8 June 1756; d. 27 March 1823; was educated at Königsberg, studying philosophy, medicine, and law, but became blind in 1777, through an attack of small-pox. In 1816, he was appointed director of the Institute for the Blind at Konigsberg. He is the author of 'A History of Prussia,' a 'History of the French Revolution,' and 'Concerning Myself and My Companions in Misfortune, the Blind' (1807).

Bad Lands, a name applied to the arid regions of the west, where are districts presenting wide areas of hills and ridges of moderate height, bare of sod and intricately broken by numerous gullies and ravines. The principal areas are in the western Dakotas and central Wyoming, and smaller examples of bad-land topography are of frequent occurrence in the arid regions in various portions of the world. In the Big Bad Lands of western South Dakota, east of the Black Hills, there is an area of about 2,000 square miles, which consists largely of bad lands occupying extensive basins cut in a plateau along the White and Cheyenne rivers. They present wonderfully weird scenery, but are rarely visited by the average sight-seer. An extensive area in the valley of the Little Missouri River is crossed by the Northern P. R.R. in the vicinity of Medora, and many bad-land features are visible near the railroad. Typical bad lands present ridges and mesas from 200 to 400 feet high in greater part, eroded into fantastic shapes and cut by ravines and gullies into an endless variety of rugged buttresses and pinnacles. The materials are mainly light-colored, sandy clays, and soft sandstones in nearly horizontal strata, and their bare slopes are dazzling in the bright sunlight. Most bad land regions were table-lands originally, and areas of the old surface remain in level-topped, grass-covered mesas of various sizes, with bad land slopes extending to flat-bottomed valleys of greater or less width. Bad lands exhibit clearly the close relations of topographic form to rock texture, the homogeneous clays being carved into regular slopes, in which sandstone layers give rise to benches, or protect columns and pinnacles of clay. Bad lands are developed in soft rocks where a region has been so uplifted that there is rapid erosion, under arid or semi-arid climatic conditions. The occasional rains cut gullies which eventually are deepened into ravines, and, as the rocks are soft, the erosion progresses more rapidly than vegetation can establish itself. In regions of abundant rainfall, vegetation is so vigorous that it usually forms a protective mantle on all but the steeper slopes, but in arid lands, a thin sod is the principal growth, and it is quickly removed by the rapid run-off of the torrential rains. The Big Bad

Typical views in Big Badlands of South Dakota, showing pinnacles of hard clay capped by sandstone, the sodless slopes, and in the distance a remnant of the original plateau out of which the Badlands are eroded.

Lands of South Dakota have yielded large numbers of fossil animals of late Eocene age, which have made the region famous as a collecting ground.

N. H. Darton,
U. S. Geological Survey.

Badagri, bä'da-grē, or **Badagry,** a British seaport on the Bight of Benin, in the extreme southwest corner of the British Niger Territory, Africa. Early in its history it was a noted slave mart; contained important manufactories; and had a population of 10,000. It was from this place that, in 1825, Clapperton and Lander started to explore the African interior.

Badajoz, bä'dä-hōth', the capital of the Spanish province of Badajoz, on the left bank of the Guadiana, which is crossed by a stone bridge of 28 arches. It is a bishop's see, and has an interesting cathedral. During the Peninsular war, Badajoz was besieged by Marshal Soult, and taken in March 1811. It was twice attempted by the English, on 5 and 29 May 1811; was besieged by Wellington on 16 March, and taken 6 April 1812. Pop. 22,860.

Badakhshan, bä'dakh-shän', a territory of central Asia, tributary to the ameer of Afghanistan. It has the Oxus on the north and the Hindu Kush on the south; and has lofty mountains and fertile valleys; the chief town is Faizabad. The inhabitants profess Mohammedanism. Pop. 100,000.

Badalona, bä'da-lō'na, a seaport of Spain, on the Mediterranean, five miles from Barcelona. Pop. 19,200.

Baddeck', a fishing village and summer resort on Cape Breton Island.

Bad'derlocks (*alaria esculenta*), an olive-colored sea weed which grows on rocks in deep water on the shores of Europe and Iceland. It has a short cylindrical stem with lateral spore-bearing process, and a membranous olive-green frond of 2 to 12 feet long, with a stout midrib. This midrib, together with the fruits, is eaten by the inhabitants of the sea coasts of Iceland, Denmark, Scotland, Ireland, etc., and is said to be the best of the esculent algæ. The name is supposed to be a corruption of balder-locks.

Badeau, ba-dō', **Adam,** American military officer: b. New York, 29 Dec. 1831; d. 19 March 1895; was educated at private schools. He served with gallantry in the Union army during the Civil War; was on the staff of Gen. Sherman in 1862–3, and secretary to Gen. Grant in 1864–9; and in the latter year was retired with the rank of captain in the regular army and of brevet brigadier-general of volunteers, and was appointed secretary of legation in London. He was consul-general in London, 1870–81, and during this period was given leave of absence to accompany Gen. Grant on his tour around the world (1877–8). In 1882–4 he was consul-general in Havana. After the death of Gen. Grant he brought suit against his heirs for payment of services rendered in the preparation of Gen. Grant's 'Memoirs,' which was satisfactorily settled out of court. His publications include: 'The Vagabond' (New York 1889); 'Military History of Ulysses S. Grant' (3 vols. 1867–81); 'Conspiracy; A Cuban Romance' (1885); 'Aristocracy in England' (1886); and 'Grant in Peace' (1886).

Baden, bä'dĕn, a grand duchy in the German empire. The Rhine separates it from Alsace on the east, and Würtemberg bounds it on the west. It has an area of 5,823 square miles, with a population of 1,866,584 in 1900, an increase of 121,120 over the census of 1895, or a gain of 1.58 + per cent each year. The country is mountainous, being traversed by the lofty plateau of the Schwarzwald, or Black Forest, which attains its highest point in the Feldberg (4,904 feet). The nucleus of this plateau consists of gneiss and granite. In the north it sinks down toward the Odenwald, which is, however, of different geological structure, being composed for the most part of red sandstone. The whole of Baden, except a small portion in the southeast, in which the Danube takes its rise, belongs to the basin of the Rhine, which bounds it on the south and west. Numerous tributaries of the Rhine intersect it, the chief being the Neckar. Lakes are numerous, and include a considerable part of the lake of Constance. The climate varies much. The hilly parts, especially in the east, are cold and have a long winter, while the valley of the Rhine enjoys the finest climate of Germany. The principal minerals worked are coal, salt, iron, zinc, and nickel. The number of mineral springs is remarkably great, and of these not a few are of great celebrity. The vegetation is peculiarly rich, and there are magnificent forests. The cereals comprise wheat, oats, barley, and rye. Potatoes, hemp, tobacco, wine, and sugar beet are largely produced. Several of the wines, both white and red, rank in the first class. Baden has long been famous for its fruits, also. Of the total area, 42 per cent is under cultivation, 37 per cent under forest, and 17 per cent under meadows and pastures. The farms are mostly quite small. The manufactures are important. Among them are textiles, tobacco, and cigars, chemicals, machinery, pottery ware, jewelry (especially at Pforzheim), wooden clocks, confined chiefly to the districts of the Black Forest, musical boxes, and other musical toys. The capital is Carlsruhe, about five miles from the Rhine; the other chief towns are Mannheim, Freiburg-im-Breisgau, with a Roman Catholic university; Baden, and Heidelberg. Baden has warm mineral springs, which were known and used in the time of the Romans. Heidelberg has a university (Protestant), founded in 1386, the oldest in the present German empire. The railways have a length of 850 miles, and are nearly all state property.

In the time of the Roman empire, southern Baden belonged to the Roman province of Rhætia. Under the old German empire it was a margravate, which in 1533 was divided into Baden-Baden and Baden-Durlach, but reunited in 1771. The title of grand duke was conferred by Napoleon in 1806, and in the same year Baden was extended to its present limits. The executive power is vested in the grand duke, the legislative in a house of legislature, consisting of an upper and a lower chamber. The former consists partly of hereditary members; the later consists of elected representatives of the people. The revenue is mainly derived from taxes on land and incomes, and the produce of crown-lands, forests, and mines. The revenue in 1901 was $37,723,000. Baden sends three members to the German Bundesrath, or Federal Council, and 14 deputies to the Reichstag. Two thirds of the population are Roman Catholics, the rest Protestants.

Ba'den, a town in Switzerland, canton Aargau. The town (*Ober-Baden,* or *Baden-im-Aargau*) is 12 miles northeast of Aarau, on the left bank of the Limmat. It has a town-hall, a handsome Roman Catholic church, a convent, monastery, hospital, etc., and is celebrated for its hot sulphurous baths, which are employed in gout, rheumatism, and cutaneous diseases. The hottest springs have a temperature of 116° F. The Romans were well acquainted with the baths here; and between the 15th and 18th centuries they were the most celebrated in Europe. Pop. (1900) 6,100.

Ba'den-Ba'den (anciently, *Civitas Aurelia Aquensis*), a town and watering-place in the grand-duchy of Baden, 18 miles south-southwest of Carlsruhe. The older part of the town is built on a spur of the Black Forest, overhanging the valley of the little stream Oosbach. The houses here are in general old and high; the streets mostly narrow and crooked, and nearly all steep. The new and larger portion of the town lies below, and is rich in fine hotels, elegant villas, and handsome private dwellings. The edifices most deserving of notice are the New Palace, standing on an isolated height above the town, and surrounded by fine gardens; the town or parish church, containing the tombs of 14 margraves of Baden; the Protestant church, the English church, and the new town-hall. Baden has been celebrated from remote antiquity for its thermal baths, which made it a favorite resort of the Romans. The season lasts from 1 May to 31 October, and 60,000 visitors arrive annually. Pop. (1900) 15,700.

Baden-Powell, bā'dĕn-pow"l, **Sir George Smyth,** English politician and political writer: b. Oxford, 24 Dec. 1847; d. 20 Nov. 1898. He became a member of various important commissions, among others that on United States and Canadian fisheries (1886–87); the new Malta Constitution (1887); the Bering Sea inquiry (1891); the Joint High Commission (Washington, 1892); and the Paris Arbitration (1893). He was author of 'New Homes for the Old Country' (1872), a storehouse of information about Australia; 'Protection and Bad Times' (1879); 'State Aid and State Interference' (1882); 'The Truth About Home Rule' (1888); 'The Land Systems of India' (1892); etc. He was a member of Parliament from Liverpool from 1885 till his death.

Ba'den-Pow'ell, Robert Stevenson Smyth, British military officer; b. London, 22 Feb. 1857; was educated at the Charterhouse School; joined the 13th Hussars in 1876; was adjutant in India, Afghanistan, and South Africa; Assistant Military Secretary on the staff in South Africa in 1887-9; took part in the operations in Zululand, for which he was highly commended, in 1888; assistant military secretary in Malta in 1890-3; on special service in Ashanti, commanding the native levies, 1895, for which he was brevetted lieutenant-colonel; chief staff officer in the Matabeleland campaign, for which he was brevetted colonel, and became lieutenant-colonel, commanding the 5th Dragoon Guards, in 1897. In the war in South Africa in 1899-1900, he signally distinguished himself by his grand defense of Mafeking, Cape Colony, holding the town with a small force against repeated attacks, under an almost continuous bombardment, from 15 Oct. 1899, to 16 May 1900. Three relief columns were started, the last only being successful. In recognition of this heroic defense, the queen promoted Baden-Powell to be a major-general. Gen. Baden-Powell has published several works, including 'Reconnaissance and Scouting' (1890); 'Vedette' (1890); 'Cavalry Instruction' (1895); 'The Downfall of Prempeh' (1896); 'The Matebele Campaign' (1896), etc.

Baden-bei-Wien, bä'dĕn-bī-vēn, a watering place of lower Austria, about 15 miles south-southwest of Vienna. It was the Aquæ Pannoniæ, or Cethiæ of the Romans, and is still famous for its warm mineral springs, which are frequented during the season by from 12,000 to 15,000 persons, chiefly from the Austrian capital. Season from July to September. Pop. (1900) 17,700.

Badeni, bä'dĕn-ē, **Count Cassimir Felix,** Austrian statesman: b. Poland, 14 Oct. 1846. His father, though poor, was a man of intellect, and was made a count by the king of Poland just before the birth of Cassimir. He also fell heir to a fortune, and his two sons received a university education. Cassimir entered the Austrian civil service; became district chief at Zolkiew in 1871; minister of the interior in 1873; governor of Galicia in 1888; and prime minister of Austria-Hungary, 15 Sept. 1895. In April 1897, because of inability to maintain a Liberal majority in the newly elected **Reichsrath,** he resigned with his cabinet, but the emperor declined to accept his resignation, and he remained in office until 28 November, when he again resigned and a new cabinet was organized. The principal feature of his administration and the one which not only caused his fall, but a long period of political agitation, was his introduction of what is known as the "language ordinance," which allowed the official use of the Czech language in Bohemia and Moravia. This measure alienated the Germans and provoked a racial conflict of a most bitter character between them and the Czechs.

Badenweiler, bä'dĕn-vī-lĕr, a watering place in the grand duchy of Baden, near Müllheim. Its mineral springs are now rated among the indifferent waters, and it is of interest chiefly for the ruins of Roman baths that were discovered in 1847. The foundation of the town is referred to the time of Hadrian, and the remains of the vapor baths, of which there are excellent specimens, are supposed to be of the same period. The ruins show a division for men and for women, each having a large outer court opening into a dressing-room; there is the hot-air bath, the warm bath, and the cold bath. The walls and steps are in their original position. The whole structure is 318 feet by 90 feet.

Badge, a distinctive device, emblem, mark, honorary decoration, or special cognizance, used originally to identify a knight or distinguish his followers, now worn as a sign of office or licensed employment, as a token of membership in some society, or generally as a mark showing the relation of the wearer to any person, occupation, or order.

Badg'er, George Edmund, American statesman: b. Newbern, N. C., 13 April 1795; d. 13 April 1866; was graduated at Yale College in 1813; became a lawyer at Raleigh; and was judge of the North Carolina Superior court

in 1820–5. He was appointed secretary of the navy, 14 March 1841, resigning after the death of President Harrison, and was elected to the United States Senate in 1846 and 1848. In 1853 he was nominated for justice of the United States supreme court, but was not confirmed. He served in the State convention called to pass on the question of secession, although opposed to such measure, and after making a strong speech in defense of the Union, was afterward known as a member of the Conservative party.

Badg'er, Joseph, American clergyman, one of the earliest missionaries to the country northwest of the Ohio River: b. Wilbraham, Mass., 28 Feb. 1757; d. 5 May 1846. He received his early instruction chiefly from his parents, and at the age of 18 joined the Revolutionary army. He remained in service for four years, then determined to obtain an education and engage in the Christian ministry. Entered Yale College in 1781, where he maintained himself and his scholarship by alternately studying and teaching. He remained a few years in Connecticut, then in 1800 was selected by the missionary society of that State to visit the unsettled parts of Ohio. His work took him from settlement to settlement, often more than a day's journey apart, through a country where there were no roads, and across rivers without bridges. During the War of 1812 he was appointed by Gen. Harrison chaplain to the army in that district, and his knowledge of the country was of great service to that commander-in-chief; but he resumed his missionary functions at the close of the war and continued them till 1835, when he retired and lived with his only daughter. During the latter years of his life he received a pension from the United States.

Badg'er, Oscar L., American naval officer: b. Windham, Conn., 12 Aug. 1823; d. 20 June 1899; entered the United States navy, 9 Sept. 1841; became lieutenant-commander, 16 July 1862; commander, 25 July 1866; captain, 25 Nov. 1872; commodore, 15 Nov. 1881; and was retired 12 Aug. 1885. He served on the steamer Mississippi during the Mexican war, taking part in the attack on Alvarado, 1846; led the party that attacked and destroyed the village of Vutia, Fiji Islands, while on the sloop John Adams, 1855–6; and in the Civil War commanded the Anacostia, of the Potomac flotilla, 1861–2, and the ironclads Patapsco and Montauk, in the operations in Charleston harbor in 1863; and was acting fleet captain on the flagship Weehawken in the attack on Fort Sumter, 1 Sept. 1863.

Bad'ger, a stout, burrowing, carnivorous mammal of the fur-bearing family *Mustelidæ,* related to the skunks and weasels, species of which inhabit various parts of the northern hemisphere. Badgers have short legs, elongated feet with powerful toes adapted to digging, heavy jaws with big teeth, and great strength, courage, and cunning. They wear coats of thick fur usually grizzled in brown and gray, the face is striped and the paws are blackish. The fur is of considerable value. The American badger (*Taxidea americana*) was formerly distributed all over the western part of the United States from the prairie districts of Ohio and Wisconsin to the Pacific coast, but has been exterminated by civilization east of the dry plains, where it is still numerous although not often seen, because it rarely comes abroad except in the night. It dwells in deep burrows which it digs for itself and feeds upon gophers, ground-squirrels, such ground-building birds and their eggs and young as it is able to catch, and, in times of scarcity, upon small reptiles and insects. Badgers abound in the vicinity of prairie-dog towns, whose underground homes they can enter or dig out without difficulty. This species is found as far north as Hudson Bay and south to central Mexico, where the local variety is called "tejon." When by rare chance a badger is surprised during the day too far away from his hole to escape into it before being observed, he squats down, withdrawing nose and feet beneath his body, and remains absolutely still, when his grizzled back looks so much like a mere hillock of earth that he is likely to escape being seen altogether. The extraordinary breadth and fatness of his form is one of his strongest characteristics. During the coldest part of the winter he retires to his den and passes the time when no food is to be had in deep sleep. The best account of this animal is to be found in Dr. Coues's 'Furbearing Animals' (Washington 1877). Consult also Ernest Ingersoll's 'Wild Neighbors' (New York 1897). The European badger (*Meles taxus*) is very similar in general appearance but differs in anatomical details. Its general habits and food are like those of the American badger except that in the absence of open plains it dwells in wooded regions and has a fondness for honey, digging it out of the nests of bumblebees and others which make their homes in the ground. This is the animal formerly used in the cruel sport of badger-baiting. A captive badger was placed in an overturned barrel or some similar place, and dogs were set upon it for the amusement of seeing the fighting that resulted. It required a powerful and active dog to overcome the little animal. Frequently, however, the badger was given no fair chance, but was compelled to face in the open two or three dogs. From this unmanly sport is derived the verb "to badger." Many references are to be found in early English literature to this amusement, and to the animal itself under the old terms "grey" and "brock," the latter still in common use in northern England and Scotland. Various closely related species and varieties of the badger are to be found in northern Asia, and other relatives exist in India, Malay Islands, and Africa. For these see SAND-BADGER; HONEY BADGER; RATEL; TELEDU; ZORILLA.

Bad'ger State, a nickname given to the State of Wisconsin.

Badghis, bäd-gēz', a region north of Herat, comprising the country between the Murghab and the Harirud rivers, as far north as the edge of the desert. It lies just to the south of the boundary line between Afghanistan and the Russian territories, as defined in 1887.

Badg'ley, Sidney Rose, Canadian architect: b. near Kingston, Ont., 28 May 1850. He studied architecture in Toronto, and, after practising some time in St. Catharines, established himself in Cleveland, O. He has made a specialty of the architecture of churches and public buildings, and has planned and erected churches

in almost all parts of Canada and the United States, and, among other structures, the Massey Music Hall, Toronto; the Slocum Library and Perkins Observatory, in Ohio; Wesleyan University, in Delaware, and the Medical College, Cleveland. He published an 'Architectural Souvenir' (1896).

Badham, băd'ăm, **Charles,** English educator: b. Ludlow, 18 July 1813; d. 26 Feb. 1884; was considered one of the most eminent classical scholars of his day; and after serving for several years as head master of King Edward VI.'s Grammar School at Louth, he became professor of classics and logic in the University of Sydney, Australia, 1867. While in Sydney he established a system of teaching by correspondence, similar to the present university extension scheme. He published a number of works on Greek classics, and 'Criticism Applied to Shakespeare' (1846).

Badia y Leblich, bą-dē'ą ę lā-blēch', **Domingo,** Spanish traveler: b. 1766; d. 1818; he visited in 1803 and the four following years the Mohammedan countries bordering on the Mediterranean. During the whole of his tour he professed to be a Mussulman, and traveled under the denomination of «Ali Bey el Abbassi.» He was so skilful in carrying out his part that he deceived Moslem rulers and scholars, and was at one time in great favor in the court of Morocco. It is now admitted that he was employed as a political agent by the Prince of Peace, at the instigation of Napoleon. His peculiar situation and religious profession gave him opportunities for making many observations which could not occur to other travelers, and he published an account of his travels, with the title 'Voyages d' Ali Bei en Afrique et en Asie.'

Badinguet, bą'dăñ-gā', afterward Radot, a Moor, as whom Napoleon III. masqueraded to escape from the fortress of Ham in 1846; afterward a nickname for Napoleon III. He died in 1883.

Badius, bā'de-ŭs, French printer and writer: b. 1462; d. 1535. About 1500 he founded his printing establishment at Paris, and published a number of the classics. He annotated these himself and wrote also a life of 'Thomas à Kempis.'

Bad'lam, Stephen, American military officer: b. Milton, Mass., 25 March 1748; d. 24 Aug. 1815; entered the Revolutionary army in 1775; became commander of the artillery in the Department of Canada. On the announcement of the adoption of the Declaration of Independence, he took possession of the heights opposite Ticonderoga and named the place Mt. Independence. Subsequently he rendered good service at Fort Stanwix, and in 1799 was made brigadier-general.

Bad'man, The Life and Death of Mr., an allegory by John Bunyan, published in 1680. It gives a vivid picture of the life of the common people during the time of Charles II.

Bad'minton. The game now called Badminton is in reality a modification of the very ancient game of battledore and shuttlecock; but it is played on a court 44 feet long by 20 wide over a net strung across the centre not less than 18 inches deep, with its lower edge five feet from the ground. The bat is strong, like a racquet bat, and weighs about five ounces. The shuttlecock is feathered after the old fashion. The service line is drawn six and one half feet from the net on either side. A line drawn down the centre, joining the service and base lines, forms two courts at each end. The game can be played by two or four, six or eight players. Each striker scores, or is penalized, according to the result of the rules. See 'The Encyclopædia of Sport' (N. Y. 1898).

Bad'minton, a special, sweetened claret, named for the Duke of Beaufort (of Badminton). As he was a patron of pugilists, the term came to mean, in the prize ring, blood, for which claret was previously a slang term.

Badoc, bą-dōk', Philippine Islands, a town of the province of Ilicos Notre, on the Island of Luzon. Pop. 11,000.

Badoura, bą-doo'rą, the daughter of the king of China, who falls in love with the sleeping prince in the story of Prince Camaralzaman, in the 'Arabian Nights' Entertainment.'

Badrinath, bă'drĭ-năth', a peak of the main Himalayan range, in Garhwal district, Northwestern Provinces, India; 23,210 feet above the sea. On one of its shoulders, at an elevation of 10,400 feet, stands a celebrated temple of Vishnu, which some years attracts as many as 50,000 pilgrims.

Badrulbudar, bą-drool'boo-door', the wife of Aladdin, in the 'Arabian Nights' Entertainment,' story of Aladdin and the lamp.

Bæbia Gens, bē'bĭ-a jĕnz, a plebeian clan of ancient Rome. The first member of the family to obtain the consulship was Cn. Bæbius Tamphilus (182 B.C.). The other distinguished ones are known under their family names, Dives, Herennius, Sulca, etc.

Baedeker, bād'ĕ-kĕr, **Karl,** German publisher: b. 1801; d. 1859; originator of a celebrated series of guide-books for travelers.

Baele, bä-ā'lĕ, an African tribe dwelling northeast of Lake Tchad. It is nomadic, half heathen and half Mohammedan, and owns large herds of cattle, camels, goats, and sheep.

Baena, bä-yā'nä, **Antonio,** Portuguese-Brazilian historian and geographer: b. Portugal about 1795; d. 28 March 1850; was an officer in the Portuguese, afterward in the Brazilian, army. He studied the geography and history of the Amazon valley. His principal works were 'The Ages of Pará (1838), a historic compend stopping in 1823, and 'Chorographic Essay on the Province of Pará' (1839), a geographical and statistical work, giving the details of explorations made by himself. These are still standard authorities on that region.

Bae'na, Spain, a town in province of Andalusia, 24 miles south-southeast from Cordova, on the Marbella. It has two principal and two smaller squares, four parish churches, a town- and court-house, several well-attended schools, two hospitals, a prison, numerous convents, and manufactures of linen, woolen and cotton fabrics. Large quantities of grain and oil are exported to Malaga. Pop. (1897) 11,994.

Baer, bār, **Karl Ernst von,** Russian naturalist: b. Piep, Esthonia, 28 Feb. 1792; d. 28 Nov. 1876; was professor of zoology at Königsberg (1819), and librarian of the Academy of Sciences at St. Petersburg (1834). His principal works were 'History of the Development of

Animals' (2 vols. 1828–37), and 'Researches Into the Development of Fishes' (1835). The writings of Baer are distinguished for their philosophical teachings.

Baer, William Jacob, artist: b. Cincinnati, 29 Jan. 1860. He studied at the Munich Royal Academy, 1880–4, receiving four medals there, and one of his works being purchased by the Academy. Between 1885 and 1892 he painted portraits and pictures, the latter chiefly in the genre style. He then devoted himself almost exclusively to miniature painting, of which he became a pioneer of the modern school. 'Aurora,' 'The Golden Hour,' 'In Arcadia,' and 'The Madonna with the Auburn Hair' are among his best-known miniatures.

Baert, bȧ-ār', **Alexandre Balthazar François de Paule, Baron de,** French writer: b. Dunkirk about 1750; d. 23 March 1825; became a deputy in the General Assembly of 1789. When the Revolution became the Reign of Terror, he fled to the United States, remaining there some years. He returned to France in 1815, and once more became deputy, maintaining his old position as a moderate reformer. He published two historical works, one on Great Britain and her colonies, the other on the country between the Black and Caspian seas.

Baert', or **Bart, Jean,** French sailor: b. Dunkirk, 1650; d. 1702. He raised himself, under Louis XIV., to the rank of commodore, and made the French navy what it was, at that time. The Dutch, English, and Spanish called him the «French Devil.» Bart brought into port a number of Dutch and English vessels, burned others, landed at Newcastle, and laid waste the neighboring country. In 1694, when there was a scarcity of corn in France, he succeeded several times, notwithstanding the watchfulness of the English, in bringing into the harbor of Dunkirk ships loaded with this article. Once he delivered a number of such vessels, in the boldest manner, from the Dutch, into whose hands they had fallen, and received, in consequence, letters of nobility. In 1695 he was taken prisoner by the English and brought to Plymouth, but managed to make his escape. In 1696 he met the Dutch fleet from the Baltic and captured the escort with 40 ships; but on his return to Dunkirk 13 Dutch ships of the line appeared, and to avoid a very unequal combat he was obliged to burn the greater part of his captures. From the Peace of Ryswick to the breaking out of the war of the Spanish succession he lived at Dunkirk.

Bætica, bē'tĭ-kȧ, the central division of ancient Spain under Roman rule, famed for its fertility, its mines of iron, gold, and silver, and its delightful climate. These advantages gave rise to a number of fabulous stories, which made it the home of Geryon, an assailant of Hercules, and placed there the Elysian Fields. It passed into the hands of the Vandals, and it was the first province conquered by the Moors.

Baeyer, bā'yĕr, **Adolf von,** German chemist: b. Berlin, 31 Oct. 1835; son of Johann Jakob Baeyer; became professor of chemistry at Strasburg in 1872, and at Munich, in 1875, succeeding Liebig at the latter. He made many important discoveries in organic chemistry, especially cerulein, eosin, and indol.

Bae'yer, Johann Jakob, Prussian geometrician: b. Müggelsheim, 5 Nov. 1794; d. 10 Sept. 1885; was an army volunteer in the campaigns of 1813 and 1814; joined the army in 1815; and became a lieutenant-general in 1858. He had charge of a number of geodetic surveys; was elected president of the Geodetic Institute in Berlin in 1870; and was the author of numerous treatises on the refraction of light in the atmosphere, the size and form of the earth, etc.

Baez, bä'āth, **Buenaventura,** Dominican statesman: b. Azua, Haiti, about 1810; d. 21 March 1884; aided in the establishment of the Dominican Republic; was its president in 1849–53; was then expelled by Santa Ana and went to New York; was recalled in 1856 on the expulsion of Santa Ana, and again elected president; and was re-elected president in 1865 and 1868. During his last term he signed treaties with the United States (29 Nov. 1869) for the annexation of Santo Domingo to the United States, and for the cession of Samana Bay. The treaties failed of ratification in the United States Senate, and caused the downfall of Baez.

Baeza, bä-ā'thȧ, Spain, a town of Andalusia, 22 miles east-northeast from Jaen. It is pleasantly situated on a height amid rich and well-watered plains, and from a distance presents a very striking appearance with its old walls, churches, and steep-roofed houses. It has several good streets and three squares, one of which is lined by a range of porticoes. The principal edifices are the cathedral, the old Aliatares tower, the town-hall with a fine façade, and an old monastery, now a theatre. Pop. (1902) about 14,300.

Baffa, bäf'fȧ, a seaport on the southwest coast of Cyprus. It occupies the site of New Paphos, which, under the Romans, was full of beautiful temples and other public buildings.

Baf'fin, William, English navigator: b. about 1584; d. 23 May 1622. He visited west Greenland as a pilot in 1612, again in 1615, and made voyages to Spitzbergen in 1613 and 1614. In 1616 he ascertained the limits of that vast inlet of the sea since distinguished by the appellation of Baffin Bay, and also discovered and named Smith's Sound, Lancaster Sound, etc. In 1617–22 he was in the employment of the East India Company, and on board vessels belonging to them in the Indian seas. He was killed at the siege of Ormuz, on the Persian Gulf.

Baffin's Bay, an inland sea or gulf in North America, between Greenland and the lands or islands north of Hudson Bay, extending from 68° to 78° N., and 55° to 80° W. It communicates with the Atlantic Ocean by Davis Strait on the south, with the Arctic Ocean by Lancaster Sound and Jones Sound on the west, and with the Polar Sea by Smith Sound and Robeson Channel on the north. Depth, 200 to 1,050 fathoms. The tides do not rise more than 10 feet. The surface of the sea is covered with ice during the greater part of the year, which extends from shore to shore in winter, though possessing a slow, southward movement. In spring and summer, the great mass, known as the middle ice, begins to move less slowly southward, leaving navigable passages on the

side of Greenland and America, and occasional channels, or crossings, between these coasts. The coasts are mountainous, barren, and deeply indented with gulfs. Whale and seal fishing is followed. This sea was discovered by the English navigator, Baffin (q.v.), in 1616, while in search of a passage to the Pacific.

Baffin Land, an island in the Arctic regions west of Greenland. Its area is not exactly known.

Bafulabe, bä'fü-lāb, a town of the French Sudan, at the junction of two head-streams of the Senegal, connected by railway with Kayes on that river.

Bagamoyo, bä'gạ-mō'yō, a seaport and commercial centre of German East Africa opposite Zanzibar, and north of Dar-es-Salaam. Though it has no harbor, and its coast is often swept by hurricanes, it has a considerable trade in ivory, copra, caoutchouc, etc. It has a fort, government house, custom-house, post-office and telegraph building, station of the German East African Association, government school, etc. The climate is unhealthy for Europeans. Pop. about 18,000.

Bagasse, bạ-găs', the name given to sugar cane in its dry, crushed state, as delivered from the mill, and after the main portion of its juice has been expressed; used as fuel in the sugar factory, and called also cane trash.

Bagatelle, băg'ạ-tĕl', a table ball game of the class of billiards, played on a table semicircular at the top end. The tables vary from 6 to 7 feet in length and are usually about 3 feet 6 inches wide. The game is played by two or more, one against the other. There are nine balls, eight white and one black, and nine holes sunk in the far end of the table in a diamond shape, numbered respectively 1, 2, 3, 4, 5, 6, 7, 8, 9.

The black ball is placed on a spot * in front of the foremost hole. The player then takes one of the white balls, and placing it within a balk line at the lower end of the table, strikes it with the cue in such a manner that it strikes the black ball; both balls go on their courses and fall, or not, into one or other of the open cups. Whichever cup the black ball falls into counts double the number of points normally allotted to it. Then the player, in like manner, plays the remaining seven balls up the table. For so many cups as he fills he counts up his dots, and that is his score. The highest wins.

Bagau'dæ, or **Bagaudi,** a body of Gallic insurrectionists of the rural class, who revolted against the Romans 270 A.D., headed by one Victoria, called by the soldiers Mother of Legions. Claudius temporarily quelled them, and Aurelian, by a remission of their taxes in arrears, and by granting them a general amnesty, made peace with them. Under Diocletian, 280 A.D., they rose again, and their two leaders assumed the title of emperor; but they were soon compelled to capitulate, though they retreated to an island formed by the confluence of the Marne and Seine, and made a desperate stand for the victory. The place of this sanguinary contest was long known as the *Fosses des Bagaudes.* From this period, the Bagaudæ may be considered as gradually transforming their activity into a kind of brigandage, which infested the forests and fastnesses of Gaul until the end of the Western Empire.

Bag'by, George William, American physician and humorist: b. Buckingham County, Va., 13 Aug. 1828; d. 29 Nov. 1883; educated at Delaware College; wrote under the pseudonym, Mozis Addums. He was editor of the Lynchburg *Express* (1853), and 'Southern Literary Messenger' (1859); State Librarian of Virginia (1870–8), and contributor to various magazines. He wrote 'John M. Daniel's Latchkey' (1868); 'What I Did With My Fifty Millions' (1875); and 'Meekins' Twinses' (1877).

Bag'dad, a town in Tamaulipas, Mexico, near the mouth of the Rio Grande, the port of Matamoras. It was of great importance during the Civil War to Confederate blockade runners.

Bag'dad, capital of the Turkish vilayet of Bagdad, situated on the Tigris. The old Bagdad, the residence of the caliphs, said to have had 2,000,000 inhabitants, was situated on the western bank of the river. The modern city lies mostly on the eastern bank of the river and is surrounded with a brick wall about six miles in circuit, partly in a ruinous condition, and with a ditch from five to six fathoms deep, intended to be filled with water from the Tigris. The houses, mostly built of brick, are but one story high, the streets unpaved, and so narrow that two horsemen can scarcely ride abreast. The houses of the wealthy are distinguished by a better architecture. Of the mosques, about 100 in number, only a few attract much notice, and many are in ruins. Their architecture is in general inferior to that of other Mohammedan cities, but they have a gaudy appearance from the glazed tiles covering their domes and minarets, and arranged in a kind of mosaic work in various colors. The bazaars are spacious and well stocked with goods. That built by Daoud Pasha still ranks as one of the most splendid in the world. Bagdad long commanded a large part of the traffic between Europe on the one hand, and Persia and India on the other. The Persian and Indian trade is still considerable, as also that with Europe, a large portion of it being carried on by steamers up and down the river. The trade with Europe was formerly more largely by land, passing through the Syrian Desert to Damascus, or by way of Armenia northward. Since the opening of the Suez Canal the sea routes are of far more importance. Wool is the chief export to Europe, others being wheat, gum, galls, dates, etc. The heat of the summer is oppressive in Bagdad, but the winter is cold enough to make a fire necessary. The climate is on the whole agreeable and healthy, though sometimes the plague prevails. Bagdad is inhabited by Turks, Arabs, Persians, Kurds, Armenians, Jews, and a small number of Christians. The Turks compose three fourths of the whole population. The Jews are confined to a certain district of the city, and are in a very oppressed condition. The population of the city, according to the most recent estimate, amounts to between 175,000 and 200,000.

Bagdad was founded in 762 by the Caliph Almanzor, and was raised to a high degree of splendor in the 9th century by the famous Harun al-Rashid, who figures so often in the 'Arabian Nights.' It then became the chief city in the Moslem world and a great centre of culture and learning. In the 13th century it was stormed by Hulagu (Holagou), grandson of Genghis-Khan, who caused the reigning caliph to be slain and overthrew the caliphate. The descendants of the conqueror were expelled in 1392 by Tamerlane. In the 15th century Shah Ismael, the first sovereign of Persia of the house of Sofi, took possession of the city. From that time it was a perpetual subject of contest in the wars between the Turks and Persians. After a memorable siege in 1638 it was conquered by the Turkish emperor, Murad IV., and Nadir Shah endeavored in vain, in the 18th century, to wrest it from the Turks.

Bage, Robert, English novelist: b. Darley, Derbyshire, 29 Feb. 1728; d. Tamworth, 1 Sept. 1801. He began to write at the age of 53. Among his works were: 'Mount Henneth' (1781); 'Barham Downs' (1784); 'Hermsprong, or Man as He Is Not' (1796), etc. The French social theories then prevailing were embodied in his novels.

Bagehot, Walter, English economist, journalist, and critic: b. Landport, Somersetshire, England, 3 Feb. 1826; d. Landport, 24 March 1877. Bagehot's career was in an uncommon degree marked for him at the outset. His father, Thomas Watson Bagehot, was vice-chairman of the Somersetshire bank, founded by Samuel Stuckey in the 18th century. His mother, a niece of Stuckey, a woman of much character and lively mind, had, through an earlier marriage, been brought into an excellent intellectual atmosphere from which, says Hutton, "she greatly profited." Bagehot, a boy of naturally keen mind and with a habit of reading, was educated with much good judgment. He first attended school in Bristol, whence, in 1842, he entered University College, London, graduating B.A., in 1846, and M.A., with much honor in philosophy and political economy, two years later. He was also distinguished as a mathematician and was widely read in poetry, metaphysics, and history. Then he took to reading law, but, though very fond of the study and though called to the bar in 1852, he never practised. Instead he entered the banking business under his father in Landport. He had previously, in 1851, spent some time in Paris during the exciting days of the *coup d'état* of Napoleon III. His first essays in journalism were accounts of the affairs of France contributed to a little weekly newspaper, the *Inquirer*. Herein Bagehot astounded his friends by a somewhat youthfully cynical support of the cause of Napoleon, on the paradoxical ground that the French were too clever to be successful as a self-governing people. Stupidity, according to his views at that time, was, says Hutton, essential to political freedom.

While in business, Bagehot contributed to reviews,—first to the *Prospective Review* and after 1855 to the *National Review*,—various biographical and critical articles. These, and also several sketches originally published as 'Estimates of Some Englishmen and Scotchmen' (1858), were collected after his death in 'Literary Studies' (2 vols., 1878), and 'Biographical Studies' (1880). In time they extend from 1852 to Bagehot's death. The essays "which best represent his peculiar genius" (so Hutton) are 'The First Edinburgh Reviewers,' 'Hartley Coleridge,' and 'Bishop Butler,' but such essays as those on Gibbon, Shelley, Clough, Dickens, and Wordsworth, Tennyson, and Browning, are among the most vigorous pieces of English criticism. All are distinguished by a dash and keenness of phrase and an uncommon faculty for sane and broad generalization.

In 1858 Bagehot married Miss Wilson, eldest daughter of the Right Hon. James Wilson, who had founded the London *Economist* during the anti-corn law agitation to represent free-trade sentiment. In 1860 Bagehot became editor, and there remained till his death. His practical knowledge of men, his great experience in business, and extensive studies enabled him to win success in this field, and also to write the books on which his fame as an economist chiefly rests. These are 'The English Constitution' (1867), which is extensively used as a text-book and has been translated into French, German, and Italian; 'Physics and Politics' (1872), which has been even more widely translated; and 'Lombard Street' (1873), a study of the money market. Besides the books already named there appeared after Bagehot's death 'Economic Studies,' a collection of earlier work, and 'The Depreciation of Silver.' Bagehot's counsel was much sought for in financial and economic questions. He tried on several occasions, with honesty rather than zeal, to be elected to Parliament, but never succeeded.

Bagehot, both as a student of institutions and of men, is entitled to high rank. To this study he brought, in spite of some natural prejudice in favor of the institutions and men of his native land, a mind of thoroughly scientific bent and much detachment. As a student he is interested in fundamental questions rather than in minutiæ. His broadest book, 'Physics and Politics,' is an example of this, and may be regarded as an exposition of his main methods and interests. It is an attempt to show how the principle of the survival of the fittest applies to the formation of states. The thesis is that in earliest times and even down nearly to the present, the people who had the faculty of organization and obedience, whether in family, tribe, or nation, were bound to prevail over those less organized, and that hence obedience to laws, or rulers of whatever sort was necessary to political success, until the habit of legality became ingrained. Hence the nation with the best military power could seize the best parts of the earth. If, however, the process stopped with organization, the nation would in time present a case of arrested development, and would no longer progress; for the principle of variation, or originality, is also necessary to complete progress. The best instrument for the cultivation of variation is free discussion. Hence arises the explanation of the fact that the western nations of Europe are far in advance of the rest of the world, in that they have tempered the rule of custom with discussion, which has, historically, been practically limited to peoples

of Greek and Germanic origin. And in general, on the other hand, discussion is useful in checking the impulse to hasty action, a relic of primitive civilizations. Bagehot's other longer works are really exemplifications of this principle: 'The English Constitution' is substantially an examination of the means of discussion in England and a comparison of it with that in other states; 'Lombard Street' is an analysis of one of the phenomena of variation with a view to expounding and criticising it as an efficient means of progress.

Bagehot's criticism of literature is likewise distinguished by breadth and a fondness for the analysis of causes. It is the criticism, not of taste or of morals, of the beautiful or the good and bad, but of types. The manner in which the mind of his author worked, the type of person he was, are the fundamental questions of interest with Bagehot. The title, for example, of his excellent essay on certain famous poets illustrates this: «Wordsworth, Tennyson, and Browning; or, Pure, Ornate, and Grotesque Art in English Poetry.» These poets are treated as examples of the three different types of mind and expression named in the title. Dickens is an example of the «irregular» genius, Hartley Coleridge of the whimsical and wayward mind with a gift for self-revelation, Shakespeare, among other attributes, of the experiencing mind. Bagehot's criticism is, in all these essays, never formal or academic, but is based on a wide practical knowledge of men. His point of view he maintains with great consistency, but always enlivens his criticism with such an abundance of keen and witty observations that his criticism is unsurpassed in vigor and is never dull. He, however, founded no school as certain other critics have done; for his criticism is essentially that of a lively personality and the impressionism of a scientific and detached mind.

Bibliography.—The chief authority for Bagehot, besides his own work, is R. H. Hutton ('Memoir' prefixed to 'Literary Studies,' and 'Dictionary of National Biography').

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Bag'gage, probably from the old French word *bague,* meaning bundle. As ordinarily used it includes trunks, valises, portmanteaus, etc., which a traveler carries with him on a journey. In a military sense the word includes tents, furniture, utensils, etc.

Baggara, bäg'gä-rä, an Arabic-speaking Hamitic tribe of the Upper Nile valley. They occupy this valley as far east as the territory of their neighboring negro tribesmen, the Shilluk. They are nomads, Egyptian soldiers, hunters, etc.

Baggesen, Jens, Danish poet, who also wrote much in German: b. Korsör, 15 Feb. 1764; d. Hamburg, 3 Oct. 1826. He traveled extensively in Europe, and on his return received an appointment from the Danish government. He possessed great sensibility and imagination, and his works are said to present a singular mixture of contradictory qualities. His best productions are his smaller poems and songs, several of which are very popular with his countrymen. His 'Seasons' in Danish, are much esteemed. The 'Labyrinth' is his most famous work.

Baghelkhand, bä-gĕl-kŭnd', a tract of country in central India, occupied by a collection of native states (Rewah being the chief, under the governor-general's agent for central India); area, 11,323 square miles; pop. 1,512,595.

Bagheria, bä'gā-rē'a, or **Bagaria,** a town of Sicily, eight miles east by south of Palermo by rail. It is beautifully situated at the base of the isthmus which separates the Bay of Palermo from that of Termini and is surrounded by groups of palatial villas of the Sicilian nobility. Pop. 12,650.

Bagimont's (bäj'i-mŏnts) **Roll,** a rent-roll of Scotland, made up in 1275 by Baiamund or Boiamond de Vicci, vulgarly called Bagimont who was sent from Rome by the Pope, in the reign of Alexander III., to collect the tithe of all the Church livings in Scotland for an expedition to the Holy Land. It remained the statutory valuation, according to which the benefices were taxed, till the Reformation. A copy of it, as it existed in the reign of James V., is in the Advocates' Library, Edinburgh.

Bagirmi, ba-gēr'me, a Mohammedan negro state in central Africa, situated partly between Bornu and Wadai, to the southeast of Lake Chad, and watered by the Shari, which falls into Lake Chad, and by its tributaries. It has an area of about 65,000 square miles, and about 1,500,000 inhabitants; but both its area and population fluctuate according as it encroaches on or is encroached on by its neighbors. The whole country is a plain 900 feet above the level of the sea, well suited for the cultivation of sorghum, which is accordingly the principal breadstuff. Sesame, beans, cotton, and indigo are also cultivated. The government is an absolute monarchy, but the ruler pays tribute to Wadai. Bagirmi was formerly included in one state with Bornu and Wadai. An inexhaustible supply of slaves is found in the heathen negro states to the south, at the expense of whom also Bagirmi, when pressed by its Mohammedan neighbors, extends its territory. The capital is Masena, situated about the centre of the state. By Great Britain and Germany Bagirmi has latterly been recognized as within the French sphere of influence, and in 1897 a treaty was concluded between the French government and the Sultan. There is a French resident in the capital.

Bag'ley, Worth, American naval officer: b. Raleigh, N. C., 6 April 1874; d. 11 May 1898. He was graduated at the United States Naval Academy in 1895; promoted to ensign, 1 July 1897, and was detailed as inspector to the new torpedo-boat, Winslow, in November following. This boat went into commission the next month, and he was appointed her executive officer. In April 1898 the Winslow was assigned to the American fleet off the coast of Cuba, and on 9 May, while on blockading duty at the harbor of Cardenas, with the Wilmington and Hudson, drew the fire of several Spanish coast-guard vessels. All the American vessels escaped untouched. Two days afterward the three vessels undertook to force an entrance into the harbor, when they were fired on by Spanish gunboats. The Winslow was disabled, and with difficulty was drawn out of the range of the enemy's guns. The Wilmington then silenced the Spanish fire, and as the action closed, Ensign Bagley and four sailors on the

Winslow were instantly killed by a shell, he being the first American naval officer to fall in the war with Spain.

Baglioni, bä-lyō′nę, a historical family of Perugia in Italy. Perugia contained two parties —an aristocratic and a democratic one. The Baglioni belonged to the former. In the 12th century Ludovico Baglioni was appointed imperial vicar of Perugia by Frederic Barbarossa, who styles Baglioni his relative, as coming, like himself, from the ducal house of Swabia. In 1393, 70 Perugian gentlemen, and among them two Baglionis, were killed in a street fight by the populace, and the whole aristocratic party was expelled from the city. Braccio Baglioni, in the service of the Pope, defeated Francesco Sforza, near Lodi, in 1453, and was made lord of Spello by Sixtus IV. Gian Paolo Baglioni began life as a condottiere; then availing himself of the dissensions of his native state he obtained supreme power over it and made alliance with Pandolfo Petrucci, ruler of Sienna. He was driven out of Perugia by Cæsar Borgia in 1502. Returning in 1503, after the death of Alexander VI., he was banished again, in 1506, by Julius II. He then entered the service of the Venetians in the war of the league of Cambray. He resumed his old position as ruler of Perugia in 1513. Here he created so much scandal that Leo X., who at first passed over his usurpation, summoned him to Rome, threw him into the castle of St. Angelo, had him tried, and he was beheaded at Rome in 1520. Malatesta and Orazio, his sons, recovered possession of Perugia after the death of Leo. Orazio turned condottiere in the service of France, and was killed in the Neapolitan expedition of 1528. Malatesta remained in Perugia until 1529, when he was driven out by the papal and imperial troops. He died at Perugia in December 1531. In the 16th century Astorre Baglioni served Charles V. in Italy and on the coast of Tunis, and rose high in the favor of Pope Paul III., who restored to him his paternal estates. He then entered the Venetian service, and was governor of Famagosta in Cyprus when the Turks besieged it in 1570. After a brave defense he was obliged to capitulate on condition of being sent home to Venice with his garrison. But Mustapha Pasha, disregarding the terms, caused Baglioni and the other Venetian officers to be beheaded.

Baglivi, bą-lyē-vē, **Giorgio,** Italian physician: b. Ragusa, Sicily, 1669; d. Rome, 1707. He became a disciple of the celebrated physiologist and anatomist, Malpighi; was appointed professor of medicine in the College de Sapienza, Rome, by Pope Clement XI., and afterward became professor there of anatomy. In opposition to the system known as Galenism, in medicine, he founded that of solidism, which locates all disease in the solid portions of the human anatomy. His principal writings were published under the title of 'Opera Omnia Medico-Practica et Anatomica' (1704).

Bagnacavallo, bä′nyą-ką-väl′lō, **Bartolommeo Ramenghi,** Italian painter: b. 1484; d. 1542; called Bagnacavallo from the village where he was born. At Rome he was a pupil of Raphael and assisted in decorating the gallery of the Vatican. His best works are: 'Disputation of St. Augustine' and 'A Madonna and Child,' both in Bologna.

Bagnères de Bigorre, bą′nyăr′ dĕ bę-gôr′ anciently *Aquensis Vicus, Aquæ Bigerronum*), a celebrated watering-place of France, in the department of Hautes Pyrénées, capital of the arrondissement of the same name, at the entrance of the valley of Campan, on the left bank of the Adour, 13 miles south-southeast from Tarbes. Its site is one of the most romantic in the Pyrenees. Well-cultivated slopes surround it on all sides, and are terminated in the distance by a mountain range, the most conspicuous summit in which is the Pic du Midi. The town is well built and contains several good squares and numerous spacious, handsome streets. Bagnères owes its chief celebrity to its baths, which are sulphurous and saline. The bathing establishment, called Fracasti, is very complete, and is the largest and most handsome building of the town. It stands at one of its extremities, immediately under Mount Olivet, and is approached by a long avenue of poplars winding through a verdant valley. The inhabitants depend chiefly on the baths, almost every house receiving lodgers; but the manufactures are of some importance. The chief of these are a kind of crape and a fine woolen gauze woven into shawls and scarfs. The springs here were known to and used by the Romans, and various ancient remains are still in existence. Pop. 6,907.

Bagnères de Luchon, bą′nyăr′ dĕ lü-shôn′, a town of France, in the department of Haute-Garonne, one of the principal watering-places of the Pyrenees, having sulphurous thermal waters said to be beneficial in rheumatic and gouty complaints, nervous ailments, skin diseases, etc., and used chiefly as baths. The town is situated in the picturesque valley of Luchon, surrounded by hills covered with wood. The main street forms a splendid avenue, at the west end of which the large bathing establishment is placed. There is also a large and splendid casino building of recent erection, comprising a theatre, concert and ball rooms, etc., and containing a large-scale model of the Pyrenees, giving an excellent idea of the configuration of the range. The neighborhood exhibits some of the most interesting scenery of the Pyrenees. Visitors number from 30,000 to 40,000 annually, and are most numerous in the months of July and August. Resident pop. 4,000.

Bagni, bä′nyę (Italian for "baths"), a name in Italy for various places which possess natural baths or thermal springs, distinctive appellations being appended to mark the particular locality. Thus there are Bagni San Giuliano, in the province of Pisa, and some four miles northeast of the city of that name; and Bagni di Lucca, in the province of Lucca, and about 13 miles northeast of the city of Lucca, one of the most frequented of the bathing places of Italy.

Bagot, Sir Charles, British diplomatist: b. 23 Sept. 1781; d. Kingston, Canada, 18 May 1843. He was the second son of William, first Lord Bagot. In 1807 he was appointed under-secretary of state for foreign affairs in the Canning administration; in 1814, minister to France; in 1820, ambassador at St. Petersburg; and in 1824, ambassador in Holland. On the death of Lord Sydenham he was made governor-general of the Canadas, which office he held till his demise.

Bagot, Richard, English bishop, brother of the preceding: b. 22 Nov. 1782; d. 15 May 1854. In 1829 he was made bishop of Oxford, and in 1845 he was promoted to the bishopric of Bath and Wells. During the Tractarian controversy he was violently assailed for his Puseyite predilections, and for his induction of the Rev. M. Bennett into the living of Frome. This had such an effect on Bishop Bagot that his intellect became disturbed.

Bag'pipe, a well-known wind instrument, of high antiquity among various nations, and so long a favorite with the natives of the Highlands of Scotland that it may now be considered as their national instrument. The peculiarity of the bagpipe consists in the fact that the air producing the music is collected into a leathern bag, from which it is forcibly pressed into the pipes by the arm of the performer. The *chanter*, a pipe into which is inserted a reed for the production of the sounds by the action of the air from the bag, is perforated with holes like the German flute, which are stopped with the fingers. The other parts of the instrument, in the common Highland form, are three tubes or *drones,* which are also furnished with reeds. Two of the drones are in unison with D on the chanter, which corresponds with the lowest note of the German flute. The third drone, which is the longest, is an octave lower. The tuning of the bagpipe is accomplished by lengthening or shortening the tubes or drones, as may be required. Its compass is from the G of the treble stave to the A above it, but its scale is imperfect. The Highland bagpipe is a powerful instrument, and calls for great exertion of the lungs, the air being forced into the bag by a pipe held between the lips. The Irish bagpipe is smaller, softer in its notes, and is always played with bellows that force the air into the bag. It has a number of keys on the chanter and drones, and is a much more perfect instrument musically than the Highland. A Lowland Scotch form of the bagpipe is also played with bellows. It is not known when the bagpipe first found its way into Scotland, but it is probable that the Norsemen first introduced it into the Hebrides, which islands they long possessed. In England it was common from Anglo-Saxon times, and is familiarly referred to by Chaucer and Shakespeare. The bagpipe is indeed of very ancient origin, as representations of it are to be found on Grecian and Roman sculptures; and it has long been well known among various eastern nations. In Italy to this day, or at least in certain parts of it, the bagpipe is still a popular instrument among the peasantry, but the Italian form of it is more simple than the Highland and Irish.

Bagratidæ, băg-ra'tĭ-dē, or **Bagratians,** a line of kings and princes of Armenia that ruled in that country from the year 885 to the 11th century. After the seizure of Asia Minor by the Seljuks, some of the princes retained power as independent lords, holding the possession of mountain fastnesses. The dynasty ended with Leo IV., who was assassinated in 1342.

Bagration, bą-grä'tę-ōn', **Peter, Prince,** Russian general, of the Georgian Bagradite family: b. about the year 1762; d. 7 Oct. 1812. He entered the Russian army in 1782 as a common soldier; and in a long military career rose to the highest grades, and gained a place among those Russian generals the most celebrated for their stubborn, unyielding bravery. Having been created a lieutenant-general, he commanded the vanguard of the Austrian army at Austerlitz, under Prince Lichtenstein. In the Prussian campaign of 1807, his resistance made the battle of Eylau so terrible that even Napoleon shuddered at its bloody results. The same is said of him at the battle of Friedland. In 1808 he overran Finland, western Bothnia, and the Aland isles; in 1809 he fought at Silistria, and destroyed the Turkish force brought up from Adrianople to relieve that fortress. In 1812 he fought an unsuccessful battle with Davoust at Mohileff, but succeeded, nevertheless, in joining the Russian main army. He was mortally wounded at the battle of Mojaïsk or Borodino, 7 Sept. 1812, just a month before he died.

Bag'shaw, Edward, English author: date of birth unknown; d. 1662. He espoused at first the cause of the Puritans, but later became a Royalist, and sat in the parliament that Charles I. convened at Oxford; was taken prisoner by the Parliamentary army, and, during his detention, composed various books, the most important of which is 'The Right of the Crown of England as Established by Law.'

Bagshot Heath, a level tract in England, now used as a field for military manœuvres. It is famous as the site of many highway robberies in the 18th century.

Bag'stock, Major Joe, an apoplectic, gluttonous character in Dickens' novel, 'Dombey and Son.'

Bagworm, or **Basketworm,** a common caterpillar of a moth (*Thyriadopteryx ephemeræformis*), found in large numbers throughout the northern part of the United States. The male has a dark body and light wings, but the egg-laying female is wingless. The larva lies head downward in a sac or case covered with bits of leaves (so that it looks like a basket), where it finally transforms, the worm-like female remaining in its case, while the male flies sluggishly about, and may be known by its hairy body and small transparent wings. When the young hatch (in May), they crawl on a leaf, gnawing little bits from the surface and fastening them together with a thread. They present a comical sight when the baskets are partly completed, walking about, tail in the air, with the body hidden in the case. As they grow older the body is entirely protected by the sac, which they drag about when in motion. These insects frequent the trees in city parks, especially junipers, in great numbers, and are apt to be detrimental to foliage unless destroyed by scraping off the cocoons. Certain small species occur on the orange in Florida, and others in the tropics. See FAGGOTWORM.

Bahadur, bą-hâ'door, the last Great Mogul from the house of Tamerlane: b. 1767; d. 1862. When the British captured Delhi, he was taken prisoner, and sent to Rangoon. He was also a poet and wrote a number of songs.

Baha'ma Bank, Great and **Little,** shoals among the West India Islands; the former between 22° and 26° N., 75° and 79° W., having south and west the Bahama old and new channels. On it are the islands of Providence, Andros, and Exuma. The Little Bank, northwest of the foregoing, between 26° and 27° N., 77°

and 79° W., has on it the Great Bahama and Abaco Islands.

Baha'ma Channel, Old and **New,** two channels of the West Indies; the former separates the Great Bahama Bank and Cuba; the latter, also called the Gulf of Florida, is between the Great and Little Bahama Banks and Florida, and forms a part of the channel of the great Gulf Stream, which flows here at the rate of from two to five miles an hour.

Bahamas, The, or **The Bahama Islands,** were formerly known as the Lucayos, from the name of a tribe of aborigines inhabiting them at the time of their discovery by Columbus in 1492. The scene of the first landing was an island on the outer or Atlantic side of this group to which Columbus gave the name San Salvador. By the natives that island was called Guanahani, and it is now known as Watling Island. The total habitable area of the islands is small, but the extent of the group, including cays and rocks rising from banks near the surface of the water, is very great — nearly six degrees of latitude, and more than six degrees of longitude. Stretching through a total distance of 780 miles, these islands and banks form a barrier between the Atlantic and the eastern entrance to the Gulf of Mexico. To reach the Florida Strait, a large vessel must follow one of three channels: the Old Bahama, north of Cuba; the Florida, and the Providence. The last passes through the group above Nassau, the capital and only important city, an attractive place with about 10,000 inhabitants.

The researches of Prof. Agassiz have shown that the Bahamas are essentially different in geological formation from the Greater and Lesser Antilles, being «wind-blown piles of shell and coral sand,— once much more extensive than now,— whose areas have been restricted by a general regional subsidence of some 300 feet, so that much of their former surface now occurs as shallow banks beneath the water. Mr. Robert T. Hill says: «The islands are merely the exposed tips of a great submerged ridge, having an outline and configuration which would be crudely comparable to the island of Cuba if the latter were so submerged that its highest points merely reached the surface.»

The Indian population having been carried away to the pearl fisheries of Panama, or to labor in the fields and mines of other Spanish colonies, the Bahamas remained deserted until, in 1629, an English settlement was begun in the island of New Providence. Twelve years later, Spain asserted her claim, based upon discovery without occupation. The English were expelled, but again attempted colonization; and Charles II., in 1680, actually granted the islands to six English noblemen and gentlemen. Early in the 18th century New Providence was twice raided by French and Spanish forces; and again it became a desert. Buccaneers of all nations made themselves at home, and held undisputed possession, until another English settlement was planted in 1718, and British troops assigned to its defense. Tory emigrants from the English colonies on the mainland at the time of the Revolution introduced slave labor and the cultivation of cotton — which did not thrive. New Providence was captured and held for a short time by the Americans under Commodore Hopkins in 1776; six years later it fell into the hands of the governor of Cuba, but was retaken by the loyalist Col. Deveaux before 12 months had passed. The rights of the old lord proprietors were purchased in 1787, the Bahamas becoming a possession of the British Crown, administered by a colonial government.

During the Civil War in the United States an enormous blockade-running trade swelled the imports of the islands from a little more than $1,000,000 to upward of $26,000,000; the exports from about $800,000 to more than $23,000,000 — a period of prosperity both brief and unique. Violent storms and droughts have more than once brought ruin to the natural industries; the cultivation of small fruits, vegetables, oranges, pineapples, cocoanuts, etc., has been carried on at a disadvantage, owing to the tariff laws of the United States, and the remoteness of other markets. Other forms of agriculture have been attempted, with moderate success. Sponge-fishing is carried on extensively. At the eastern end of the group are the Turks and Caicos islands, which were separated politically from the Bahamas, and made a dependency of Jamaica in 1848. Grand Turk is the capital, and there the chief executive officer, or commissioner, resides. From these islands 1,500,000 bushels of salt are exported annually, and a large number of sponges are also gathered and exported. The total value of imports to all the islands is about $825,000, the United States supplying nearly three fourths of that amount. Besides Turks and Caicos, the principal inhabited islands are: New Providence, with about 15,000 inhabitants; Abaco, Harbor Island, Eleuthera, Mayaguana, Ragged Island, Rum Key, Exuma, Long Island, Long Key, the Biminis, Great Bahama, Crooked, Acklin, Cat, Watling, Berry, and the Andros Islands. The inhabitants of Great Abaco are chiefly descendants of the American Tories, referred to above. Harbor Island has about 2,000 inhabitants, who are descendants of the buccaneers. Largest and most densely wooded are the Andros Islands.

From November to May the temperature ranges between 60° and 75° F.; in the summer months it varies from 75° to 85°. The climate, though subject to greater extremes of heat and cold than that of other groups in the West Indies, is agreeable and health-giving; and Nassau is a favorite resort for tourists in winter. The population (about 54,000), includes a large proportion of negroes, the natural increase among the descendants of former slaves being greater than among the descendants of the white settlers. There is little immigration. Good schools are maintained by the government, and by the Church of England. The administration of the islands is conducted by a governor, and an executive council. Members of the representative assembly, 29 in number, are elected by suffrage. There is a legislative council. From Nassau cables run to Florida and the Bermudas. A line of steamers connects the capital with London, and there is regular mail connection with New York and Florida.

Authorities.— 'Cuba and Porto Rico, with the Other Islands of the West Indies,' by Robert T. Hill; 'Amerika,' by Rudolf Cronau.

MARRION WILCOX,
Authority on Latin-America.

Bahar, bạ-här′, province in India. See BEHAR.

Bahar, bạ-här′, or **Barre,** the name of certain weights used in several places in the East Indies. They have been distinguished as the *great bahar,* with which are weighed pepper, cloves, nutmegs, ginger, etc.; and the *little bahar,* with which are weighed quicksilver, vermilion, ivory, silk, etc. But this weight varies much in different parts of the East, being in some places not much above 400 pounds, in others considerably over 500.

Bahawalpur, bạ-hä′wạl-poor′, India, town and capital of a state of the same name in the Punjab, two miles from the Sutlej. It is surrounded by a mud wall and contains the extensive palace of the Nawab, a vast square pile with towers at the corners. It has underground rooms, which afford a more comfortable temperature in the warm season than the upper rooms. Silk goods are manufactured. Pop. about 14,000. The state has an area of 17,285 square miles, of which 10,000 is desert, the only cultivated lands lying along the Indus and Sutlej. Cultivation largely depends upon irrigation, which has been considerably extended in recent times, with a great increase to the state revenue. The chief crops are cereals, cotton, and indigo. The political relations between the British government and the state are regulated by a treaty concluded in 1838. No tribute is exacted from the Nawab. Pop. 720,700.

Bahia, bä-ē′ạ, or **São Salvador da Bahia,** so named because it is situated on a large harbor or bay, ranks, in population and importance among the cities of Brazil, next to Rio de Janeiro. It lies about 740 miles north of Rio, in lat. 13° 1′ S., and lon. 38° 32′ W. Amerigo Vespucci visited this port on his voyage of exploration in 1503. Before 1763 Bahia was the capital of Brazil, and in the 16th century it was the scene of frequent conflicts between the Portuguese and the forces of other European nations (see BRAZIL). At present it is the capital of the state of Bahia, which has great natural resources in its mines and forests, as well as in fertile lands devoted largely to the cultivation of sugar-cane. The location of the city is picturesque, its upper portion being built on high ground several hundred feet above the sea-level. On the upper terraces stand churches, the cathedral, convents, a great theatre, the mint, and the governor's palace. Below, bordering the port, which has a fine lighthouse and is defended by several forts, are docks and warehouses where the products of the country,— coffee, sugar, cotton, dye-woods, tobacco, rum, hides, horns, and tallow,— are collected, to be shipped to all parts of the world. Bahia has an excellent public library, which was founded in 1811; its manufactures have received attention in recent years, and formerly it was the headquarters of the diamond trade before the mines of South Africa and southern Brazil were developed. The population is somewhat more than 200,000, with an annual increase of nearly 6,000.

MARRION WILCOX.

Bahia Blanca, bä-ē′ạ blän′kạ, Argentina, an important seaport town in the state of Buenos Ayres. The town has an excellent harbor and is the seat of a considerable foreign trade. The United States is represented by a consular agent. Pop. (1903) 11,600.

Bahia Honda, bä-ē′ạ ōn′dạ, a seaport of Cuba, on the coast of the Gulf of Mexico, and lying on a small bay, bearing the same name, which affords one of the best harbors on the island. The town and bay are about 50 miles west of Havana, being commanded by a small fort. There are mines of coal and copper in the vicinity. A short distance to the south are the sulphur springs of Aguacate.

Bahr, bär, **Johann Christian Felix,** German philologist: b. Darmstadt, 13 June 1798; d. 29 Nov. 1872; educated at Heidelberg Gymnasium and University, of which last he became ordinary professor of classical philology in 1823. His chief work is his 'History of Roman Literature' (1828; 4th ed. 1868–70), which is noted for its clearness and comprehensiveness. Three supplements to this work deal with the 'Christian Poets and Historians of Rome' (1836); the 'Christian-Roman Theology' (1837); and the 'History of Roman Literature in the Carlovingian Period' (1840). His edition of 'Herodotus' (2d ed. 1855–61) is also noteworthy.

Bahr, bär, an Arabic word signifying sea or large river; as in Bahr-el-Huleh, the Lake Merom in Palestine; Bahr-el-Abiad, the White Nile, Bahr-el-Azrek, the Blue Nile, which together unite at Khartum.

Bahr-el-Ghazal, bär′ĕl-gạ-zäl′, name of two rivers in central Africa: one flows from Lake Chad through a desert region; the other is formed by the union of several streams near the Congo Free State, and flows eastward through a very swampy region, and shortly after leaving Lake No unites with the Bahr-el-Jebel to form the White Nile. Its banks are apt to be very indefinite owing to inundations. In 1869 Schweinfurth explored the greater part of its basin. The head of steam navigation on the river is Meshra-er-Rek. The basin of these two rivers is a province of the same name. A settled government was established there on behalf of Egypt in 1878, but the Mahdist rebellion temporarily severed its connection with that country. Since the reconquest of the Egyptian Sudan by the British and Egyptian forces under Kitchener, however, the Bahr-el-Ghazal has been again brought under a settled administration. It is said to be rich in ivory, rubber, and timber, and suited for cotton growing. The Ubangi district of the French Congo lies to the west of the Bahr-el-Ghazal.

Bahr Yusuf, bär yoo′sŭf, or **Bahr el Yusuf,** an artificial irrigation channel from the left bank of the Nile below Sint, to the Fayum; 270 miles long. According to Coptic traditions it was constructed during Joseph's administration.

Bahraich, bạ-rīch′, a town of Hindustan, capital of Bahraich district, Faizabad division, Oudh. The town is in a flourishing state; it is drained and lighted, and carries on a good local trade. The chief edifice of interest is the shrine of Musand, a warrior and saint of the 11th century, which attracts both Hindu and Mohammedan pilgrims to the number of 150,000 annually. The American Methodist mission has a station and a school here. Pop. about 24,000.

Bahral, bä'räl, or **Burrel,** a wild sheep (*Ovis nahura*) of the high plains of Tibet, which resembles a goat in appearance, although it has no beard. The rams carry large flattened and nearly smooth horns, which curve outward and backward, but do not curl. The general color is brown, becoming gray in winter, while the abdomen and insides of the legs and tail are white; a stripe along the sides and on each side of the face, the throat, and the front of the legs, are black, interrupted by white patches at the knees and above the hoofs. The females are plainer and have small horns. This animal, which is a favorite object of sport in Tibet, passes its whole time above the limit of forest growth, and clambers about the rocks in the manner of a goat rather than of a sheep. It is believed that these animals, which are often kept captive by the mountaineers, have influenced the Asiatic races of domestic sheep. Consult Lydekker, 'Royal Natural History,' Vol. II. (London 1895).

Bahrdt, bärt, **Karl Friedrich,** German theologian: b. Bischofswerda, Saxony, 25 Aug. 1741; d. Halle, 23 April 1792; studied in Schulpforte and Leipsic, where he first showed his great talents. In 1762 he was appointed professor in the University of Leipsic. His works and his talents as a preacher procured him many admirers, but in consequence of immoral conduct he was obliged to quit that city in 1768. From this time he led an unsettled life. He was successively professor of theology and preacher in Erfurt (where he was made doctor of theology), in Giessen, Switzerland, and in Dürkheim, but was obliged to leave each of these places on account of his severe attacks on the clergy and the heterodox views manifested in his writings and sermons, as well as on account of his irregular life. The Aulic Council declared him disqualified to preach or to publish unless he would revoke the religious principles advanced in his works. In 1779 he went to Halle, where he published his creed. It is thoroughly deistical, denying the miracles, and not insisting on the immortality of the soul. He lectured in Halle, but soon became involved in difficulties with the clergy; upon which he left the city, and established, in a neighboring vineyard, a public-house, where he had many customers, whose vitiated tastes and depraved habits he made no scruple of gratifying. Ultimately, in consequence of two works which he wrote, the patience of government was exhausted. He was brought to trial, condemned, and confined in the fortress of Magdeburg. Here he wrote his life. At the end of a year, having regained his liberty, he again opened his public-house at Halle, where he died.

Bahrein, ba-rān', or **Aval Islands,** a group of islands lying on the south side of the Persian Gulf, since 1867 under British protection. The principal island, usually called Bahrein, is about 27 miles in length and 10 in breadth. It is in general very flat and low, a mere shoal hardly 20 feet above sea-level; though in the centre there are hills 400 feet high. The soil is not fertile except in some places, and is often cultivated by means of irrigation. Excellent dates are produced. Fishing is an important industry, and the pearl-fishery here is famous. The inhabitants are a mixed race. The principal town is Manameh or Manama; pop. 25,000. The island of Moharrek, separated from Bahrein by a strait two miles broad and only about three feet deep at ebb, is much smaller than it; but contains a town called also Moharrek, which is the present seat of government, and has a population of 22,000. The islands are governed by a sheikh. The total population is estimated at 70,000.

Baiæ, bī-ē, Italy, a place where wealthy Romans had their summer homes, the favorite abode of the dancing-girls and the buffoons. It is now deserted, and interesting to the stranger only for the ruins of old baths, which are shown as temples, and for the remains of former palaces, visible beneath the waves of the sea. Baiæ owes its fame to its hot baths, and its situation on a most charming bay, secured by surrounding hills from the violence of the winds. The life of the Romans there was particularly luxurious and dissolute. It has now entirely lost its ancient position of importance.

Baidyabati, bād'ya-bä'tē, a town of Bengal, situated on the river Hugli, about 15 miles from Calcutta, with an important market for jute and other produce. Pop. about 18,400.

Baif, bä-ē, **Jean Antoine de,** French poet: b. 1532; d. 1589; one of the literary league known as the 'Pléiade,' and the chief advocate of its plan of reducing French poetry to the metres of the classic tongues; also a spelling reformer, in favor of the phonetic system. His most meritorious works were translations of Greek and Roman dramas.

Baikal, bī-käl', a lake of Siberia, 360 miles long from southwest to northeast, and from 20 to 53 in breadth, interspersed with islands; lon. 104° to 110° E.; lat. 51° 20′ to 55° 20′ N. It contains seals and many fish, particularly sturgeons and pikes. In the environs are several sulphurous springs, and in one part, near the mouth of the river Barguzin, it discharges a kind of pitch which the inhabitants purify. The water is sweet, transparent, and appears at a distance green, like the sea. It receives the waters of the Upper Angara, Selinga, Barguzin, and other rivers; but the Lower Angara is the only one by which it seems to discharge its waters. It is enclosed by rugged mountains, and the scenery is unusually magnificent. In summer the lake is navigated by steamboats, but it is frozen from November to April, and trade is carried on over the ice.

Baikie, bā'ki, **William Balfour,** English naturalist and traveler: b. Kirkwall, Orkney, 1825; d. 12 Dec. 1864. He studied medicine at Edinburgh, and after receiving his degree entered the royal navy as assistant surgeon. He served in the Mediterranean, was assistant surgeon at Haslar Hospital in 1851–4, and was then appointed surgeon and naturalist to the Niger expedition, which was about to start for the exploration of this river. The death of the captain of the exploring vessel the Pleiad, left him in chief command, and he succeeded in reaching a point 250 miles higher up the river than had previously been attained. On a second expedition he was able to establish a settlement at the confluence of the Niger and Benue, and in a few years did much to spread civilization among the natives of the neighboring regions. He was author of 'Observations on the Haussa and Fufulde Languages,' and joint author with R. Heddle of 'Mammalia and Birds Observed on the Orkney Islands.'

Baiktashi, bīk-tä'shę. See DERVISHES.

Bail, in law, is the delivery of a person to another for keeping, and is generally used in reference to one arrested, or committed to prison, upon a criminal process, such person being said to be *bailed* when he is delivered to another (or is supposed to be so, but is simply set free from custody), who becomes his surety (to a greater or less amount according to the crime with which he is charged) for his appearance at court to take his trial. The person who thus becomes surety is said *to become bail,* and the amount itself is also called *bail.* Bail may generally be granted except in the case of treason. The word is not used as a plural.

When the punishment by the law of the United States is death, bail can be taken only by the supreme or circuit court, or by a judge of a district court of the United States. The proceedings attendant on giving bail are substantially the same in England and in all States of the United States. An application is made to the proper officer, and the bond or the names of the bail proposed filed in the proper office, and notice is given to the opposite party, who must except within a limited time, or the bail justify and are approved. If exception is taken, notice is given, a hearing takes place, the bail must justify, and will then be approved unless the other party oppose successfully; in which case other bail must be added or substituted. A formal application is in many cases dispensed with, but a notification is given at the time of filing to the opposite party, and unless exceptions are made and notice given within a limited time, the bail justify and are approved.

Bail'ey, Gamaliel, American journalist: b. Mount Holly, N. J., 3 Dec. 1807; d. 5 June 1859; was editor of the *Methodist Protestant* at Baltimore; with J. G. Birney founded the anti-slavery journal, the 'Cincinnati Philanthropist' (1836), the office of which was destroyed by a mob, though it continued to be published till 1847; after 1843 was also editor of a daily paper, *The Herald.* He established the well-known newspaper, the Washington *National Era* (1847), in which the famous novel, 'Uncle Tom's Cabin,' appeared first.

Bail'ey, Jacob Whitman, American scientist: b. Auburn, Mass., 29 April 1811; d. 26 Feb. 1857; was graduated at the United States Military Academy in 1832; and from 1834 till his death was professor of chemistry, mineralogy and geology at the Military Academy. He was the inventor of the Bailey indicator and of many improvements in the microscope, in the use of which he achieved high distinction; and he is regarded as the pioneer in microscopic investigation. He was president of the American Association for the Advancement of Science in 1857; and was author of numerous papers on the results of his researches.

Bail'ey, James Montgomery, American humorist: b. Albany, N. Y., 25 Sept. 1841; d. 4 March 1894; served in the 17th Connecticut regiment during the Civil War; returned to Danbury, founded the Danbury *News* in 1870. He wrote 'Life in Danbury' (Boston 1873); 'Danbury News Man's Almanac' (1873); 'They All Do It' (1877); 'The Danbury Boom' (1880); etc.

Bail'ey, Joseph, American military officer: b. Salem, O., 28 April 1827; d. 21 March 1867; entered the Union army as a private in 1861, and signally distinguished himself in the Red River campaign under Gen. N. P. Banks, in 1864 by building a dam and deepening the water in the channel, which enabled Admiral Porter's Mississippi flotilla to pass the Red River rapids in safety and so escape the perilous situation. For this engineering feat, Bailey, who before entering the army was a plain farmer, was brevetted brigadier-general, promoted colonel, voted the thanks of Congress, and presented by the officers of the fleet with a sword and a purse of $3,000. Subsequently, he was promoted to full brigadier-general, and was engaged on engineering duty till his resignation 7 July 1865.

Bailey, Joseph Weldon, United States senator for Texas: b. Copish County, Mo., 6 Oct. 1863. He studied for the legal profession, graduated as a lawyer in 1883, and, entering politics, in 1884 served as a district elector on the Cleveland and Hendricks ticket. The following year he removed to Gainesville, Texas, and in 1888 served as elector for the State at large on the Democratic ticket. He was elected to the Fifty-second, Fifty-third, Fifty-fourth, Fifty-fifth, and Fifty-sixth Congresses, and was the Democratic nominee for speaker of the House of Representatives on the organization of the Fifty-fifth Congress, 15 March 1897. He was chosen to succeed the Hon. Horace Chilton as United States senator for Texas, 23 Jan. 1901, and was re-elected 22 Jan. 1907.

Bail'ey, Liberty Hyde, American horticulturist: b. South Haven, Mich., 15 March 1858; graduated at the Michigan Agricultural College in 1882; was associate to Dr. Asa Gray at Harvard University in 1882–3; professor of horticulture and landscape gardening in the Michigan Agricultural College in 1883–8; in the last year became professor of horticulture in Cornell University; and in 1903 was appointed director of the College of Agriculture at Cornell. He was an associate editor of the revised edition of 'Johnson's Universal Cyclopædia' (1892–6), and editor of 'American Gardening.' He has published a large number of technical works, including 'Annals of Horticulture,' 'Evolution of Our Native Fruits,' 'Text-book of Agriculture,' etc.

Bail'ey, Loring Woart, chemist and geologist: b. West Point, N. Y., 28 Sept. 1839. He graduated at Harvard in 1859, and in 1861 was appointed professor of chemistry and natural history in the University of New Brunswick, Fredericton, N. B., since which date he has also been connected with the geological survey of Canada. Besides his official reports he has published: 'New Species of Microscopical Organism from the Para River, South America' (1861); 'Mines and Minerals of New Brunswick' (1864); 'Geology of Southern New Brunswick' (1865); 'Elementary Natural History' (1887).

Bail'ey, Nathaniel (or NATHAN), English lexicographer: d. 1742. He was the author of an English dictionary, the best before that of Dr. Johnson. The first edition appeared in 1721 under the title of 'An Universal Etymological English Dictionary,' by N. Bailey; and

it was soon republished in an enlarged form. Altogether some thirty editions of it appeared up to 1802. Dr. Johnson made use of an interleaved copy of it when drawing up his own dictionary. Bailey also published a spelling-book: 'All the Familiar Colloquies of Erasmus, Translated'; 'The Antiquities of London and Westminster'; 'Dictionarium Domesticum,' etc.

Bail'ey, Philip James, English poet: b. Nottingham, 22 April 1816; d. 6 Sept. 1902. He was educated first in his native city and afterward at Glasgow University; was called to the bar, but never practised. His best known poem, 'Festus,' was first published in 1839, and has passed through a very large number of editions, both in Great Britain and the United States. He is author of a few other poems and of one prose work; among the former are 'The Age' (1858), a satire, and 'The Angel World' (1850), now incorporated with 'Festus.'

Bail'ey, Samuel, English banker and writer on political and mental philosophy: b. Sheffield. 1791; d. 18 Jan. 1870. His first work was a volume of 'Essays on the Formation and Publication of Opinions' (1821), in which he ably defended the proposition that a man's opinions are independent of his will. His 'Essays on the Pursuit of Truth and on the Progress of Knowledge' (1829) are only less valuable. His many controversial books on questions of political economy are already almost forgotten, though these, as well as his pamphlets and treatises on political representation, primogeniture, and the like, are characterized alike by terse exposition and vigorous style. Not less interesting are his 'Review of Berkeley's Theory of Vision' (1842); 'Theory of Reasoning' (1851); and 'Letters on the Philosophy of the Human Mind' (1855–63). The third series of the last contains an able defense of utilitarianism, in which the author avows himself a thorough determinist.

Bail'ey, Solon Irving, astronomer: b. Lisbon, N. H., 29 Dec. 1854. He graduated from Boston University, 1881; and Harvard (A.M.), 1887. In 1889 he was sent to Peru to determine the best location for a southern station of the Harvard Observatory. Arequipa was selected, an observatory was built, and as associate professor of astronomy Prof. Bailey has had charge of the work there for eight years. In 1893 he established a meteorological station on the summit of El Misti, by far the highest scientific station in the world. His scientific writings have been issued in the 'Annals of Harvard College Observatory.'

Bail'ey, Theodorus, American naval officer: b. Chateauguay, N. Y., 12 April 1805; d. 10 Feb. 1877; entered the navy in 1818; served on the western coast of Mexico during the Mexican war; commanded the frigate Colorado, of the western Gulf blocking squadron, in 1861–2; and in the last year commanded the right column of Admiral Farragut's squadron in the passage of forts St. Philip and Jackson, and led the fleet at the capture of the Chalmette batteries and the city of New Orleans. In 1862–5 he commanded the east Gulf blockading squadron. He was commissioned rear-admiral and retired in 1866.

Bail'ey, Vernon, American scientist: b. Manchester, Mich., 21 June 1863; received a university education and in 1900 was chief field naturalist of the United States Biological Survey. Among his publications are 'Spermophiles of Mississippi Valley,' 'Revision of Voles of the Genus Evotomys,' 'Mammals of District of Columbia,' etc.

Bail'ey, William Whitney, American botanist: b. West Point, N. Y., 22 Feb. 1843. He was educated at Brown and Harvard, having been a pupil of Prof. Asa Gray. In 1867 he was botanist of the United States Geological Survey of the 40th parallel; in 1867-9 assistant librarian of the Providence Athenæum. He was appointed instructor in botany at Brown University in 1877, and became professor there in 1881. He has published 'Botanical Collector's Handbook' (1881), and contributed to several periodicals.

Bailey, Willis T., American statesman: b. Carroll County, Ill., 12 Oct. 1854. He was educated at the University of Illinois. In 1873 he removed to Nemaha County, Kan., and engaged in farming and stock-raising. In 1888 he was elected to the State legislature and was sent to Congress in 1899. He was elected governor of Kansas on the Republican ticket in 1903.

Bail'ie, or **Baillie,** a municipal officer or magistrate in Scotland whose jurisdiction extends to breaches of the peace, drunkenness, petty thefts, and like offenses. They sit and vote in the city councils, like other members, and are subject to the ordinary rules of retirement.

Bail'iff, a name which was introduced into England with William I., and came to be applied to various officials representing or acting for the king. He is essentially a person intrusted by a superior with power of superintendence. In the United States the word bailiff has no precise meaning. The term is most frequently used to denote a court officer whose duty it is to take charge of juries and wait upon the court. In England: an officer appointed for the administration of justice in a certain bailiwick or district. The sheriff is the king's bailiff, whose business it is to preserve the rights of the king within his "bailiwick" or county. (1) The governor of a castle belonging to the king. (2) A sheriff's officer. Bailiffs are either bailiffs of hundreds or special bailiffs. (a) Bailiffs of hundreds are officers appointed by the sheriff over the districts so called, to collect fines, summon juries, to attend the judges and justices at the assizes and quarter sessions, and to execute writs and process. (b) Special bailiffs are men appointed for their adroitness and dexterity in hunting and seizing persons liable to arrest. They assist the bailiffs of hundreds in important work for which the latter have no natural aptitude or acquired skill. Special bailiffs being compelled to enter into an obligation for the proper discharge of their duty are sometimes called bound bailiffs, a term which the common people have corrupted into a more homely appellation. (Blackstone's 'Commentaries,' book I., chapter ix.)

Bail'iwick, the jurisdiction of a bailiff, from *bailie* and *wick* (*vicus*), a town or village. In the United States it generally refers to a county, or in a jocular way is applied to any territory or place in which a person has authority.

Baillairge, bạ-yārzh', **Charles P.,** Canadian architect and civil engineer: b. Quebec, 27 Sept. 1826. Among his best known works as an architect are the Laval University, the asylum and churches of the Sisters of Charity and Good Shepherd, the Music Hall, the new jail, Dufferin Terrace, the aqueduct bridge over the St. Charles, and the Monument aux Braves de 1760, all in the city of Quebec. In 1863–5 he was joint architect and engineer with Messrs. Fuller and Page, of the parliamentary and departmental buildings in Ottawa. He is a member of the Royal Academy of Arts, Fellow of the Royal Society of Canada, and a past president of the Quebec Association of Architects. He has received many honors and diplomas from his own and other governments, and has published a large number of important works, including 'Plane and Spherical Geometry and Trigonometry' (1863); 'Key to the Stereometrical Tableau' (1870); 'Homonymes Francais' (1891); 'English Homonyms' (1891), etc.

Baillarger, bạ'yär-zhā', **Jules Gabriel,** French physician: b. 1809; d. 1891. He made a specialty of mental and nervous diseases and in 1843 joined with Longet and Cerise to establish a review especially devoted to these subjects, known as the 'Annales Medico-psychologiques du Système Nerveux.' In 1849 he received the medal of the Legion of Honor; in 1842 he received a prize from the Academy of Music for his essay on 'Des Hallucinations.'

Baillet, bạ-yā', **Adrien,** French writer: b. Neuville, 13 June 1649; d. 21 Jan. 1706. He was ordained priest in 1675, and his love for learning was so intense that after discharging for five years the duties of a parish priest, he accepted the position of librarian to Lamoignon, president of Parliament. His first publication was entitled 'Judgments of the Learned upon the Principal Works of Authors,' a book of criticism which taught better rules than it illustrated. He also produced a book on 'Devotion to the Holy Virgin,' the lives of the saints, which extended to four volumes, and a life of Descartes.

Bailleul, bạ-yēl', a French town, in the department of the Nord, near the Belgian frontier, about 19 miles west of Lille. It has manufactures of woolen and cotton stuffs, lace, leather, etc. Population, about 13,600. A village of the same name in the department of Orne gave its name to the Baliol family.

Bail'lie, Lady Grizel, Scotch poet: b. Redbraes Castle, 25 Dec. 1665; d. 6 Dec. 1746; daughter of the first Earl of Marchmont; married George Baillie in 1692; published a large number of songs in Ramsay's 'Miscellany,' and other collections; the best known is 'Werena My Heart Licht, Isvad Dee.'

Bail'lie, Harry, the proprietor of the Tabard Inn, who acts as chairman of the meeting of the pilgrims in Chaucer's 'Canterbury Tales.'

Bail'lie, Joanna, Scotch author: b. Bothwell, near Glasgow, 11 Sept. 1762; d. 23 Feb. 1851. She removed in early life to London, where in 1798 she published the first volume of her well-known 'Plays on the Passions,' in which she attempted to delineate the stronger passions by making each passion the subject of a tragedy and a comedy. These plays were not well adapted for the stage, but gave Miss Baillie a very extended reputation. Her first volume was followed by a second in 1802, a third (of miscellaneous plays) in 1804, and a fourth in 1812. Other plays appeared in 1836, and a complete edition of her whole dramatic works in 1850. The only plays performed on the stage were a tragedy entitled the 'Family Legend,' which was brought out at the Edinburgh Theatre in 1810 under the patronage of Sir Walter Scott, and had a run of 14 nights, and one of the plays on the passions entitled 'De Montfort,' which was brought out by John Kemble, and played for 11 nights, though an attempt to revive it at a later period failed. Miss Baillie also wrote songs and miscellaneous poems. All her productions are full of genius. The language is simple and forcible, the female portraits are particularly beautiful, and great knowledge of the human heart is displayed in the delineations of character. She was an intimate friend of Sir Walter Scott, who greatly admired her writings, and her home was frequented by many of the prominent authors of the day.

Bail'lie, Matthew, Scotch physician and anatomist: b. Lanarkshire, Scotland, 27 Oct. 1761; d. 23 Sept. 1823; brother of Joanna Baillie; educated at the University of Glasgow and Oxford. While at Oxford he began his medical and anatomical studies under his maternal uncles, the celebrated William and John Hunter, then lecturers in London. In 1787 he was elected one of the physicians of St. George's Hospital, and held that office for 13 years. In 1789 he took the degree of M.D., and was admitted a fellow of the College of Physicians. He very soon stood at the head of his profession, and in 1810 was made physician to the king by George III. He published 'The Morbid Anatomy of Some of the Most Important Parts of the Human Body'; also wrote 11 essays in the "Transactions of the Society for the Promotion of Medical and Chirurgical Knowledge," and 7 papers in the Medical Transactions, published by the London College of Physicians.

Bail'lie, Robert, Scotch Presbyterian clergyman: b. Glasgow, 1599; d. 1622; educated at the University of Glasgow. In 1638 he sat in that famous general assembly which met in Glasgow to protest against the thrusting of Episcopacy on an unwilling people. In 1649 he was chosen by the Church to proceed to Holland, and to invite Charles II. to accept the covenant and crown of Scotland. He performed his mission skilfully; and, after the Restoration, through Lauderdale's influence, he was made principal of Glasgow University.

Bail'lie, Robert, of Jerviswood, Scotch patriot of the reign of Charles II.: d. 24 Dec. 1684. He first came into notice in 1676 through his rescue of a brother-in-law, the Rev. Mr. Kirkton, from the clutches of Archbishop Sharp's principal informer. In 1683 he took a prominent part in a scheme of emigration to South Carolina, as he saw no other refuge from the degrading tyranny of the government. About the same time he corresponded with Monmouth's supporters in London, Russell and Sidney, and subsequently repaired there to concert measures for securing ade-

quate reforms. On the discovery of the Rye-house plot, he was arrested and sent to Scotland. Accused of conspiring against the king's life, and of hostility to monarchical government, he was tried at Edinburgh and condemned to death upon evidence at once insignificant and illegal. The sentence was carried into execution on the very day that it was passed.

Bail'lie of Jerviswood. See BAILLIE, ROBERT.

Baillot, bạ-yō', **Pierre Marie François de Sales,** French violinist: b. Passy, 1771; d. 15 Sept. 1842. He was a professor in the conservatory; traveled in Russia, Belgium, Holland, and England, and was considered without a rival. His style was severely classical, as distinguished from that introduced by Paganini.

Baillou, bä-yō', **Guillaume de,** French physician: b. 1538; d. 1616; became physician to the Dauphin in 1601; was author of several works, including 'Adversaria Medicinalia,' and is considered the first exponent of the nature of croup.

Bailly, bạ-yẹ', **Antoine Nicolas,** French architect: b. 6 June 1810; d. 1 Jan. 1892; was appointed to an office under the city government of Paris in 1834; in 1844 was made architect to the French government, and received the cross of the Legion of Honor in 1853. The Molière Fountain and the Tribunal of Commerce in Paris, and the reconstruction of the Cathedral of Digne, are his work.

Bailly, bạ-yẹ', **Jean Sylvain,** French astronomer, statesman, and historian: b. Paris, 15 Sept. 1736; d. 12 Nov. 1793. Leaving the art of painting, to which he was educated, he pursuch poetry and belles-lettres, until his acquaintance with La Caille, when he turned his attention to astronomy, and calculated the orbit of the comet of 1759. In 1763 he was admitted to the Academy of Sciences; in 1766 he published his treatise on Jupiter's satelites, which also contains a history of that section of astronomy. In 1771 he published a valuable and interesting treatise on the light of the satellites. Later he wrote also a history of astronomy. In 1784 he was chosen secretary of the academy, also admitted to the French academy, and the next year admitted to the Academy of Inscriptions; a rare thing for one person to belong to the three academies. He espoused the democratic cause in the Revolution, was elected from Paris, in 1789, first deputy of the *tiersétat,* and was chosen president of the assembly. In July 1789 he was chosen mayor of Paris and discharged his duties during 26 months of a most trying and dangerous period with great firmness and wisdom. Losing his popularity by repressing riots and defending the queen, he gave up public life, and lived in retirement, till seized by the Jacobins and brought to Paris, where he was condemned as a conspirator and executed. Several posthumous works of his have appeared; the most noted are an 'Essay on the Origin of Fables and Ancient Religions,' and his 'Memoirs of an Eye-witness from April to October 1789.'

Bailly, bạ-yẹ', **Joseph A.,** French sculptor: b. Paris, 1825; d. 15 June 1883; removed to Philadelphia, Pa., in 1850; and produced 'Adam and Eve,' 'Eve and Her Two Children,' and the marble monument of Washington in front of the State house (1869).

Bail'ment, in law, is the delivery of a chattel or thing to another to keep, either for the use of the bailor or person delivering, or for that of the bailee or person to whom it is delivered. A bailment always supposes the subject to be delivered only for a limited time, at the expiration of which it must be redelivered to the bailor; and the material inquiries in cases of bailment, relate to the degree of responsibility of the bailee in regard to the safe-keeping and redelivery of the subject of the bailment. This responsibility will depend, in some degree, upon the contract on which the bailment is made. If a thing is delivered to the bailee to keep without any advantage or use to himself, or any compensation, but merely for the benefit of the bailor, he is answerable only for gross negligence; but if the bailment is for the mutual benefit of both parties, the thing must be kept with the ordinary and usual care which a prudent man takes of his own goods; but if it be delivered for the benefit of the bailee only, he must exercise strict care in keeping it, and will be answerable for slight negligence. A special agreement is made in many cases of borrowing or hiring, specifying the risks assumed by the borrower or hirer; and in such case his obligations will be determined by his stipulations.

Bail'y, Edward Hodges, English sculptor: b. Bristol, 10 March 1788; d. 22 May 1877. He was brought up with a view to a mercantile career; but ere long gained considerable success as a modeler in wax. He became a pupil of Flaxman in 1807, gained the academy gold medal in 1811 for his 'Hercules Restoring Alcestis to Admetus,' and was elected a member of the Royal Academy in 1821. His principal works are 'Eve at the Fountain'; Eve Listening to the Voice'; Maternal Affection'; 'Girl Preparing for the Bath'; 'The Graces'; etc. The bas-reliefs on the south side of the marble arch, Hyde Park, the statue of Nelson on the Trafalgar Square monument, and many statues of distinguished men, were executed by him. In 1863 he was placed on the honorary retired list of the Royal Academy.

Bail'y, Francis, English astronomer: b. Newbury, in Berkshire, 1774; d. 1844; entered a London house of business, and traveled two years in America; then settled in London as a stockbroker and published several works on the doctrine of life annuities and insurance. On retiring from business with an ample fortune in 1825 he turned his attention particularly to astronomy, and became one of the founders of the Astronomical Society; improved the nautical almanac, and investigated and described the phenomenon called Baily's beads (q.v.). Besides many astronomical papers he wrote a 'Life of Flamsteed.'

Bail'y's Beads, a phenomenon attending eclipses of the sun, the unobscured edge of which appears discontinuous and broken immediately before and after the moment of complete obscuration. It is classed as an effect of irradiation and defraction.

Bain, Alexander, Scottish electrician: b. Watten, Caithness, 1810; d. 1877. He went to London and began a series of electrical experi-

ments in 1837; and invented electric fire-alarm and sounding-apparatus, and the automatic chemical telegraph, by which high speed telegraphy was for the first time made possible.

Bain, Alexander, Scotch writer on mental science and education; b. Aberdeen, 1818; d. 2 Jan. 1887; educated at Marischal College and University there. In 1840 he became deputy teacher of the moral philosophy and natural philosophy classes in Marischal College; between 1845 and 1860 he was professor at the Andersonian College, Glasgow, assistant secretary to the Metropolitan Sanitary Committee and the general board of health, and examiner in mental and moral science in the University of London, and for the India civil service examinations. From 1860 till 1880 he occupied the chair of logic and English in the University of Aberdeen (formed by the union of the two universities of Marischal College and of King's College), and in 1881, also in 1884, was elected its lord rector. He is the author of numerous works on mental and moral philosophy, the two most important being 'The Senses and the Intellect' (1855), and 'The Emotions and the Will' (1859). These contain a comprehensive examination of mental phenomena from the standpoint of the experiential school, and have run through several editions. Among his other works are 'The Study of Character' (1861); 'Mental and Moral Science' (1868); 'John Stuart Mill: a Criticism, with Personal Recollections' (1882); 'Logic, Deductive and Inductive' (1870); 'Higher English Grammar' (1863); 'Manual of English Composition and Rhetoric' (1866); 'Education as a Science' (1879).

Bain'bridge, Edmond, English military officer: b. 1841. He was educated at the Royal Military Academy, joined the army in 1860, and became colonel in 1893. Since 1876 he has been connected with the ordnance branch of the military service, serving also as instructor in the School of Gunnery; and, becoming, in 1899, director-general of the English ordnance factories.

Bain'bridge, John, English astronomer and mathematician: b. Ashby-de-la-Zouch, in Leicestershire, 1582; d. 1643. He studied at Cambridge; set up a grammar-school in his native place, and at the same time practised physic, devoting his leisure to the science of mathematics. His 'Description of the Comet of 1618' was the means of introducing him to Sir Henry Savile, who had founded an astronomical lecture at Oxford, and who in 1619 appointed Dr. Bainbridge to the professorship. He died while engaged in publishing corrected editions of the works of the ancient astronomers, an undertaking which was one of the duties enjoined on him as Savilian professor. His other published works are 'Procli Sphæra et Ptolemæi de Hypothesibus Planetarum,' together with 'Ptolemæi Canon Regnorum' (1620); and 'Canicularia: A Treatise on the Dog Star' (1648).

Bain'bridge, William, American naval officer: b. Princeton, N. J., 7 May 1774; d. 28 July 1833. He entered the merchant service and became captain within four years. In 1798, when the United States navy was organized, he was made lieutenant and given command of the schooner Retaliation. He was captured by the French and kept a prisoner for several months, and on his return to the United States was placed in command of the Norfolk and subsequently appointed to the command of the frigate George Washington, which was ordered to take tribute to Algiers. The dey of Algiers demanded that Bainbridge convey an Algerian ambassador and valuable presents to Constantinople, and Bainbridge was forced to comply to avoid war and the destruction of the unprotected trade in the Mediterranean. The United States government fully approved the course he had pursued. He was soon employed in the Mediterranean again in command of the frigate Essex, and afterward upon the declaration of war against the United States by Tripoli, was appointed to the frigate Philadelphia, one of the vessels of the squadron sent against that power, under the command of Commodore Edward Preble. On 26 Aug. 1803, he captured the Moorish frigate Meshboa, but was himself taken prisoner with his officers and men in October of that year. While pursuing one of the enemy's vessels, the Philadelphia ran aground; every possible effort was made to float her, but she was soon surrounded by gunboats from Tripoli, about three miles distant, and Capt. Bainbridge was compelled to surrender, having first taken such measures as it was thought would ensure the final loss of the ship. He remained with his associate prisoners in Tripoli until the conclusion of peace, which took place 3 June 1805. On his return a court of inquiry for the loss of the Philadelphia gave him honorable acquittal. His next service afloat was in the War of 1812, when he was appointed, with the rank of commodore, to the command of a squadron, consisting of the Constitution (his flagship), Essex, and Hornet, and sailed from Boston 25 Oct. for a cruise. On 26 Dec. off San Salvador, while separated from the rest of his squadron, it was his good fortune to fall in with and capture H. B. M. frigate Java. In 1815 he was appointed to the command of a squadron of 20 sail, intended to act against Algiers, then at war with us, but peace was concluded before it reached the Mediterranean. In 1819 he again commanded in the Mediterranean, and returned from this, his last service afloat, in 1821. From this time until his death he was almost constantly employed in important shore service, commanding at different times the navy yards at Boston and Philadelphia, and holding the position of president of the board of navy commissioners. As an officer he had few superiors. Though ardent in his temperament, he was cool in danger, and always had the confidence of those under his command. His system of discipline, though rigid, was always consistent and just, and he was remarkable for paying the greatest attention to the formation of his young officers.

Bainbridge, Ga., a town and county-seat of Decatur County, situated on the Flint River, 236 miles west of Savannah. It is in a cotton and tobacco region, and has various manufactures: turpentine distilleries, lumber mills, etc. It is the seat of the Georgia Southern Military College. Pop. (1904) 5,000.

Baines, Thomas, English artist and explorer: b. Norfolk, 1822; d. 8 May 1875. In

1842 he went to Cape Colony, whence he accompanied the British army in the Kaffir war as artist. He afterward went with Gregory's party to explore northwest Australia; with Livingston to the Zambesi; with Chapman's expedition to the Victoria Falls; and finally headed an expedition to the gold fields of Tati. Everywhere he made large numbers of sketches. A handsome folio of colored lithographs from his drawings at Victoria Falls was published in 1865. His last journey among the Kaffirs was very carefully mapped out and sketched. His writings are 'Explorations in Southwestern Africa' (1864); 'The Gold Regions of Southeastern Africa' (1877).

Baini, bạ-ē'nẹ, **Giuseppe,** Italian musician: b. Rome, 1775; d. 1844. He was director of the Pope's choir from 1814 till his death. The severe gravity and profound science of his compositions contrasted strongly with the careless style and shallow dilettanteism of most of his compeers; but it was by his historical researches that Baini secured for himself a prominent place in musical literature. His principal work is his 'Life of Palestrina' (1828).

Bairaktar, bī'rak-tär' (more correctly, BAIRAK-DAR), signifying "standard-bearer," the title of the Grand Vizier Mustapha: b. 1755, d. 15 Nov. 1808. When he was pasha of Rustchuk in 1806, he fought with some success against the Russians, and after the revolt of the Janissaries in 1807, by which Selim III. was deposed from the throne in favor of Mustapha IV., he marched his troops to Constantinople, deposed Mustapha IV., and proclaimed the brother of this prince, Mahmoud II., sultan on 28 July 1808. Bairaktar was now appointed grand vizier, and endeavored to carry out Selim's reforms, and to strengthen the regular army. His chief object was the annihilation of the Janissaries; but they rebelled, and, with the support of the fleet, attacked the seraglio 15 Nov. 1808, and demanded the restoration of Mustapha IV. Bairaktar defended himself bravely; but when he saw that flames threatened to destroy the palace, he strangled Mustapha, threw his head to the besiegers, and killed himself.

Bairam, bī-räm' or **Beiram,** bī'ram, a Mohammedan feast, immediately following the Ramadan or Lent (a month of fasting), and last three days. This feast begins, like the Ramadan, as soon as the new moon is announced by the persons appointed for that purpose, and during the course of 33 years makes a complete circuit of all the months and seasons, since the Turks reckon by lunar years. It is the custom at this feast for inferiors to make presents to their superiors, a custom formerly extended even to the Europeans. Seventy days after this first great Bairam begins a second — the lesser Bairam. They are the only two feasts whose celebration is prescribed by the Mohammedan religion.

Baird, Absalom, American military officer: b. Washington, Pa., 20 Aug. 1824; d. near Relay, Md., 14 June 1905. He was graduated from the United States Military Academy and assigned to the artillery in 1849. He was commissioned brigadier-general of volunteers, 28 April 1862, and brevetted major-general, 1 Sept. 1862, for his conduct in the Atlanta campaign. On 13 March 1865, he was brevetted major-general, United States army, for meritorious services in the field during the war. He was continually in the field from the Manassas campaign, in 1861, till after the surrender of Gen. Johnston's army in 1865. He was staff inspector-general from 1885 to 1888, when he was retired.

Baird, Andrew Wilson, English military engineer: b. Aberdeen, Scotland, 26 April 1842. He became a colonel in the Royal Engineers Corps in 1893; was special assistant engineer of the harbor defenses of Bombay, in 1864; assistant field engineer of the Abyssinian expedition in 1868, and, for nearly 20 years thereafter, employed on the great trigonometrical survey of India. His services were rewarded with numerous official commendations, medals, and decorations; and he has published a number of important works on his labors in India.

Baird, Charles Washington, American historian and religious writer, son of Robert Baird: b. Princeton, N. J., 28 Aug. 1828; d. 10 Feb. 1887. He was a graduate of Union Theological Seminary, and pastor in Brooklyn in 1859, and in Rye, N. Y., 1861. Besides works on the Presbyterian liturgies (which he was the first to collect and investigate) and local histories, he wrote 'History of the Huguenot Emigration to America' (2 vols. 1885), a work especially interesting to the genealogist.

Baird, Sir David, British general: b. Newbyth, Scotland, 6 Dec. 1757; d. 18 Aug. 1829. He entered the English army in 1772, and going to India distinguished himself at a disastrous engagement at Perambocum, 10 Sept. 1780, in which the small British force engaged was nearly cut to pieces after surrendering. His life was spared, but he was kept prisoner for four years. He attained the rank of major in 1787, and in October 1789, obtained leave of absence and returned to Britain. In 1791 he joined the army under the Marquis Cornwallis, and as commander of a brigade of Sepoys he was present at the siege of Seringapatam, in 1791 and 1792; and likewise at the storming of Tippoo Saib's lines in the Island of Seringapatam. In 1793 he commanded a brigade of Europeans, and was present at the siege of Pondicherry. On 9 May 1799, he commanded the storming party at the assault of Seringapatam; when, in requital of his brilliant services, he was presented by the army, through the commander-in-chief, with the state sword of Tippoo Saib. In 1800 he had a command in Egypt, and with the increased rank of lieutenant-general commanded an expedition which sailed in October 1805, for the Cape of Good Hope, where he defeated the Dutch army and received the surrender of the colony. After a short period of service in Ireland Sir David sailed in command of an armament of 10,000 men for Corunna to assist Sir John Moore. Moore was killed in the battle of Corunna and Sir David succeeded to the chief command; he received for the fourth time the thanks of Parliament, and was created a baronet. In 1814 he was promoted to the rank of general, and in 1819 became governor of Kinsale, next year commander of the forces in Ireland, and in 1827 of Fort George in Scotland. See Hook, 'Life of Sir David Baird' (1832).

Baird, Henry Martyn, American author: b. Philadelphia, Pa., 17 Jan. 1832; d. Yonkers, N. Y., 11 Nov. 1906. He was graduated from New York University in 1850, and later took a course in theology at Union and Princeton. In 1859 he was appointed professor of the Greek languages and literature in the New York University. He wrote: 'History of the Rise of the Huguenots' (1879); 'The Huguenots and Henry of Navarre' (1886); and 'The Huguenots and the Revocation of the Edict of Nantes' (1895); 'Theodore Beza, the Counsellor of the French Reformation' (1899).

Baird, Julian William, American chemist: b. Battle Creek, Mich., 14 Feb. 1859. He was graduated from the University of Michigan in 1882; was instructor in chemistry and in charge of the qualitative analysis and assaying in Lehigh University, 1883–6; and became professor of analytical and organic chemistry in the Massachusetts College of Pharmacy, Boston, in 1886, and its dean, in 1887.

Baird, Robert, American historian. b. Fayette County, Pa., 6 Oct. 1798; d. Yonkers, N. Y., 15 March 1863. He was graduated from Jefferson College; and published 'History of the Waldenses, Albigenses, and Vaudois,' 'History of the Temperance Societies' (1836); 'Religion in America' (1844); 'Protestantism in Italy' (1845); etc. He was corresponding secretary of the American and Foreign Christian Union (1849–55, 1861–3).

Baird, Spencer Fullerton, distinguished American naturalist: b. Reading, Pa., 3 Feb. 1823; d. 19 Aug. 1887. He became professor of natural sciences at Dickinson College, Carlisle, Pa., 1845; assistant secretary Smithsonian Institution, 1850; United States commissioner of fish and fisheries, 1871; secretary of the Smithsonian Institution, 1878; and founder of the National Museum. Among his more important works are a 'Catalogue of North American Reptiles' (1853); 'Birds of North America' (with Cassin and Lawrence, 1860); 'Mammals of North America' (1858); 'History of North American Birds'' (with Brewer and Ridgeway, 1874–84), etc. His work had a beneficent influence on natural history in the United States.

Baireuth, bī-roit, or **Bayreuth,** a city of Bavaria, on the Red Main, 41 miles northeast of Nuremberg. The principal edifices are the old palace now occupied by public offices, the new palace, with garden and park open to the public; the opera house, a gymnasium, and the national theatre, constructed after the design of the composer Wagner, and opened in 1876 with a grand performance of his 'Ring of the Nibelungen.' Baireuth fell to the burgrave of Nuremberg in 1248, and after many vicissitudes was ceded to Bavaria in 1810. The chief industries are cotton-spinning, and weaving, sugar-refining, brewing, etc. Pop. (1900) 29,000.

Baiter, bī'tėr, **Johann Georg,** Swiss philologist: b. Zurich, 31 May 1801; d. 10 Oct. 1877. He was professor in the University of Zurich, and from 1849 to 1865, director in the gymnasium there. He published, alone and with others, various editions of the classics, 'Panegyrics of Socrates,' 'Ciceronis Scholistæ,' 'The Attic Oratoris' (1839–50), etc.

Ba'ius, or **De Bay Michael:** b. 1513, at Melin, near Ath, in Hainaut; educated at Louvain, in 1551; made professor of Scripture at this university in 1563, sent by the king of Spain to the Council of Trent, was one of the greatest theologians of the Roman Catholic Church in the 16th century. He founded systematic theology directly upon the Bible and the Christian fathers, leaving the scholastic method. He studied specially the writings of St. Augustine and had his own interpretations of that father. The doctrines that the human will, when left to itself, could only sin; that even the mother of Jesus was not free from hereditary and actual sin; that every action which did not proceed from pure love of God was sinful; and that no penance was effectual for the justification of the sinner, but everything was to be attributed solely to the grace of God, through Christ, caused the superior of the Franciscan Order in Belgium to submit 18 of his propositions to the Sorbonne in Paris. The Sorbonne faculty condemned 3 of the propositions as false and 13 as contrary to Catholic teaching. Baius disavowed the condemned sentences, claiming that some of them had not been taught by him and that others had been presented incorrectly. After his return from Trent, he published theses which contained doctrines that were rejected by the Spanish and Italian universities to which they had been submitted. Finally 76 sentences taken from his works were condemned by Pius V. in 1567 and some dispute arising about the meaning of this bull, it was confirmed by Gregory XIII. and entrusted to the Jesuit Cardinal Toletus to deliver to Baius. Baius submitted; yet the opposition still continued, as did also his defense of some of his interpretations of Augustine in his lectures; and as the theological faculty at Louvain was entirely in his favor, he not only remained in the quiet possession of his dignities, but was also appointed dean of St. Peter's in 1575, and in 1578 chancellor of the university. He died in 1589, and left the reputation of great learning, pure morals, and a rare modesty. His interpretations of Augustine, which were called *Baianism*, were adopted by the Jansenists and were defended by them against their Jesuit opponents. His doctrine of pure undivided love to God has also been adopted by the Quietists. His writings, mostly polemical, were published at Cologne (4to 1696).

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Baja, bŏ'yŏ, a Hungarian market town situated on the Danube, 90 miles south of Budapest. It has important manufactures of alcohol and shoes and is celebrated for its annual swine fair, and its trade in grain and wine. Pop. (1890) 19,500.

Bajada Del Parana, bạ-hä'dạ dĕl pä'rạ-nä'. See PARANA.

Baj'azet' I., or **Bayazid I.,** a Turkish sultan: b. 1347; d. 1403. In 1389 he succeeded his father, Murad of Amurath, who fell in the battle of Kossova against the Servians, and caused his brother Jacob, his rival for the throne, to be strangled. He made great and rapid conquests, in three years conquering Bulgaria, part

of Servia, Macedonia, Thessaly, and subjecting the states of Asia Minor. In order to save Constantinople, King Sigismund of Hungary (afterward emperor of Germany) assembled a great army, but Bajazet met them at Nicopolis and obtained a decisive victory over the allied Hungarians, Poles, and French in 1396. He would probably have now overturned the whole Greek empire if Timur had not overrun Asia Minor in 1400 and defeated him in a battle at Angora. He himself fell into the power of the conqueror and died in Timur's camp, in Caramania. His successor was Soliman I. BAJAZET II., b. 1447; d. 1512, succeeded his father, Mohammed II., Sultan of the Turks, in 1481. He increased the Turkish empire by conquests on the northwest, and in the east, took Lepanto, Modon, and Durazzo, in a war against the Venetians, and ravaged the coasts of the Christian states on the Mediterranean, to revenge the expulsion of the Moors from Spain. At home he had to contend against his rebellious son Selim, to whom he at last resigned the empire. It has been supposed that he was put to death by the order of his son. He was a man of great talents, and did much for the improvement of his empire and the promotion of the sciences.

Baj'azet', the title of a tragedy by Racine, in which the chief character is Bajazet, the brother of the Sultan Amurath, whose choice between the throne and the woman he loves forms the theme of the drama.

Baj'azet', Mosque of, a mosque at Constantinople, built in 1505 by Bajazet II. It is one of the finest specimens of Mohammedan architecture, and displays excellent proportions and great richness of detail in decoration. There are four Persian doorways and an octagonal foundation in the centre of the court.

Baj'imonts' Roll. See BAGIMONTS' ROLL.

Bajocco, bạyŏk'kō, or **Baiocco,** a papal state copper coin, whose value is about one cent. A Neapolitan coin, value about 83 cents, was also called Bajocco in Sicily.

Baj'ree. See GUINEA CORN.

Bajura, bạ-joo'rạ, the banner of Mohammed.

Bajza, boi'zŏ, **Joseph,** Hungarian poet and critic: b. 1804; d. 1858. He devoted himself to history, and edited a 'Historical Library' (1843–5) and the 'New Plutarch' (1845–7). He was also editor of two critical journals, which exerted a strong influence on Hungarian literature. From 1831 he was a member of the Hungarian Academy, and from 1836 of the Kisfaludy Society. He ranks among the best lyric poets of Hungary. His 'Poems' appeared in 1835, and his 'Collected Works' in 1861.

Bakacs, bō'kŏch, **Thomas,** Hungarian statesman, son of a peasant: b. about the middle of the 15th century; d. 1521. He held several bishoprics in succession, became chancellor of the kingdom, and finally archbishop and cardinal. He preached a crusade against the Turks; but his army of peasants and vagabonds turned their arms against the nobility, and a fierce civil war ensued.

Bakairi, bạ-kä-ī-rẹ, or **Baccahiry,** a Caribbean tribe of central Brazil, remarkable for their light complexion. The men have assembly houses, where they spend most of their time, which women are forbidden to enter.

Bakarganj, bäk'ar-gạnj, an English district in India, under the lieutenant-governor of Bengal. It contains 3,649 square miles, is fertile, and is watered by the lower streams of the Ganges and the Brahmaputra. In the south of the district are the forest tracts of the Sunderbunds. Barisal, the headquarters, on the west bank of Barisal River, is the only town with more than 5,000 inhabitants. Bakarganj, the former capital, situated near the junction of the Krishnakati and Khairabad rivers, is now in ruins. Pop. 2,153,695.

Bake, bä'kĕ, **Jan,** Dutch philologist: b. Leyden, 1 Sept. 1787; d. 28 March 1864. In 1817 he became professor of Greek and Roman literature at the University of Leyden, holding the position till 1857. Here he edited and published valuable editions of Posidonius, and of the astronomer Cleomedes, and assisted in the large and original work entitled 'Bibliotheca Critica Nova.' He published a series of philological articles, edited some of the works of Cicero, and wrote an excellent essay upon the Greek tragedians.

Baker, David Augustine, Benedictine ascetical writer: b. 1575; d. 1641. The most original and ablest spiritual writer among English Catholics during the first half of the 17th century. Having finished his studies at Oxford, he devoted himself to law at Clifford's Inn, and later at Inner Temple. In his 40th year he became a convert to the Catholic faith, and a few years later was ordained priest and was subsequently received into the Benedictine Order. Dugdale and Dodsworth are indebted to his historical labors for much of the data found in their monumental works. It was Father Baker who discovered that the old English Benedictine monastery of Saint Peter at Westminster was legally continued in the person of an old priest, Dom Sigebert Buckley. By this sole survivor David Baker was professed into the monastery of Westminster, and thus became the connecting link between the old and the new congregation in England. It was as spiritual director at Douai and Cambrai that he composed his admirable treatises on the spiritual life. Consult: Wood, 'Athenæ Oxoniensis'; Taunton, 'English Black Monks of Saint Benedict.'

Baker, SIR **Benjamin,** English engineer: b. near Bath, 1840; d. Pangbourne, Berkshire, 19 May 1907. In 1877 he superintended the removal of Cleopatra's Needle from Egypt to London and was consulting engineer on the Assouan dam. In conjunction with Sir John Fowler he planned the bridge over the Firth of Forth. He wrote 'Long Span Iron Bridges'; 'Suspension Versus Cantilever Bridges'; 'The Strength of Beams'; and 'Transportation and Re-erection of Cleopatra's Needle.'

Bak'er, Benjamin W., American educator: b. Coles County, Ill., 25 Nov. 1841. He served in the Union army through the Civil War; became a Methodist Episcopal clergyman in 1874; and was financial secretary of the Illinois Wesleyan University in 1883–93; president of Chaddock College in 1893–8; and subsequently became president of the Missouri Wesleyan College in Cameron.

Bak'er, Charles Whiting, American civil engineer: b. Johnson, Vt., 17 Jan. 1865. He was graduated at the engineering department of the University of Vermont and became managing editor of 'Engineering News' in 1900. He is the author of 'Monopolies and the People'; etc.

Bak'er, Edward Dickinson, American soldier and politician: b. London, England, 24 Feb. 1811; d. 21 Oct. 1861. He came to the United States in youth, was elected to the Illinois legislature in 1837, became a State senator in 1840, and was sent to Congress in 1844. He served under Gen. Scott in the war with Mexico, and was elected United States senator from Oregon in 1860. He entered the Federal army at the outbreak of the Civil War, and was killed at the battle of Ball's Bluff.

Bak'er, Frank, American zoologist: b. Pulaski, N. Y., 1841. He was professor of anatomy in the University of Georgetown; and in 1900 was superintendent of the National Zoological park, in Washington, D. C. He is a Fellow of the American Association for the Advancement of Science, and a member of the Academy of Science, and the Anthropological and the Biological Societies, all in Washington.

Bak'er, George Augustus, American painter: b. New York, 1821; d. 2 April 1880. He studied at the National Academy of Design in New York, and in Europe, and was elected to the National Academy in 1851. He was especially celebrated as a portrait painter, and reproduced flesh-tints very accurately. His principal works, aside from his portraits, are 'Love at First Sight'; 'Wild Flowers'; 'Faith'; and 'The May Queen.'

Bak'er, George Augustus, American writer of verse and stories: b. New York, August 1849. He wrote 'Point Lace and Diamonds,' light society verse (New York 1875) 'Bad Habits of Good Society' (1876); 'Mrs. Hephæstus and Other Stories' (1887); and several comedies.

Bak'er, Harriette Newell (Woods) (pseudonyms Madeline Leslie and Aunt Hatty), American writer of juvenile stories: b. 1815; d. 1893. A very voluminous writer, several of her works have been translated into French and German. She has written 'Tim, the Scissors-Grinder' (1861, sequel in 1862), her most popular work; 'Up the Ladder' (1862); 'The Two Homes' (1862); 'The Organ-Grinder' (1863); 'White and Black Lies' (1864); 'Worth and Wealth' (1864); 'Tim's Sister' (1864); 'Wheel of Fortune' (1865); 'Courtesies of Wedded Life' (1869) 'Paul Barton' (1869); 'Fashion and Folly' (1869); 'Lost but Found' (1869); 'Ingleside' (1886); 'This and That' (1887); etc. She was a daughter of Leonard Woods, the theologian, and wife of Rev. Abijah R. Baker.

Bak'er, Henry, English naturalist: b. 8 May 1698; d. 25 Nov. 1774. In 1740 he was chosen a Fellow of the Royal and Antiquarian societies, and in 1744 obtained the Copley medal for his microscopical discoveries on crystallization. He contributed many papers to the 'Philosophical Transactions'; was an active member of the Society for the Encouragement of Arts. He wrote 'The Microscope Made Easy'; 'Employment for the Microscope'; many scientific papers, and several poetical works.

Bak'er, Ira Osborn, American educator: b. Linton, Ind., 23 Sept. 1853. He became professor of civil engineering in the University of Illinois in 1880, and has published 'Engineers' Surveying Instruments'; 'Treatise on Masonry Construction'; and 'Brick Pavements.'

Bak'er, James Hutchins, American educator: b. Harmony, Me., 13 Oct. 1848. He was principal of the Denver High School in 1875–91; and in the last year became president of the National Council of Education, and also of the University of Colorado. He has published numerous lectures and monographs, and a work on 'Elementary Psychology.'

Bak'er, John Gilbert, English botanist: b. Guisborough, Yorkshire, 13 Jan. 1834, and was appointed assistant curator at the herbarium at Kew in 1866. He was for many years lecturer on botany to the London Hospital, and in 1882 received a like appointment from the Apothecaries' Company; he is also a member of the Royal and Linnæan Societies. His voluminous writings include works on the flora of districts so diverse as the north of England, Madagascar, and Brazil; and popular monographs and scientific catalogues of high value.

Bak'er, Lafayette C., American detective: b. Stafford, N. Y., 13 Oct. 1826; d. 2 July 1868. He was chief of the Secret Service Bureau during the Civil War; and reached the military rank of brigadier-general. He superintended the pursuit of Wilkes Booth, President Lincoln's assassin; and published a 'History of the United States Secret Service' (1868).

Bak'er, Marcus, American cartographer: b. Kalamazoo, Mich., 23 Sept. 1849. He became connected with the United States Coast and Geodetic Survey in 1873, and with the United States Geological Survey in 1886; and in 1900 was secretary of the United States Board on Geographic Names. He was cartographer to the Venezuela boundary commission, and after spending many years surveying and exploring in Alaska, and along the Pacific coast, prepared, with William H. Dall, the 'Alaska Coast Pilot.'

Bak'er, Moses Nelson, American civil engineer: b. Enosburg, Vt., 26 Jan. 1864. He was editor for several years of the 'Manual of American Waterworks'; and in 1900 was associate editor of 'Engineering News.' He has published 'Sewage Purification in America'; 'Sewerage and Sewage Purification'; etc.

Bak'er, Osmon Cleander, American clergyman: b. Marlow, N. H., 30 July 1812; d. 20 Dec. 1871. He was educated at Wesleyan University; spent several years in teaching, and was one of the founders of the system of Methodist Episcopal theological schools. He was professor in the Biblical Institute in Concord, N. H., 1847–52, and in the last named year was elected a bishop. His work, 'Guide-Book in the Administration of Discipline of the Methodist Episcopal Church' (1855), is a standard authority.

Bak'er, Sir Richard, English historian: b. Kent, 1568; d. 1645. He was educated at Oxford, and knighted in 1603 by James I.; in 1620 he filled the office of high sheriff of Oxfordshire, having estates in that county. Shortly afterward he was thrown into Fleet Prison be-

cause of having given security for a debt contracted by his wife's family, which he was unable to pay. During his imprisonment he wrote 'Chronicle of the Kings of England,' first published in 1641, and afterward continued by Edward Phillips, the nephew of Milton, and others, a work popular at the time, but not of permanent value. He died in prison.

Bak'er, Sir Samuel White, English explorer: b. London, 8 June 1821; d. 30 Dec. 1893. He was trained as an engineer, and at the age of 24 went to Ceylon, where he founded an agricultural settlement at Nuwara Eliya in 1847. In the early part of 1861, accompanied by his wife, he set out for Africa on a journey of exploration. When he had ascended the Nile as far as Gondokoro he met Speke and Grant returning after their discovery of the Victoria Nyanza Lake, and learned from them that another large lake in the district had been spoken of by the natives. This lake he determined to discover, and after many adventures he and his wife beheld the Albert Nyanza, on 14 March 1864. On his return home he was received with great honor, and was knighted. In 1869 he returned to Africa as head of an expedition sent by the Khedive of Egypt to suppress the slave trade, and to annex and open up to trade a large part of the newly explored country, being raised to the dignity of pasha. Returning in 1873, he was succeeded by the celebrated Gordon. In 1879 he explored the island of Cyprus, and subsequently traveled in Asia and America. His writings include: 'The Rifle and the Hound in Ceylon' (1854); 'Eight Years' Wanderings in Ceylon' (1855); 'The Albert Nyanza' (1866); 'The Nile Tributaries of Abyssinia' (1867); 'Ismailia, a Narrative of the Expedition to Central Africa' (1874); 'Cyprus as I saw It in 1879'; 'Wild Beasts and Their Ways' (1890); also, 'Cast up by the Sea,' a story published in 1869.

Bak'er, Thomas, English antiquary: b. 1656; d. 1740. His 'Reflections on Learning' (1709–10) went through seven editions. He left in manuscript 42 folio volumes of an 'Athenæ Cantabrigiensis,' from which a 'History of St. John's College' was edited by Prof. Mayor in 1869.

Bak'er, Valentine, English military officer, also known as Baker Pasha: b. 1825; d. Tel-el-Kebir, 1887. He was a brother of Sir Samuel White Baker. For his services in the Crimean war he was made colonel of the 10th Hussars. In the Russo-Turkish war of 1877 he was in the Turkish service, and subsequently served in Egypt. He wrote 'Clouds in the East' (1876); and 'The War in Bulgaria' (1879).

Bak'er, William Bliss, American artist: b. New York, 1859; d. Ballston, N. Y., 1889. He studied at the National Academy, and is especially noted for his landscapes. Among his works are 'In the Old Pasture'; 'October Morning'; and 'Under the Apple-Tree.'

Bak'er, Sir William Erskine, Scottish military and civil engineer: b. Leith, Scotland, 1808; d. 16 Dec. 1881. He served in the first Sikh war, and afterward held many offices in the public works department of India. His engineering work in Scinde was very valuable, as the scheme of irrigation which he carried through has imparted fertility to a barren territory. He became a member of the council of India in 1861; major-general in 1865; a K. C. B. in 1870; and retired from public life in 1875.

Bak'er, William Henry, American gynæcologist: b. Medford, Mass., 11 March 1845. He was graduated at the Harvard Medical School, and became professor of gynæcology there. His publications include 'The Treatment of Cancer of the Uterus'; 'Diseases of the Urethra and Bladder'; etc.

Bak'er, William Mumford, American novelist and clergyman: b. Washington, D. C., 27 June 1825; d. South Boston, Mass., 20 Aug. 1883. He was graduated at Princeton 1846, and held Presbyterian pastorates in Texas for 15 years, when he returned to the north and accepted a charge in South Boston. As a writer, one of his most important books was 'Inside: A Chronicle of Secession' (1866), secretly written during the war, and giving an illuminating picture of Southern sentiment. Other works are: 'Life and Labors of Rev. D. Baker' (1858); 'The Ten Theopanies' (1883). His novels, several of which appeared serially, include: 'Mose Evans' (1874); 'Carter Quarterman' (1876); 'Colonel Dunwoodie' (1878); 'The Virginians in Texas' (1878); 'His Majesty Myself' (1879); and its sequel, 'The Making of a Man' (1884); 'Blessed Saint Certainty' (1881).

Bak'er, and the Baker's Wife, The, names popularly given to Louis XVI. of France, and Marie Antoinette, because they gave bread to the starving mob at Versailles, 6 Oct. 1789.

Bak'er City, Ore., a city and county-seat of Baker County, situated on the east fork of the Powder River, 360 miles east of Portland, on the Oregon R.R. It is the centre of an extensive farming, gold-mining and stock-raising region, and has a considerable export trade. It is governed by a mayor, biennially elected, and a city council, and operates the waterworks. It was settled in 1860 and incorporated in 1872. Pop. (1900) 6,663.

Bak'er, Mount, an occasionally active volcano in Whatcom County, Wash., belonging to the Cascade Range; elevation, 10,827 feet.

Bak'er University, a co-educational institution in Baldwin, Kan. It was founded in 1858, under the auspices of the Methodist Episcopal Church, and at the end of 1905 had 40 professors and instructors, and 1,000 students. Its library contained 14,000 volumes, and the grounds and buildings were valued at $80,000; graduates, 1,200; productive funds, $50,000; income $40,000.

Bak'er's Antelope, a large antelope (*Hippotragus Bakeri*) of equatorial Africa, discovered by Sir Samuel Baker. It is pale brownish-red with black stripes on the shoulders, and has massive horns.

Bak'er's Dozen, a familiar phrase supposed to have originated in an old practice of bakers who, when a heavy penalty was inflicted for short weight, used to give a surplus number of loaves, called the inbread, to avoid all risk of incurring the fine. Thirteen, therefore, became a baker's dozen, and 13 also is assumed to be the number of witches who sat down together at dinner on the Lord's Day, even as it was the

number who were at that last Passover supper which immediately preceded the betrayal of Christ. Thirteen was also called the "devil's dozen."

Bak'ersfield, Cal., a town and county-seat of Kern County, situated on the Kern River and on the Southern Pacific railroad. It is the centre of an oil region and of a stock-raising and fruit-growing industry; therefore has a good trade and some manufacturing interests as well. Pop. (1900) 4,836.

Bake'well, Robert, English agriculturist: b. 1725; d. 1795. He succeeded his father, in 1760, as occupier of the Dishley farm in Leicestershire, and then began experiments for the improvement of cattle (introducing the celebrated long-horned breed), and also of horses, pigs, and sheep. He also introduced into English agriculture the practice of flooding meadows. He never contributed anything to literature, but Arthur Young, in his annals of agriculture, fully described and praised his plans and improvements.

Bakhmut, bäkh-moot'. See BACHMUT.

Bakhtchissarai, bäk'chẹ-sa-rī', a town of Russia, the capital of the government of Taurida; situated on the Tchoorook, 15 miles southwest of Simferopol. It consists of a single street, built along the banks of the Tchoorook, and lined in Oriental fashion with bazaars and workshops. It contains also several mosques, whose tall minarets rise high above the neighboring houses. Here also is the ancient palace of the khans who ruled over the Tauridian state before the rise of Russian power. The inhabitants are chiefly Mohammedans. Pop. (1900) 13,000.

Bakhtegan, bäkk-tē-gän, a salt lake in Persia, 47 miles east of Shiraz; 74 miles long and from 4 to 13 miles wide. Large quantities of salt are gathered from its basin.

Bakhtiari, bäkh'tē-ä'rē. (1) A range of mountains of Persia extending parallel to the Arva and Laristan ranges. (2) A half-civilized tribe living in the above mountains, estimated to number 232,800.

Baki, bä'kē, the greatest lyric poet of Turkey: died about 1600. His 'Divan' contains almost exclusively odes in praise of the Sultan.

Baking Machinery. See BREAD AND BREAD-MAKING.

Bak'ing Pow'der, a chemical preparation used in the place of yeast to give lightness to bread and other similar articles of diet. Yeast induces a kind of fermentation, accompanied by the generation of bubbles of the gas known to chemists as carbon dioxid; and it is the development of these bubbles within the dough that causes it to swell (or "rise") and become light. When baking powder is used in the place of yeast, the action is similar, except that the gas is generated by direct chemical action, instead of by fermentation. The best baking powders contain bicarbonate of soda or bicarbonate of ammonia as their alkaline constituent, intimately mixed with tartaric or phosphoric acid, or an acid tartrate or phosphate. So long as the powder is kept dry, its acid and alkaline constituents do not combine with each other; but when moistened, combination takes place, and carbon dioxid is generated, just as in the case of yeast. Owing to the cost of tartrates and phosphates, alum is not infrequently used as the acid constituent in the cheaper powders; but health authorities almost universally condemn this substitution.

Bakkebakke, bäk'kẽ-bäk'kẽ, a tribe of African pigmies dwelling in the French Congo territory.

Bakonywald, bŏ'kōn-y'-vält, a mountain range in Hungary, between the Raab and Lake Balaton, separating the great and little Hungarian plains. Average elevation, 2,000 feet. It is covered with forests, on the mast of which large herds of swine are fed. There are fine quarries of marble in the mountains.

Baksheesh, bäk-shēsh', or **Bakshish,** an Eastern word, denoting a present or gratuity. In Egypt and other parts of the Turkish empire the traveler has scarcely set foot on shore before clamors for baksheesh, on the most frivolous pretexts, or in simple beggary, without pretext at all, assail his ears from every quarter. Baksheesh is the first Arabic word with which he becomes acquainted, and he acquires it unwillingly.

Baku, a Russian town in Georgia, on the Caspian Sea. The rocky peninsula upon which it is built and the islands in the bay are composed of Tertiary strata, abounding in fossil shells. Through these strata numerous springs of naphtha and petroleum issue, together with streams of inflammable gas, and eruptions of mud from so-called mud volcanoes. These phenomena give to the region the name of the Field of Fire, and formerly made Baku the sacred city of the Guebres or Fire Worshippers. Naphtha is so abundant as to be an article of commerce. The chief product of the region, however, is petroleum. Over 500 oil wells are operated, producing large quantities of petroleum, much of which is carried by pipes directly to the refineries. Baku has a large trade, exporting besides the oil, grain, salt, etc. It has grown very rapidly in recent years, its prosperity being due to the petroleum industry which is chiefly in the hands of foreign capitalists. See Marvin, 'The Region of Eternal Fire' (1883); Louis, 'The Baku Petroleum District' in the 'Engineering Magazine, No. XV.' (1898). Pop. about 119,000.

Bakunin, ba-koon'yen, **Michel,** Russian anarchist: b. 1814; d. 1 July 1876. He was educated in a military school at St. Petersburg, and served for a time in the artillery of the guards. In 1841–3 he was in Germany, engaged in philosophical study. In 1843, he went to Paris, and entered into relations with the Polish emigration, and shortly afterward to Switzerland, where he participated actively in various socialist and communist associations. The Russian government ordered him to return home. Bakunin refused, and his estate was confiscated. In 1847, during the excitement produced in Paris by the question of parliamentary reform, he made a speech invoking the fusion of Poles and Russians, for the better and easier revolutionizing of Russia, on account of which the Russian government demanded his expulsion from France. For the next two years he was active in the revolutionary movement at Prague, at Berlin, and at Dresden. He was taken prisoner and condemned to death; but the sentence was commuted to life imprisonment

and he was sent to Siberia. In 1860, he escaped to Japan, and from there went by way of the United States to London. Here he joined the work of the revolutionary socialist movement, and in 1869, founded the Social Democratic Alliance, which later joined the International Workingmen's Association. His views were thoroughly anarchistic and when he tried to impose them upon the Association he was expelled by the Hague Congress in 1872. In 1873 Bakunin stopped active work and lived for the rest of his life in Switzerland.

Bala, bä-la, a town of North Wales, at the north end of the Bala lake, county of Merioneth. The town and its neighborhood have long been famous for the manufacture of knitted stockings, and gloves of strong and soft texture. At the south end of the town is a large artificial mound, supposed to be of Roman origin. This mound was anciently occupied by the Welsh as a fort to prevent the incursions of the English.

Bala Beds, a local deposit in North Wales, near Bala, which form a group in the Lower Silurian of Murchison. They consist of a few beds, rarely more than 20 feet in thickness, and chiefly composed of hard crystalline limestone, alternating with softer argillaceous bands, which decompose more freely, and leave the limestone like a cornice molding, affording a characteristic by which, at a considerable distance, the Bala Beds can be distinguished from the rocks of hard, gritty slate above and below. Trilobite and cystidæ are the predominant fossils of the group.

Balaam, a Biblical personage, the son of Beor, and a native of Pethor. The children of Israel had reached, in their journey, the plains of Moab. Balak, the king, terrified at seeing so great a host invading his territory, sent, therefore, to Balaam, a well-known prophet and soothsayer, to come and curse these hosts for him, so that, peradventure, he might then smite them and drive them out of the land. Balaam, warned of God in the night, refused to go with the messengers, and sent them away. Balak sent yet others. He at first also refused them, but in the morning he went, with the divine injunction to speak what the Lord should tell him. The angel of the Lord met him in the way, gave the ass he rode a vision in three several instances, and each time Balaam angrily smote the beast for her involuntary manifestations of terror. After the third beating an interlocution ensued between the ass and the master, when the Lord opened the eyes of Balaam, and, seeing the angel, he conversed with him instead of the ass. As the result of the conversation, Balaam was permitted to go on, and the charge repeated to speak only that which the Lord should tell him. Coming unto Balak, he informed him that he could only speak that which God shall put into his mouth. Balaam refused to curse Israel, but pronounced a blessing upon them, in the three several places to which Balak brought him in the vain hope of securing his purpose. This is the Old Testament history of the transaction, given in Numbers xxii.–xxiv. In Numbers xxxi. 8, 16, and Joshua xiii. 22, Balaam is mentioned as advising Balak to lead the children of Israel into idolatry, which, according to his directions, they did, and hence arose a war with Moab.

Bal'achong, an Oriental condiment, composed of small fishes, or shrimps, pounded up with salt and spices and then dried.

Bal'æna, the genus including the Greenland or right whale, type of the family *Balænidæ,* or whale-bone whales. Hence *baleen* = whalebone.

Bal'æniceps ("whale-head"), a genus of African wading birds belonging to the region of the Upper Nile, intermediate between the herons and storks, and characterized by an enormous bill, broad and swollen, giving the only known species (*B. rex*), also called shoe-bird. It feeds on fishes, water-snakes, carrion, etc., and makes its nest in reeds or grass adjoining water. The bill is yellow, blotched with dark brown, the general color of the plumage dusky gray, the head, neck, and breast slaty, the legs blackish.

Balaguer, bä-lä-gär', **Victor,** Spanish historian: b. Barcelona, 11 Dec. 1824. He became keeper of the archives at Barcelona, professor of history in the university there; and was an active Liberal politician, and, in 1888, chief of the council on the Philippine Islands. He wrote 'The Troubadours of Montserrat' (1850); 'Political and Literary History of the Troubadours' (1878–80); 'Poems' (1874); 'Don Juan de Serravalle' (5th ed. 1875), etc.

Balahissar, bä'-la-hĭs-sär', a village in the southwestern part of the province of Angora, Asia Minor. It is on the site of the ancient Pessinus, famous for its worship of Cybele. Among fragments of marble columns, friezes, etc., rise the ruins of her gorgeous temple, and remains of a theatre in partial preservation, a castle, and a circus.

Balakireff, ba-lä'ke-ryĕf, **Mili Alexeyevich,** Russian composer: b. Nizhni-Novgorod, 1837; he is ranked as the founder of the young Russian school of music. At 18 he is said to have known by heart nearly all of the musical classics. With other musical enthusiasts he strove to impart a flavor of nationalism into music, his especial works in this direction being 'Songs' (1858–60); three overtures on Russian themes; three on Chekh themes (1867); 'Forty National Songs' (1866); 'Islamey,' a fantasy (1869). His most important compositions are 'Tamora,' a fantasy for orchestra and a symphony in C major. His extended works illustrate programme music of the Berlioz Liszt school. See Cui, 'La Musique en Russie' (1880); Pongin, 'Essai Historique sur la Musique en Russie' (1897).

Balaklava, bä-la-klä'va, or **Balaclava,** a small seaport of Russia, in the Crimea, eight miles south-southeast of Sebastopol. It consists for the most part of houses perched upon heights, and it has an old castle, built by the Genoese. The harbor has a very narrow entrance, and, though deep, is not capacious. In 1854 Balaklava became the principal landing-place of the British after the battle of the Alma. The battle of Balaklava fought 25 Oct. 1854, when the Russians in overwhelming force were repulsed by a small body of British troops, is one of the most heroic achievements of modern times, the "charge of the light brigade" being the most glorious incident in the conflict. (Kinglake, 'Invasion of the Crimea'; Paget, 'The Light Cavalry Brigade in the Crimea.')

Balamban, bä-läm'bän, a small town on the west coast of Cebu, on Tanon Strait, Philippines. It was occupied by a garrison of United States infantry after a battle with Filipino insurgents early in January 1900. It has a native population of some thousands, and a public school in which English is taught.

Balan, ba-läṅ. (1) A French poem, an early version of 'Fierabras,' of which there was also an English version, 'The Sowdan of Babylon.' (2) The brother of Balin, in Arthurian legends.

Bal'ance (Latin, *bis,* "twice," and *lanx,* a "dish," or "pan"), an instrument for determining the mass of a body by comparison with a series of other bodies (called "weights") whose masses are known. The term is often applied, though somewhat incorrectly, to the familiar instruments in which the weight of a body is determined by observing the extension that it can produce when acting upon a spring whose extensibility has been previously determined by direct experiments with known weights. The "spring balance" is useful in the ordinary affairs of life, where high precision is not essential; but it is seldom employed in accurate scientific work, since it is liable to errors that cannot be eliminated or allowed for — errors that are small enough to be neglected in commercial transactions, but quite intolerable in refined laboratory work.

The "lever balance" consists essentially of a lever (q.v.) having arms of known lengths. The mass to be determined is suspended at the extremity of one of the arms, and the known masses (or weights) are suspended from the extremity of the other one, their number and size being varied until, after repeated trials, a perfect equilibrium, or "balance," is attained. If the two arms of the lever are equal, the mass of the body under examination is then equal to the sum of the masses of the weights that are balanced against it. In many cases (for example, in the familiar "platform scales") the arms of the lever are intentionally made very unequal, the object to be weighed being suspended from the short arm of the lever, while the weights are suspended from the long arm. To determine the mass of the object it is then necessary to multiply the sum of the masses of the weights by the ratio of the long arm to the short one; but in practical work this calculation does not need to be performed, because the instrument is graduated by the maker so that all necessary allowance for the difference in the arms has been made, and the readings give the corrected mass directly. In many cases the balances (or "scales") used in commerce are constructed so that equilibrium is attained by varying the length of the lever-arm rather than by varying the load at the extremity of that arm; but the fundamental principles involved are the same in all cases, and are set forth in detail in the article Lever (q.v.).

In the "precision balance" of the chemist and physicist, the lever (called the "beam") consists of a light but strong and rigid framework, usually made of brass or bronze, and having a shape somewhat like that shown in Fig. 1. It is supported by means of a wedge-shaped piece of steel, technically known as a "knife-edge," which is hardened and ground to a sharp and accurately straight edge, and which rests, when the balance is in use, upon a flat slab of agate, or other hard, smooth substance, in such a manner as to leave the beam free to tip one way or the other, with practically no frictional

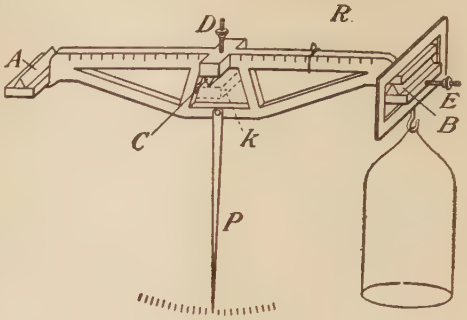

Fig. 1

resistance. (The agate slab is suggested by the dotted contour, *k,* in the figure; the pillar that supports *k* being omitted for the sake of clearness.) Knife-edges similar to the central one, but with their edges directed upward instead of downward, are provided at the respective ends of the beam (as shown at *A* and *B*) for the support of the pans (only one of which is shown) in which the masses to be compared are placed. The three knife-edges, *A, B,* and *C,* must be made with great care, and must be set in position so that they shall be accurately parallel to one another. They must, moreover, have their edges all in the same plane, so that a straight line joining any two points in the edges of *A* and *B* will likewise pass through the edge of *C.* The two arms of the beam should also be precisely equal, so that *C* is exactly half way between *A* and *B.* *P* is a pointer whose free end travels over a graduated scale, so as to indicate the extent of the oscillations of the beam as it swings to and fro on the central knife-edge *C.* When the beam is horizontal, its centre of gravity (*G* in Fig. 2) should lie in

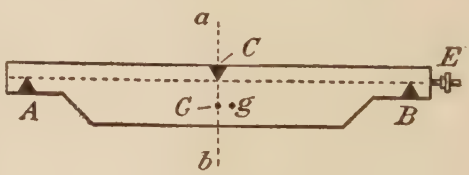

Fig. 2

the same vertical line, *ab,* with the central knife-edge. Whether this condition is fulfilled or not is easily shown by removing the scale-pans and allowing the beam to come to rest. It can only be in equilibrium when its centre of gravity is directly below the knife-edge *C;* so that if it comes to rest in a horizontal position it is evident that the condition specified above is sensibly realized. If, on the other hand, the beam, when freed from the pans, comes to rest with its right-hand end lower than the left-hand one, it is evident that the centre of gravity of the beam is too far to the right, as is indicated by the point *g.* The better makes of balance are provided with an adjustment to correct an error of this sort. This adjustment may take the form of a fine screw-thread carry-

ing a nut, as suggested at *E*. If the nut be caused to approach *B*, the centre of gravity of the beam (considering the nut as a part of the beam) will thereby be shifted toward the left, and after a number of trials the point *g* may be made to coincide with *G*, so that the beam, when free from the pans, comes to rest in a perfectly horizontal position. If it does not remain horizontal when the pans are suspended in their proper places, then it follows that one of the pans is heavier than the other; this defect is easily remedied by the use of a light counterpoise in connection with the lighter pan, or by removing a small portion of the material of the heavier one.

The centre of gravity of the beam being properly adjusted, and the equality of the two pans being assured, it is evident that the beam will set itself in a horizontal position when the pans are empty. The balance may still be defective, however, through the arms not being of precisely equal length. The equality of the arms may be tested in the following manner: Let a mass, *P*, be placed in one of the pans, and suppose that *w* is the mass that has to be placed in the other pan in order to secure a perfect balance. Let *L* be the length of the arm from which *P* is suspended, and *l* be the length of the arm from which *w* is suspended, as indicated in

FIG. 3

Fig. 3. Then, by the principle of the lever, we have —

$$P \times L = w \times l.$$

Next, let *P* be placed in the other pan, connected with the arm whose length is *l*, and yet *W* be the mass that must be suspended from the arm of length *L*, in order to secure a perfect balance. We then have the equation —

$$P \times l = W \times l.$$

Now, if *P* be eliminated between these two equations, we have the relation —

$$L \div l = \sqrt{w \div W};$$

and since *W* and *w* are both known, it follows that the ratio of the two arms of the balance is also known. If this ratio does not come out sensibly equal to unity, its value may be carefully determined, and allowance made for the inequality of the arms after a weighing has been performed. The effect of inequality in the arms may also be eliminated by a double weighing, such as has been supposed to be performed, above. For if we eliminate *L* (instead of *P*) from the foregoing equations, we find —

$$P = \sqrt{W \times w};$$

that is, the true weight is the geometric mean between *W* and *w*. In practice the arms of a good balance are so nearly equal that the simple arithmetic mean of *W* and *w* is a sufficiently close approximation to the geometric mean required by theory.

The sensitiveness of a balance depends largely upon the position of the centre of gravity of the beam relatively to the central knife edge. Thus, if the arms of the balance are precisely equal, and the beam hangs perfectly horizontal with a weight *P* in each pan, the angle, *x*, through which the beam turns when the weight in the left-hand pan is increased to $P + p$, may be taken as a measure of the sensitiveness of the balance. Let *S* be the weight of the beam itself, and let the centre of gravity of the beam be at a distance, *h*, below the central knife-edge when the beam is horizontal. Then, if *x* is the angle that the beam makes with the horizontal when it comes to rest with $P + p$ in the left-hand pan and *P* in the right-hand pan, the theory of the lever gives the equation (see Fig. 4) —

$$(P + p).L.\cos x = P.L.\cos x + h.S.\sin x,$$

from which we easily obtain —

$$\tan x = \frac{L \times p}{h \times S}.$$

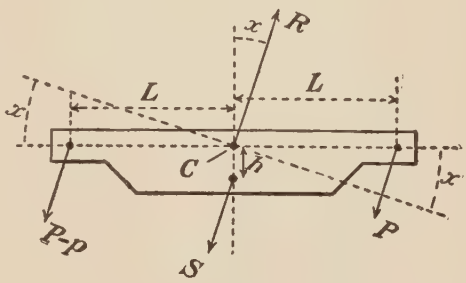

FIG. 4

It is evident that *x* will be increased as *h* is decreased, so that the sensitiveness of the balance becomes greater the nearer the centre of gravity of the beam is caused to approach to the centre of support. The balance should be provided with a thread and nut, *D* (see Fig. 1), to facilitate the vertical adjustment of the centre of gravity, in the same way that *E* is used in adjusting the horizontal position of that point. The centre of gravity of the beam must always remain below the centre of support, because when it is above that point the beam is unstable, and when it coincides with the centre of support the instrument will remain in equilibrium in any position. When a balance is made very sensitive, by bringing the centre of gravity close to the point of support or by increasing the length of the arms of the beam, the period of oscillation of the beam grows very long, so that the instrument is tedious to use. The experienced chemist or physicist therefore selects a balance whose sensitiveness and period of oscillation can be best adapted to the work he has in hand.

The "precision balance" is a delicate instrument, and should be kept in a glass case, for protection, when not in actual use. The weighings are also performed with the balance enclosed in like manner, in order to avoid error from the effect of air-currents upon the beam. The knife-edges should be kept away from their bearings, and provision is always made for raising the pans from the ends of the beam, and the beam itself from the central support, by means of a system of stops and levers (not here shown) actuated by a conveniently situated lever or wheel. The beam and pans should always

be raised in this manner when changing the weights in the pans, in order to avoid giving the least shock to the knife-edges; for when these are dulled or otherwise injured the accuracy and sensitiveness of the balance are materially lessened.

Weighings may be effected by two general methods. In the first method the position of the pointer, P (in Fig. 1), is noted on the scale at its extremity when the balance is at rest with the pans empty. The position so recorded is called the "zero" of the balance. The object to be weighed is then placed in one of the pans, and weights are added to the other pan until the balance will come to rest with its pointer at the same spot, or zero, as before. The weighing is then complete.

In the second method of conducting the experiment (known as the "method by oscillations") the balance is not brought to rest at all, the necessary readings being taken while the beam is oscillating. The zero reading of the pointer is first obtained (with the pans empty) in the following manner: The empty balance is allowed to oscillate freely for a short time, and then the position attained by the pointer at one of its extreme positions toward the right is noted. The reading of the next following extreme position to the left is then taken, and so on, observing the positions attained at the alternate right and left swings, just as the pointer pauses and begins to return toward the mean position. The last reading is taken on the same side as the first, so that there is an odd number of observations on one side of the zero, and an even number on the other side. The readings on the right are then averaged together, and those on the left are also averaged in the same way; after which the mean reading on the right is averaged with the mean reading on the left, and the result is taken as the position of the zero of the balance. The object to be weighed is then placed in one pan, and the weights in the other, the process of guess and trial being followed here just as in the preceding method until an almost exact balance has been attained. The method of oscillations, with alternate readings to the right and left, is next repeated in precisely the same manner as when the pans were empty, and the reading obtained by the final averaging of these observations is taken as the reading of the balance for the loads that are in the pans at the time. A very small weight is next added to one of the pans, and the oscillations are again observed, under the new conditions, precisely as before. The weight of the object under examination can then be determined by simple proportion. Thus, suppose that the original zero reading of the pointer, with the pans empty, was 11.6. The object to be weighed being placed in one pan, and weights having a combined mass of W in the other, let the reading of the pointer (as deduced from the oscillations) be 10.4. The small mass, w, being then added to W, let the final reading of the pointer be 12.2. The following facts are now known: With empty pans the pointer reads 11.6. With the unknown mass (which may be denoted by P) in one pan, and a mass, W, in the other, the pointer reads 10.4. Finally, with P in one pan and $W + w$ in the other, the pointer reads 12.2. The mass w has displaced the reading of the pointer by 1.8 divisions. If it be assumed that a mass x, when added to W, would have made the reading of the pointer precisely 11.6, as it was with the empty pans, we have the additional fact that a mass x would alter the reading of the pointer by 1.2 divisions. Hence the simple proportion —

$$x : w :: 1.2 : 1.8;$$

whence $x = \frac{2w}{3}$, and therefore the concluded mass of P is $W + \frac{2w}{3}$.

The method of oscillations is favored by many physicists, in the belief that a better value of the zero of the balance can be obtained by studying the free swings in this way than by allowing the instrument to come to rest. Instead of adding very small weights to secure the last adjustments, the "rider" is often used. This consists of a tiny weight made of wire, and suspended on the beam of the balance, as indicated at R in Fig. 1. The beam is graduated when a rider is to be used, and the final step in the weighing consists in observing what position the rider must have in order to make the balance perfect. The effect of moving the rider one division on the beam being known by previous experiment, the correction to be applied for any given position of the rider is easily calculated. Obviously the rider can be used with equal advantage whether the weighing is conducted by the method of oscillations or not.

The weights used in connection with precision balances must be accurately compared among themselves if refined work is to be done, and a table of corrections prepared, by means of which the proper allowances may be readily found, for any minute inconsistencies that may exist among them. Reference must be made to the standard works on experimental physics for the details of the process by which these corrections are obtained. Crookes' classical paper on the atomic weight of thallium 'Philosophical Transactions,' (1873, p. 277) may also be consulted with advantage, as it contains full details on this point, as well as on many others in connection with accurate weighing. (For further information on the theory and use of the precision balance, see Stewart & Gee, 'Lessons on Elementary Practical Physics,' Vol. I, and Glazebrook & Shaw, 'Practical Physics.' Much advanced information may also be had in the 'Travaux et Mémoires' of the International Bureau of Weights and Measures.) See also CHRONOMETER; INDUCTION BALANCE; TORSION BALANCE.

Balance of Power, is the system by which greater states are withheld from absorbing smaller ones. Vattel, in 'Law of Nations,' thus defines it: "By this balance is to be understood such a disposition of things, as that no one potentate or state shall be able absolutely to predominate and prescribe to the others." The system of the balance of power is entirely the outgrowth of the modern political system of Europe, as it began to shape itself in the 15th century; not that it was entirely unknown to the ancients before the irresistible progress of Roman arms put any idea of balance out of the question, but these early efforts after the balance of power were not sustained for a sufficiently long period, from generation to genera-

tion, from century to century; were too transitory and casual to entitle them to be elevated into a system. They must be regarded as approaches and tentatives, interesting, but in the end fugitive and unsuccessful. During the latest centuries of the Middle Ages, the kings of France and the emperors of Germany were too much engaged in their domestic struggles with their great vassals, to spare the concentrated attention and energy upon international affairs necessary to originate and sustain a system of balance in Christian Europe. In Italy, then so far in advance of the rest of Europe in intellectual, social, and political development, the princes, podestas, and republics of that peninsula, from an early period of the 15th century, had built up the institution of an equilibrium for their mutual regulation. But this was too local and on too small a scale to be deemed the parent of our modern system. Not until Louis XI. of France had repressed the Dukes of Burgundy and Brittany, not until Ferdinand of Castile and Aragon had united almost the whole of modern Spain under his sway, not until Maximilian in Germany, and Henry VII. in England and Ireland had consolidated the monarchical authority, was the time ripe for the application of this idea. The invasion of Italy by Charles VIII. of France, and his claim to the kingdom of Naples, in 1494, gave rise to the first great European combination of otherwise hostile powers for the repression of the ambition of one. Almost all the Italian states, Maximilian, the German emperor, and Ferdinand of Aragon, suspended their animosities, and drove the French out of Italy. The Emperor Charles V. of Germany, Spain, Burgundy, the Netherlands, and a vast transatlantic empire, 1519–56, caused the jealousy of Europe. Francis I. of France, actually went so far as to ally himself with the sultan, Solyman the Magnificent, against Charles. The Turks at one end of Europe, the kings of France and England at the other, and the opposition of the Protestant princes in the centre, prevented Charles from realizing his ambitious schemes. The misfortunes of Philip II., the son of Charles V., in the Dutch Netherlands and in the expeditions against England and the English power in Ireland, effectually dissipated the fears Europe entertained concerning the overgrown power of the Spanish branch of the house of Hapsburg. The idea of a European equilibrium had now become sufficiently definite for Henry IV. of France to propose to Elizabeth of England, at the commencement of the 17th century, a scheme for a federative congress, whose purpose it should be to maintain the peace of Europe in the same manner as the great powers do now. The idea was impracticable in those days, and was entirely abandoned even as a project, on the assassination of that liberal and high-minded prince. The next potentate whose power gave general alarm and caused a coalition against him in the general interest, was the emperor Ferdinand II. of Germany (reigned 1619–37). Gustavus Adolphus, of Sweden, appealing to the Protestant princes of Germany, subsidized by Richelieu, the French minister, and supplied with men by England and the united provinces of the Netherlands, achieved the task of humbling the power of the house of Austria. After the death of Gustavus, Oxenstiern of Sweden, and Richelieu of France, together forced upon the German emperor the celebrated Treaty of Westphalia (1648), which relieved Europe from the fear of the house of Austria, and put an end to the Thirty Years' war. The next general danger came from France. The invasion by Louis of the Dutch Netherlands (1672), brought about a coalition of Holland, the emperor of Germany, the elector of Brandenburg, and the king of Spain, against the French king. William, prince of Orange, was the hero of this war; but the Peace of Nimeguen (1678) sealed the supremacy of Louis XIV. The will of the king of Spain nominating the second son of the French dauphin as his successor (1700), thus putting the powerful monarchies of France and Spain into the same hands and utterly destroying the European equilibrium, created the grand alliance and the war of the Spanish succession. The emperor of Germany, the Duke of Savoy, the king of England, and the states-general of the United Provinces, united in this grand alliance. The king of Portugal afterward joined the anti-French confederacy. Marlborough and Prince Eugene of Savoy were the great military leaders in behalf of the balance of power. The Peace of Utrecht (1713), by which the union of the French and Spanish crowns was prevented, and the territorial conquests of France almost wholly surrendered, re-established the influence of the equilibrium doctrine, and secured Europe from danger on this side until the era of the French republic. The Empress Elizabeth, of Russia, was the first Russian potentate who took part in wars in which she had only a remote general interest. Prussia and Russia, celebrated their entry into the rank of first-class powers by dealing the most terrible blow to the balance of power which it has ever suffered. The first partition of Poland (1771–72) is admitted by every writer on this subject to be at war with the fundamental principles on which the equilibrium rests. The achievement of American independence (1783), though not generally reckoned by European writers as belonging to the history of the international balance, may well be included therein, inasmuch as it put an end to the overgrowth of British colonial power and British naval preponderance. At the Congress of Vienna (1814–15), it was the leading wish of Lord Castlereagh, the British plenipotentiary, to restore the kingdom of Poland, as included in the European equilibrium, in which he was seconded by Metternich for Austria, and Talleyrand for the French legitimate sovereign, but opposed by the representatives of the Russian and Prussian monarchies. The return of Napoleon from Elba put an end to this difference, and in the renewed conferences after the battle of Waterloo, the western powers did not insist upon the point. From 1815 to 1853, the world was substantially preserved from any war of importance by the five great powers who then presided over the destinies of Europe, namely, France, Great Britain, Russia, Austria, and Prussia. In 1853, the invasion of the trans-Danubian provinces of the Turkish empire by a Russian army was declared by a congress of the great powers at Vienna to be a breach of the political equilibrium. In this declaration France, Great Britain, Austria, and Prussia agreed. An Anglo-French alliance was made (1854) to repel the aggression, and the confederation of Turkey, Great Britain, and France, was reinforced by the king of Sardinia in the spring of the year

1855. After a war of three campaigns, the Treaty of Paris was signed (30 March 1856), by which Russia abandoned her claims, and the principle of the balance of power was anew vindicated. The Congress of Berlin in 1878, acting in the interests of the balance of power, deprived Russia of many benefits gained through the Treaty of San Stefano. Within a generation, the principle of nationalism has arisen in opposition to that of the balance of power. This is exhibited in United Italy, United Germany, and the spread of Pan-Slavism in Russia, but as a set-off to this may be mentioned the extension of European influence in Asia and Africa as regards colonization and trade. Thus the balance of power has become a world question and such nations as Germany and Italy are desirous of acquiring colonies to balance the colonial possessions of Russia and England. At present the balance of power in Europe is held by the six nations of Great Britain, France, Germany, Austria, Russia, and Italy.

Balance of Trade. The so-called balance of trade is a theory arising from the apparent relation of exports to imports. The protectionist school of political economy holds that excess of exports over imports constitutes what is termed a "favorable balance," which must be returned to us in gold and silver, this being the profit to the nation on its foreign trade. According to this theory the one desirable thing in foreign commerce is the exportation of merchandise. It should be said that all protectionists do not share in a belief in this theory.

In a great measure, and in its more exaggerated form, this doctrine is a survival of the old mercantile theory, which down to the time of Adam Smith controlled most of the legislation relating to commerce, and which held that gold and silver were the only wealth. It still retains a firm hold on the popular mind, but it may be said that the full weight of the teachings of orthodox political economy is against the notion that excess of exports constitutes a favorable balance.

The argument of the latter is that if the theory is true there cannot be too great an excess of exports, and that our imports should therefore consist only of gold and silver. In this "reduction to absurdity" (since a country has no more need of an excessive supply of the metals than of any other commodity) the free-trade school of political economy rejects the conclusions based upon the apparent excess of exports over imports.

Opponents of the theory hold that such trade as exists between two countries, exclusive of what is paid as interest, rent, or tribute, must show a mutual profit, and represent to each a corresponding excess of the value of importation. For illustration: A commodity costing in one country $75 will be bought in another for $100, in exchange for a commodity costing $75 in the country of its exportation and $100 in the importing country, such difference representing the degree of desirability of these particular commodities to each country. It will be observed that this precisely reverses the "balance of trade" theory.

Countries may be able to show a favorable balance from two causes, neither of which contributes to their prosperity. It may result from an actual drain, as in the case of Ireland, which is being sapped of its wealth by absentee landlords, and in India, where the same phenomenon is caused by a similar drain in the form of tribute, official salaries spent outside the country, pensions, etc. But in these instances it is clear that there is a condition unprofitable to both countries. Or, on the other hand, it may result, as in the United States, which has the same favorable balance, by reason of the large sums annually paid as interest on loans that entered originally into railroad building, industrial improvements, etc. Most of the royal families of Europe, not to mention less exalted individuals, draw large dividends from American investments. Money spent by American tourists abroad helps to swell this favorable balance.

For proof that this theory has no such relation to national prosperity as its friends conceive, its opponents point to England, whose commercial greatness is rivalled by this country alone, and which has a prevailing "unfavorable" balance, because she has been the money-lender of the world, and her excess of imports represents the return received by her people for moneys invested in foreign lands.

It is impossible to account for the growing increase of our own export balance wholly on the explanation that such excess is rent or interest upon loans. Much of such excess is indeed fictitious, and is to be accounted for by undervaluation of imports and overvaluation of exports. In the latter case there is a strong inducement to overvalue, in order to conceal the fact that many of our exporters are selling goods cheaper abroad than at home. The inducement to undervalue imports is quite as strong. In short, customs statistics, with every desire on the part of the treasury department to be accurate, are of necessity unreliable.

Balanga, bạ-lăn'gạ, Philippines, in the province of Bataan, on the western coast of Manila Bay, in the Island of Luzon. It has a post-office and telegraph station. Pop. about 9,000.

Balani'tis, an inflammation of the mucous membrane of the foreskin. It is a common condition and is due to uncleanliness. Quacks and charlatans magnify its importance, declare it to be a fearful malady, and promise miraculous cures. Ordinary cleanliness will cause a balantis to disappear in a few days. This cannot happen if the local trouble is of a venereal nature.

Balanoglos'sus, a worm-like marine animal, the chief representative of the most primitive class of chordate animals, *Enteropneusta* or *Adelocephala.* This remarkable creature, the type of its class, combines characters peculiar to itself, with features reminding us of the nemerteans, annelids, tunicates, and the vertebrate omphioxus, while its free-swimming larva was originally supposed to be a young echinoderm. From the fact that the central nervous system lies above a notochord, Bateson placed it next to the vertebrates.

One American species, *Balanoglossus aurantiacus,* is a long, cylindrical, soft, fleshy worm, footless, without bristles, but with a large, soft, whitish, tongue-shaped proboscis in front arising dorsally within the edge of the collar surrounding the mouth. The surface of the body is ciliated. At the beginning of the digestive

canal is a series of sac-like folds of which the upper or dorsal portion is respiratory and separated by a constriction from the lower, which is digestive, and leads directly to the intestine behind. This pharyngeal respiratory portion of the digestive canal has on each side, in each segment, a dorsal sac, the two communicating along the median line of the body. The dorsal respiratory sacs each bear in their walls a delicate chitinous gill-support or -arch. Between the gill-arches, forming numerous lamellæ, are a series of slits, leading on each side to openings (spiracles), situated dorsally. The water passes through the mouth into each gill-sac, and out by the spiracles. The nervous system lies above a short sac regarded as a notochord. There is a dorsal blood vessel, which sends branches to the respiratory sacs, and a ventral vessel. The worm lives in sand at low-water mark from Cape Ann to Charleston, S. C., also in the Mediterranean.

The life-history of this worm is most interesting. The young, originally described under the name of *Tornaria,* was supposed to be an echinoderm larva, though it resembles the larval *Gephyrea* and *Annelida.* It is a transparent, surface-swimming, minute, ciliated, slender, somewhat bell-shaped form, with black eye-specks. When transforming to the worm condition, a pair of gills arise on sac-like outgrowths of the œsophagus, and afterward three additional pairs, with their external slits, arise, somewhat as in ascidians. The entire Tornaria directly transforms into the worm, the transitional period being very short. The body lengthens, the collar and proboscis develop, afterward the body lengthens, the end tapering and becoming much coiled.

Consult: A. Agassiz, 'The History of Balanoglossus and Tornaria' ('Memoirs of the American Academy of Arts and Sciences,' Vol. IX, Boston, 1873); 'The Later Stages in the Development of Balanoglossus Kowalevskii, etc.' ('Quarterly Journal of the Microscopical Society,' London, 1885–6.)

Balantidium, băl-ăn-tid'i-um, a genus of *Infusoria,* some members of which, notably *B. coli* have been found in the large intestine, where they cause symptoms of intestinal derangement, anæmia, peevishness, and other symptoms of an intestinal parasite. The diagnosis is made by means of the microscope. Quinine enemas, five grains to the pint, are usually curative. See INTESTINE — *Intestinal Parasites.*

Bal'anus ("acorn-shells"), a genus of sessile cirripeds, family *Balanidæ,* of which colonies are to be found on rocks at low water, on submerged timbers, crustaceans, shells of mollusks, etc. They differ from barnacles in having a symmetrical shell and being destitute of a flexible stalk. The shell consists of six plates with an operculum of four valves. They pass through a larval state in which they are not fixed, moving by means of swimming-feet which disappear in the final state. All the *Balanidæ* are hermaphrodites. A South American species (*B. psittacus*) is eaten on the coast of Chile, the *B. tintinnabulum* by the Chinese. The old Roman epicures esteemed the larger species.

Balao, ba-lā'ō, a West Indian name, among Spanish-speaking fishermen, for the half-beaks (q.v.).

Balard, ba-lär, **Antoine Jerome,** French chemist: b. Montpellier, 30 Sept. 1802; d. Paris, 31 March 1876. He was professor of chemistry at the Collège de France, Paris, and discoverer of bromine; also of a process of extracting sulphate of soda directly from sea-water. In 1868 he was made Inspector-General of Superior Instruction.

Balas Ruby, a variety of ruby spinel.

Balashov, băl-a-shōf', a Russian town in the government of Saratov, situated on the Don, 170 miles west of the city of Saratov. It has a considerable export trade of grain, etc. Pop. about 13,000.

Balasore, băl-a-sōr', a city of Bengal, British India, capital of the district of Balasore. It is situated near the coast and has dry docks and a considerable coasting trade. Pop. about 20,000.

Bal'ata, băl'a-ta, a rubber-like exudate derived from the milky juice of *Mimusops balata* and *M. schomburgkii.* The gum is used widely in the arts, and is sometimes confused with gum chicle, from which much of the chewing-gum of commerce is derived.

Balate, ba-lā'ta, the Philippine name for a kind of trepang (*Holothuria atra*).

Balatka, bă'lăt-ka, **Hans,** musician: b. Hoffnungsthal, Moravia, 1828. After studying music in Vienna he settled in Milwaukee, Wis., where he founded the Musikverein in 1851, which he conducted for nine years. He then removed to Chicago, where he organized the Liederkranz, the Mozart Club, and conducted the Philharmonic Society and the Symphony Society.

Balaton, bŏ'lŏ-tōn, or **Platten See,** a lake in the southwest of Hungary, extending from lat. 46° 45′ to 47° 5′ N., and from lon. 17° 14′ to 18° 10′ E.; area about 110 square miles, or, including the marshy shores, about 138 square miles. It receives the waters of more than 30 small streams. It discharges through the Sio, which empties into the Sarviz, an affluent of the Danube. The Balaton is constantly in a state of motion, sufficient to cause waves. Its waters are perfectly transparent and abound with fine fish, notably one called *fogas,* frequently 20 pounds in weight, and with delicious flesh of snowy whiteness. Another kind, resembling the herring, swarm in the lake during the winter in such shoals that fishermen sometimes haul 50 cartloads from under the ice in a single day.

Balauang, bä-low-äng', Philippines, a town in the province of La Unión, Luzon, north of San Fernando. Pop. about 25,000.

Balau'stion's Adven'tures, a poem by Robert Browning, describing a Greek girl of Rhodes. 'Aristophanes' Apology' is a continuation of this poem.

Balawat, bä-la-wät', a ruined city of Asiatic Turkey, 10 miles from Nimrud. Excavations there have resulted in the finding of the ruins of the palace of Shalmaneser II. The bronze gates that opened into the vestibule of this palace are especially interesting and valuable, and have been placed in the British Museum.

Balayan, bä-lä'yan, Philippines, a town of Batangas province, Luzon, situated on the Gulf of Balayan, northwest of the town of Batangas. Pop. about 25,000.

Bal'bec. See BAALBEK.

Balbi, bäl'bē, Adriano, famous geographer: b. Venice, 25 April 1782; d. Padua, 14 March 1848. In 1808 his first work on geography procured his appointment as professor of that science in the College of San Michele, at Murano, and in 1811 he became professor of natural philosophy in the Lyceum at Fermo. Having married an actress, he went in 1820 to Portugal, where he became acquainted with the leading scholars and statesmen. He had free access to the government archives, and from the documents he collected, composed two interesting works entitled 'Essai Statistique sur le Royaume de Portugal et d'Algarve, Comparé aux Autres États de l'Europe,' and 'Variétés Politiques et Statistiques de la Monarchie Portugaise,' which he published at Paris in 1822. He followed his scientific pursuits in that metropolis, and four years later produced the first part of his 'Atlas Ethnographique du Globe, ou Classification des Peuples Anciens et Modernes d'après leurs Langues,' a work of superior arrangement, in which he spread before the French public the result of the researches and disquisitions of the German philologists. He published afterward, in concert with several scientific men, statistical tables of Russia, France, the Netherlands, etc. He now gave all his attention to his 'Abrégé de Géographie Rédigé sur un Plan Nouveau,' a summary of geographical science which appeared in 1832 and has been translated into nearly all the European languages. Then he retired to Padua, where he published, in 1835, his 'Essai sur les Bibliothèques de Vienne.' Beside the works above-cited mention may be made of 'La Monarchie Française Comparée aux Principaux États de l'Europe' (Paris, 1828); 'Balance Politique du Globe' (1828); 'L'Empire Russe Comparé aux Principaux États du Monde' (1829); 'The World Compared with the British Empire' (1830); 'Statisque Comparée de l'Instruction et du Nombre des Crimes' (1829). Balbi was also a contributor to many important publications, 'L'Encyclopédie des Gens du Monde' and 'Le Dictionnaire de la Conversation.' His works show a great amount of knowledge, thorough research, and skilful arrangement of material; but, being utterly deficient in style, they are heavy and of difficult reading; however, they may always be advantageously and safely consulted.

Bal'bi, Gasparo, Venetian dealer in precious stones, who lived in 16th century. He traveled first to Aleppo and thence down the Euphrates and Tigris to the Malabar coast, sailing finally for Pegu, where he remained two years. His 'Viaggio all' Indie Orientale,' published on his return to Venice in 1590, contains the earliest account of India beyond the Ganges.

Balbi, Giovanni, called DE JANUA or JANUENSIS, from his birthplace, Genoa, a Dominican friar, who lived toward the end of the 13th century. He composed a kind of encyclopædia, which he called the 'Catholicon.' This book owes its celebrity principally to the fact that it has become one of the earliest monuments of the art of printing. The original edition is to be found under the title, 'Summa Grammaticalis valde Notabilis quœ Catholicon Nominatur' (Moguntiæ, per Johannem Faustum, 1460, fol.). It was reprinted at Augsburg, 1469 and 1472, by Schoeffer; at Nuremberg, 1483, by Koburger; at Venice, 1487, revised and improved, by Pietro Gilles.

Balbi'nus, Decimus Cælius, Roman senator and poet. After the death of the two Gordiani, killed by the soldiers of Maximinus, he was elected emperor by the Senate, concurrently with Clodius Pupienus Maximus, in opposition to the usurper Maximinus. The two emperors reigned little more than one year, and were assassinated by their soldiers 238 A.D.

Bal'bo, bäl'bō, Cesare, Count, Italian statesman and author: b. Turin, 21 Nov. 1789; d. 3 June 1853. Through the favor of Napoleon he was appointed auditor to the French privy council in 1807, and afterward became secretary to the French commissioners charged with the organization of Tuscany and the Papal States. In 1812 he was promoted to the office of commissioner of Illyria, and after the downfall of Napoleon became secretary of the Sardinian ambassador in London until the outbreak of the Sardinian revolution in 1821, when he returned to his native town in order to devote himself to literary pursuits. He wrote a history of Italy up to the time of Charlemagne, and translated Heinrich Leo's 'Exposition of the Municipal Institutions of Lombardy,' from German into Italian, under the name of 'Comuni Italiani.' His reputation was not firmly established, however, until the latter year, when his 'Speranze d'Italia' made its appearance. His appeal in favor of a national independence found a powerful echo in the popular heart, and paved the way for the revolution in which he was destined to play a prominent part as a champion of the moderate party. His next work, printed at Bastia, in 1849, 'Della Storia d'Italia, dall' Origine Fino al 1814' (History of Italy, from the Beginning to 1814), was not only inspired by the same patriotic spirit, but also distinguished by historical merit. But although in 1848 and 1849 he had strenuously opposed the democratic party and unwaveringly adhered to a more conservative policy, he threw the entire weight of his political influence into the scale of patriotism as soon as the war against Austria began. He supported the different cabinets which governed Sardinia after the promulgation of the constitution of 4 March 1848, and, though for a very short time, was personally connected with the government. He became a regular contributor to the *Risorgimento*, a leading paper of Turin, and in it gave a constant support to D'Azeglio's administration.

Balboa, bäl-bō'a, Vasco Nuñez, the discoverer of the Pacific Ocean: b. Jerez de los Caballeros, Spain, 1475; d. 1517. At the age of 25 he went to America to seek his fortune, joining the expedition of Rodrigo de Bastidas (see CENTRAL AMERICA), and returned to Española, (Haiti), after exploring with Bastidas a part of the southwestern coast of the Caribbean Sea. At the town of Salvatierra in Española he became a planter, but with such indifferent success that, when he resolved to attach himself

to Alonzo de Ojeda's new colony on the mainland of South America, he found difficulty in escaping from his creditors. To elude their vigilance, he hid in a large cask, and thus was carried from his plantation to the landing, and thence on board one of Ojeda's vessels, as a part of the cargo. It is probable that when he emerged from his place of concealment he would have been handed over to the authorities on shore if the expedition had not stood in need of every available fighting-man. Admitted to membership reluctantly, and as a common soldier, Balboa showed his talent for leadership when the undertaking seemed on the point of failure. He suggested transferring the colony to Darien, describing the more favorable conditions there, as he had seen them on his previous voyage. His advice was taken, and the name Antigua (Santa Maria de la Antigua del Darien) was given to the new settlement. Here the Spaniards were somewhat more successful and Balboa assumed command.

In the year 1513 he received a letter from a commissioner whom he had sent to Spain, informing him that he might expect to be summoned to court to answer grave charges. Resolving to win back the royal favor by some striking service, he selected 190 men, the best of his soldiers, and with these and 1,000 native warriors and carriers, and a pack of bloodhounds, sailed from Antigua, 1 September 1513, following the Darien coast westward until he reached a point opposite the Gulf of San Miguel. This gulf extends far into the south coast from the Pacific, narrowing the isthmus to a width of 50 miles. Accurate information in regard to the southern coast, the ocean that lay beyond, and the superior civilization of the Incas of Peru, whose country was to be reached by way of this ocean, had been obtained from the Indians, especially through Balboa's favorite Indian mistress, Fulvia.

The march began 6 September. On the 24th reaching an elevated plateau, the Spaniards repulsed an attack by 1,000 Indians and found supplies in the village of Quarequá. The following day, 25 September 1513, Balboa gained the summit of a mountain from which the waters of Mar del Sur (southern sea) were visible. The name, Pacific, was not applied to this ocean until seven years later, when it was bestowed by Magellan. On 29 September Balboa took formal possession of the «Southern Sea» by marching into the water, and, in the names of the king and queen of Castile, claiming «these seas and lands.»

The warning received from the Spanish court was justified in the event. Balboa had already been superseded by Pedrarias. The reward of the former was an empty title of Adelantado of the Southern Sea; while on shore he was made the subordinate of his rival and bitter enemy, Governor Pedrarias. Three years later a South Sea expedition was in prospect, and Balboa, instead of Pizarro, might have been the conqueror of Peru; but the governor's jealousy was aroused, and Balboa was executed at Acla.

MARRION WILCOX,
Authority on Latin-America.

Balbrig'gan, a watering place in County Dublin, Ireland, 21 miles north of Dublin. It is a seat of linen, cotton, calico, and stocking manufactures. The cotton stockings made here are remarkable for fineness of texture and beauty of open work. Many women are employed in embroidering muslin.

Balbus, Lucius Cornelius, Roman officer, sometimes surnamed MAJOR, to distinguish him from his nephew (see below): b. Gades, Iberia, in the 1st century. He served his first campaign under Q. Metellus Pius and Pompey. For his conduct in this war the privileges of a Roman citizen were conferred on him, his brother, and his nephews. In 72 B.C. Balbus removed to Rome, and soon became an intimate friend of Cæsar. He was consul in 40 B.C., and is supposed to have been the first adopted citizen to fill that office. He wrote a diary in which he described the chief events in his own and Cæsar's life.

Balbus, Lucius Cornelius (MINOR), nephew of the above, a Roman officer, who in acknowledgment of a victory gained in Africa, was awarded the honor of a triumph, the first ever paid to one not born in Rome.

Balch, George Beall, American rear-admiral: b. Tennessee, 3 Jan. 1821. He was appointed to the navy from Alabama 1837, was promoted passed midshipman 1843, and served through the Mexican war. He was with Commodore Conner's squadron in the first attack on Alvarado, with the mosquito fleet under Commodore Tatnall, and at the bombardment and surrender of Vera Cruz. As a lieutenant on the Plymouth he was with the Asiatic squadron 1851–5, and received a hip wound in a fight between the rebels and imperialists at Shanghai, China. During the Civil War he commanded the Pocahontas and Pawnee, taking part in numerous engagements with the Confederate batteries, chiefly in South Carolina. He became captain, 25 July 1866; commodore, 13 Aug. 1872; rear-admiral, 5 June 1878; and was retired in 1883.

Balcony, a gallery or framework of wood, iron, or stone, projecting from the front of a house, generally on a level with the floors of rooms, and supported on cantilevers or brackets, and sometimes on columns of wood or stone. Balconies are often surrounded by iron railings or stone balustrades. The etymology of the word has been frequently traced to the Greek *βαλλειν,* to throw. This rests upon the presumption that balconies were built originally for purposes of defense, the enemy being attacked with missiles thrown upon him from the balcony. The Latin word is *balcus* or *palcus,* the Italian *balcone,* also *balco* or *palco,* the Turkish *bala-khaneh,* the German *balcon.* The use of balconies is comparatively modern, although there is no doubt about their existence in times of antiquity. Winckelmann, the great German writer upon art, refers to the fact that in Greece every private dwelling-house had contrivances which, although then designated under different terms, would be called balconies in our day. In Spain, Italy, and South America, they are used for sitting, walking, chatting, and flirting, in warm summer evenings; but they are less common in northern countries, where the nature of the climate does not call for such romantic contrivances. They are, however, often used as miniature gardens for potted plants. Upon Boccaccio and Bandello, the great Italian novelists of the 16th century, the poetical utility of balconies was not lost, and entertain-

ing balcony scenes abound in their stories. Shakespeare took his plot of Romeo and Juliet from one of Bandello's novels, and the balcony scene exhibits, with that power of genius of which the great English dramatist alone was capable, the beauty of a balcony when two young lovers like Juliet and Romeo make it the witness of their passion.

In modern theatres the term is applied to the first or second gallery or tier of seats above the pit.

Bald Cypress. See CYPRESS.

Bald Eagle, the American white-headed eagle. See EAGLE.

Bald Mountain, the name of several eminences in the United States, of which the following are the principal: (1) In Colorado, height, 11,493 feet; (2) in California, 8,295 feet; (3) in Utah, 11,975 feet; (4) in Wyoming, in the Wind River Range, 10,760 feet; and, (5) in North Carolina, 5,550 feet. The last named was the cause of much excitement in May 1878, because of inexplicable rumblings which lasted for about two weeks. The mountain shook as if in the throes of an earthquake, immense trees and rocks were hurled down its sides, and for a time fears were entertained lest a volcanic eruption should follow. A subsequent examination showed that a large section of the mountain had been split asunder, but no further disturbance occurred.

Baldachin, băl'dą-chĭn. See ALTAR.

Balde, Jakob, bäl'dā, yä'cōb, German Latin poet: b. Ensisheim, Alsace, 1604; d. Neuburg, on the Danube, 1668. He was court-chaplain to the prince electoral of Bavaria, and distinguished himself by the excellence of his Latin poetry. Herder called attention to the beauty and genius of his lyrical productions, many of which he translated.

Balder, bâl'dėr, or **Baldur,** in Norse mythology a divinity, represented as the son of Odin and Frigga, beautiful, wise, amiable, and beloved by all the gods. His mother took an oath from every creature, and even from every inanimate object, that they would not harm Balder, but omitted the mistletoe. Balder was therefore deemed invulnerable, and the other gods in sport flung stones and shot arrows at him without harming him. But the evil god, Loki, fashioned an arrow from the mistletoe and got Balder's blind brother Höder to shoot it, himself guiding his aim. Balder fell dead, pierced to the heart, to the deep grief of all the gods. He is believed to be a personification of the brightness and beneficence of the sun.

Balderstone, bâl'dėr-stōn, **Caleb,** the old butler of the master of Ravenswood, in Scott's 'Bride of Lammermoor.'

Baldi, bäl'dē, **Benardino,** Italian scholar and poet: b. 1553; d. 1617. He was an accomplished linguist and a very prolific writer, and was abbot of Guastalla for 25 years. Among his numerous works are 'Cronica dei Matematici'; 'La Nautica,' a poem on navigation; an Arabic grammar; and a translation of the 'Targum of Onkelos.'

Baldness. Under the title ALOPECIA the general types of baldness have been considered. Premature alopecia, or the general affection of the young and middle-aged, deserves greater consideration. *Alopecia presenilis,* or premature baldness, is recognized as of two distinct varieties, the idiopathic and the symptomatic. In the idiopathic variety that occurs before the age of 45 there does not seem to be any disease of the scalp or of the general nutrition to explain it. It is a gradual and progressive loss of hair, thinner and thinner hairs replacing those that have fallen out, until the follicle will not produce hair. It is usually symmetrical, beginning at the tonsure or running back from the temples. The skin is usually left thin and hard.

In the symptomatic form some general disorder, or a definite disease of the scalp is the cause. This latter is usually a scaly dandruff; the general causes may be syphilis, tuberculosis, fevers or local destructive conditions. Dandruff (q.v.) is the most frequent accompaniment and cause of baldness. Dandruff is really at least three different diseases of the skin, but the general character is that of a general seborrheal dermatitis; that is, a mild inflammation with excessive fatty secretions. This is frequently due to digestive disturbances, and is closely dependent upon the general health of the entire body. The hair falls out as in the idiopathic form. The dandruff usually continues until the hair is gone, and then ceases.

Treatment should be begun early, particularly in those whose families have tended to baldness. The details of treatment require professional advice. The large number of hair-tonics in the market speaks well for the general inutility of all of them. Cleanliness, frequent dry-brushings, and shampoos once in every two or three weeks, are safe measures, and tend to keep up the general hygiene of the scalp. Consult Jackson, 'Diseases of the Skin' (1900). See DANDRUFF.

Baldo, Monte, a mountain in Lombardy, Italy, near Lake Garda, with an elevation at its highest peak of 7,275 feet.

Baldovinetti, bäl'dō-vē-nĕt'tē, **Alessio,** Florentine artist: b. 1422; d. 1499. Few of his works remain except a 'Nativity' in the Church of the Annunziato, and two altar-pieces in the gallery of the Uffizi and the Academy of Arts, Florence.

Baldpate, or **Baldhead,** the name of several different birds having a white head, as an eagle, one of the widgeons, a kind of domestic pigeon, a West Indian dove, a fruit-crow, etc.

Baldric, bâl'drĭk, a belt or sash worn over the right or left shoulder diagonally across the body, often highly decorated and enriched with gems, and used not only to sustain the sword, dagger, or horn, but also for purposes of ornament and as a military or heraldic symbol. The fashion of wearing a baldric appears to have reached its height in the 15th century. In the United States it now forms a part of the uniform of Knights Templar and other fraternal organizations.

Balducci, bäl-dō'chē, **Francesco,** leading Italian Anacreontic poet: b. Palermo; d. Rome, 1642. He wrote 'Sicilian Songs' in the Sicilian dialect, etc.

Baldung, bäl'dŭng, **Hans,** or **Hans Grün,** German painter and wood engraver: b. Suabia, 1470; d. Strasburg, 1522. His work, though inferior to Durer's, possessed many of the same

characteristics, and on this account he has been sometimes considered a pupil of the Nuremberg master. His principal paintings are the series of panels (of the date of 1516) over the altar in Freiburg Cathedral; others of his works are to be found at Berlin, Colmar, and Basel. His numerous and often fantastic engravings have the monogram H. and B., with a small G. in the centre of the H.

Bald'win I., king of Jerusalem. He was the son of Eustace, Count of Bouillon, and accompanied his brother Godfrey of Bouillon into Palestine, where he gained the sovereignty of the state of Edessa. He succeeded his brother on the throne of Jerusalem in 1100, and for 18 years waged war against the Turks, the Arabs, the Persians, and the Saracens. He took many towns and secured for the Christians the coast of Syria from the Gulf of Issus to the confines of Egypt. He died at Laris, in the desert in 1118, and was buried on Mount Calvary. In the first canto of Tasso's 'Gerusalemme Liberata,' the poet has depicted the character of this monarch as well as that of his brother, Godfrey.

Bald'win I., the first Latin emperor of Constantinople, son of Baldwin VIII., Count of Flanders and Hainault: b. Valenciennes, 1170. In 1200 he joined the crusaders with his brother, Thierry, and in 1202 aided the Venetians in their attack upon Constantinople, of which city he was crowned emperor 16 May 1204. In the next year Baldwin was taken prisoner by the king of Bulgaria, and, it is said, died in captivity in 1206. He was much esteemed by the Greeks for his charity, temperance, and justice.

Bald'win II., king of Jerusalem, son of Hugh, Count of Rethel. He was crowned in 1118, after Eustace, brother of Baldwin I., had renounced all claim to the vacant throne. In 1120 he gained a great victory over the Saracens, but in 1124 he was taken prisoner by them, and was ransomed only by giving up the city of Tyre. In 1131 he abdicated in favor of his son-in-law, Foulques of Anjou, and retired to a monastery, where he died in the same year. The military and religious order of the Templars, for the defense of the Holy Land, was instituted, it is thought, in the reign of this monarch.

Bald'win II., the last Frank emperor of Constantinople: b. 1217; d. 1273. He was the son of Pierre de Courtenay, and succeeded his brother Robert in 1228. He was twice besieged in his imperial city, and, being too weak to defend his dominions, repaired to Italy to seek aid from the Pope. At the court of France Baldwin was favorably received by the king, St. Louis, to whom he presented a crown of thorns which was held by all Christendom to be the genuine relic. Baldwin, in 1239, set out for Constantinople with a body of crusaders, who, however, soon quitted him and took the route to Palestine. He succeeded, ultimately, in raising new forces in the West, and regained his capital; but in 1261 Michael Paleologus invested it and entered Constantinople on the 29th of July. Baldwin fled to Sicily, where he died in obscurity.

Bald'win III., king of Jerusalem: b. 1130; d. Antioch, 1162. He was son of Foulques of Anjou, whom he succeeded in 1142 under the guardianship of his mother. He took Ascalon and other places; but under his reign the Christians lost Edessa. He was succeeded by his brother, Amaury I.

Bald'win IV., king of Jerusalem: d. 1185. He was son of Amaury, and succeeded to the throne on the death of his father in 1174; but as he was leprous, Raymond, Count of Tripoli, governed the kingdom for him. He afterward resigned the throne to his nephew, Baldwin V., in 1183.

Baldwin V., king of Jerusalem: b. 1178; d. 1186. He was son of Sibylla, sister of Baldwin IV., and was called to the throne when five years old. He died of poison, supposed to have been administered by his mother in order that her second husband, Guy de Lusignan, might enjoy the throne. The following year, 1187, the Christians lost Jerusalem, which was taken by Saladin.

Baldwin, Abraham, American statesman: b. Guilford, Ct., 6 Nov. 1754; d. 1807. He was graduated at Yale in 1772, and was tutor there, 1775–79. During the American Revolution he was a chaplain in the army, and, at the suggestion of General Greene, settled in Savannah, Ga., 1784, where he was admitted to the bar. His efforts as a member of the legislature secured a charter and endowment for the University of Georgia, which was established according to his own plans and ideas, and of which he became president. He took part in the Constitutional Convention of 1787; was a delegate to the Continental Congress 1785–88; member of the House of Representatives 1789–99; United States senator 1799, until his death.

Baldwin, Charles H., American naval officer: b. New York city, 3 Sept. 1822; d. 17 Nov. 1888. He entered the navy as a midshipman in 1839. Serving on the frigate Congress during the war with Mexico, he figured in several sharp encounters near Mazatlan. He commanded the steamer Clifton at the passage of Forts Jackson and St. Philip in 1862, and at the first attack on Vicksburg. He became rear-admiral in 1883, receiving the command of the Mediterranean squadron, and was retired in 1884.

Baldwin, Evelyn Briggs, arctic explorer: b. Springfield, Mo., 22 July 1862. He was graduated from Northwestern College, Naperville, Ill., and engaged chiefly in teaching until 1892, when he entered the United States Weather Bureau service. He is now an inspector-at-large of the signal corps of the United States army. He accompanied, as meteorologist, Peary's North Greenland expedition, 1893–4; joined the Wellman Polar expedition, 1898–99, as second in command, built Fort McKinley, and discovered Graham Bell Land. Securing the co-operation of Mr. William Ziegler of New York he organized and commanded the Baldwin-Ziegler expedition of 1901. He has written 'The Search for the North Pole,' 'Auroral Observations, Franz-Joseph Land,' 'Meteorological Reports of the North Greenland Expedition' (1893–4), and meteorological publications in government reports.

Bald'win, Frank D., American military officer: b. Michigan, 26 June 1842. He entered the volunteer army in 1861 and the regular army in 1866; became colonel of the 4th United

States Infantry, 26 July 1901; and was promoted brigadier-general, United States army, 9 June 1902. He was awarded a Congressional medal of honor for service at the battle of Pine Tree Creek, Ga., 20 July 1864, and another for gallantry in an action against Indians in Texas. He greatly distinguished himself in the Philippines in the early part of 1902.

Bald'win, Henry, American jurist and author: b. New Haven, Conn., 14 Jan. 1780; d. Philadelphia, Pa., 21 April 1844. A graduate from Yale College in 1797, he studied law, became a barrister, and settled in Pittsburg, Pa. In 1817, and twice subsequently, he was elected a Federal member of Congress. He was appointed justice of the United States Supreme Court in 1830, and in the same year received the degree of LL.D. from his *alma mater*. He wrote 'A General View of the Origin and Nature of the United States' (1837).

Baldwin, Henry Porter, American politician: b. Coventry, R. I., 22 Feb. 1814; d. Detroit, Mich., 31 Dec. 1892. He went to Michigan in his youth and from 1869 to 1873 was governor of the State. From 1879 to 1881 he sat in the United States Senate. He was very prominent in the affairs of the Episcopal Church in Michigan.

Baldwin, James, American author: b. Hamilton County, Ind., 15 Dec. 1841. Very largely self-taught, he was engaged in teaching from 1865 to 1887. He filled an editorial position with Harper & Bros. 1887–93, when he became editor of school books for the American Book Co. He has written: 'Story of Siegfried' (1882); 'Story of Roland' (1883); 'Six Centuries of English Poetry' (1892); 'Old Greek Stories' (1895), etc.

Baldwin, James Mark, American psychologist: b. Columbia, S. C., 12 Jan. 1861. He was educated at Princeton College, Leipsic, Berlin, and Tübingen universities; was instructor of German and French at Princeton 1886–87; professor of philosophy in Lake Forest University 1887–89, and in the University of Toronto 1889–93; and professor of psychology at Princeton University since 1893. He was vice-president of the International Congress of Psychology at London 1892; honorary president of the International Congress of Criminal Anthropology at Geneva 1896; president of the American Psychological Association 1897–98; judge of award at the World's Columbian Exposition 1893; was awarded a gold medal by the Royal Academy of Arts and Sciences of Denmark, in 1897, for the best work on the general question of social ethics; and was elected a member of the Institut International de Sociologie 1898. He is author of 'Handbook of Psychology' (2 vols., 1889–91); a translation of Ribot's 'German Psychology of To-day' (1886); 'Elements of Psychology' (1893); 'Social and Ethical Interpretations in Mental Development' (1897), etc. He was also one of the founders of the 'Psychological Review,' editor-in-chief of the 'Dictionary of Philosophy and Psychology,' and a contributor of articles on psychology to 'Johnson's Universal Cyclopædia' (1892–95).

Baldwin, John Denison, American journalist, politician, poet, and writer on archæology: b. North Stonington, Conn., 28 Sept. 1809; d. 8 July 1883. After studying law and theology he entered journalism, was long editor and proprietor of the Worcester *Spy*, and was a member of Congress 1863–69. He wrote 'Raymond Hill, and Other Poems' (1847); 'Prehistoric Nations' (1869), and 'Ancient America' (1872).

Baldwin, Joseph G., American jurist: b. Sumter, Ala. 1815; d. 30 Sept. 1864. He was a judge of the superior court of California in 1857–63; chief justice of the State from 1863 till his death, and author of 'Party Leaders' and 'Flush Times in Alabama and Mississippi.'

Baldwin, Maurice Scollard, Canadian clergyman: b. Toronto, 21 June 1836. He was graduated at Trinity College in that city 1862; became rector of St. Luke's Church in Montreal; was dean of Montreal 1882–83; and in the last year was made Bishop of Huron. He published 'Break in the Ocean Cable' 'Life in a Look,' etc.

Baldwin, Robert, Canadian statesman: b. Toronto, 12 May 1804; d. there, 9 Dec. 1858. He began to practise law in 1825, and four years later became a member of the Assembly of Upper Canada. He was solicitor-general in 1840 and premier and attorney-general of Upper Canada 1842–43. He was long prominent as a Reform leader in Canada, but retired from office in 1851.

Baldwin, Simeon Eben, American jurist: b. New Haven, Conn., 5 Feb. 1840. He is a great-grandson of Roger Sherman, a signer of the Declaration of Independence, and great-great-grandson of President Clap, of Yale. His father was a United States senator and governor of Connecticut. Judge Baldwin graduated from Yale 1861, and from the Harvard Law School 1863. Settling in New Haven he rapidly acquired a large general practice, in which he continued until 1893. Since 1872 he has held a professorship in the Yale Law School, and since 1893 he has been an associate justice of the Connecticut supreme court of errors. As a legal writer he has a wide reputation in the United States and abroad, through his contributions to leading law journals. He is the author of 'Digest of Connecticut Reports' (2 vols. 1871–82; revision, 2 vols. 1900); 'Illustrated Cases on Railroad Law'; and 'Modern Political Institutions' (1899).

Baldwin, Stephen Livingston, American missionary: b. 1835; d. 1902. He went to China as a missionary under the auspices of the Methodist Episcopal Church, and on his return to the United States he held several pastorates. While in China he translated a large part of the Bible into Chinese, and, it is said, printed the first copy of the Bible in that language.

Baldwin, Theodore A., American military officer: b. New Jersey, 21 Dec. 1839. He entered the army as a private 3 May 1862, and served in that grade and as quartermaster-sergeant in the 19th U. S. Infantry till 31 May 1865, when he became first lieutenant. He was promoted captain 23 July 1867; major, 7th Cavalry, 5 Oct. 1887; lieutenant-colonel, 10th Cavalry, 11 Dec. 1896; and colonel, 7th Cavalry, 6 May 1899. From 6 Oct. 1898 till 31 Jan. 1899 he served as a brigadier-general of volunteers.

Baldwin, Thomas, Baptist minister: b. Norwich, Conn., 23 Dec. 1753; d. 29 Aug. 1825. His early culture was very limited; yet he acquired a reputation for scholarship. At an

early age he removed to Canaan, N. H., where, becoming converted, he joined the Baptist Church in 1781 and became one of the most energetic supporters of its tenets, and one of the ablest advocates of its civil rights. In 1782 he was licensed to preach, and in 1783 was ordained pastor of the church in Canaan, serving for seven years. In 1790 he was called to the Second Baptist Church of Boston and served there till his death. He took a prominent part in the establishment of Waterville College, Me., and of Columbian College, Washington, D. C. He was several times elected to the State legislature and was a member of the convention of 1821 to revise the Massachusetts Constitution. He published a volume in defense of Baptist tenets.

Baldwin, William Henry, American capitalist and philanthropist: b. Boston, Mass., 5 Feb. 1863; d. Locust Valley, L. I., 2 Jan. 1905. He was graduated at Harvard College in 1885, and studied for a year at the Harvard Law School. He then entered the Omaha auditor's office of the Union Pacific Railway as a clerk; in less than a year he was promoted general traffic manager at Omaha; in 1888 he became assistant general freight agent for the Union Pacific; in 1889–90 he was president of the Montana Union Railroad; and in 1890 was elected assistant vice-president of the Union Pacific. In 1891 he entered the service of the Flint & Pere Marquette Railroad as general manager; and in 1894 became third vice-president of the Southern Railway, and in 1895 second vice-president and general traffic manager of the same road. In 1896 he was chosen president of the Long Island Railroad; his administration was particularly efficient and marked by a rapid growth of the road, and the completion of a number of improvements. He was actively interested in reform movements in New York city, and served as chairman of the Committee of Fifteen appointed in 1900; and was also a leader in the Southern educational movement, being president of the General Education Board, a member of the Southern Education Board, and a trustee of Tuskegee Institute.

Bale, John, an English ecclesiastic: b. Suffolk, 1495. Although educated a Roman Catholic, he became a Protestant, and had to take refuge in the Netherlands. On the accession of Edward VI. he returned to England, was presented to the living of Bishop's Stoke, Southampton, and soon after was nominated Bishop of Ossory, in Ireland. Here, on preaching the reformed religion, popular fury reached such a pitch that in one tumult five of his domestics were murdered in his presence. On the accession of Mary he lay some time concealed in Dublin. After enduring many hardships he was enabled to reach Switzerland, where he remained till the death of Mary. On his return to England he contented himself with the calm enjoyment of a prebendal stall at Canterbury, where he closed his stormy life in 1563. He was so bitter a controversialist that he earned the title of «Bilious Bale.» The only work which has given him distinction among authors is his 'Scriptorum Illustrium Majoris Britaniæ Catalogus'; or 'An Account of the Lives of Eminent Writers of Britain.' This account, which, according to the title, commences with Japhet the son of Noah, reaches to the year 1557, at which time the author was an exile on the Continent. It is compiled from various writers, but chiefly from the antiquary Leland.

Bâle, bäl. See Basel.

Balearic (băl-ē-ăr'ĭk) **Crane.** See Crane.

Bal'earic Islands, a group of five islands, southeast of Spain, including Majorca, Minorca, Iviza, and Formentera. The popular derivation of the ancient name Baleares (Greek *ballein,* to throw), has reference to the repute of the inhabitants for their skill in slinging, in which they distinguished themselves both in the army of Hannibal and under the Romans, by whom the islands were annexed in 123 B.C. After being taken by the Vandals under Genseric, and in the 8th century by the Moors, they were taken by James I., king of Aragon, 1220–34, and constituted a kingdom which in 1375 was united to Spain. The islands now form a Spanish province, with an area of 1,860 square miles. Pop. (1897) 306,926.

Baléchou, bä-lā-shoo, **Jean Jacques Nicolas,** celebrated French engraver: b. Arles, 1715; d. Avignon, 18 Aug. 1765. His full-length portrait of Augustus, king of Poland, has been proclaimed the masterpiece of the kind in the 18th century. But Baléchou dishonestly sold the best proofs for his own benefit, and was consequently expelled from the Academy of Fine Arts.

Baleen'. See Whalebone.

Baleen Whales, the group of whales whose mouths are furnished with a growth of baleen or whalebone (q.v.). They form a sub-order *Mysticeti* of the *Cetacea,* which includes the families *Balænopteridæ* or rorquals, and *Balænidæ,* the right whales. These whales are known in all oceans and form an important object of the chase. See Humpback; Right Whale; Rorqual; Whale; etc.

Bal'er, Philippines, a town in the northeast part of Luzon. The population is several thousand, mostly natives. The most conspicuous edifice is a native Catholic church. The town is noted for the heroic defense of a Spanish garrison in 1899, during a siege by the Filipinos, lasting 11 months. The Spaniards were commanded by Lieut. Saturnino Martin Cerezo, who refused to surrender the town, even when directed to do so by his superiors in Manila. He entrenched himself in the church and heroically resisted the besiegers until his supplies gave out, when he surrendered with all the honors of war, 2 July 1899. Baker was occupied by the American troops and garrisoned with two companies of the 34th Volunteer Infantry, under Major Shunk, in March 1900.

Balestier, băl-ĕs-tēr', **Charles Wolcott,** American novelist: b. Rochester, N. Y., 13 Dec. 1861; d. 6 Dec. 1891. He studied at Cornell University, and became connected with a New York publishing house. His writings, which deal largely with frontier life in Colorado, include 'The Naulahka,' written in collaboration with Rudyard Kipling, his brother-in-law; 'Benefits Forgot' (1892), and a 'Life of James G. Blaine.'

Balestra, bą-lĕs'trą, **Antonio,** an Italian painter: b. Verona, 1666; d. there, 21 April 1740. He became a pupil of Belucci, in Venice, and subsequently studied in Rome under Carlo Maratti. He executed the 'Defeat of the Giants,' which took the prize at the Academy of St. Luke in 1694. In 1695 he left Rome for Venice, where he became the head of a school, and counted many distinguished names among his pupils. His works are found in many of the galleries and churches of northern Italy. Among his paintings are 'Saint Theresa,' at Bergamo, a 'Virgin,' at Mantua; and a portrait of himself, at Florence. He was among the last of the Venetian school of artists.

Balfe, bălf, **Michael William,** British composer: b. Dublin, 15 May 1808; d. 20 Oct. 1870. He received his first instructions in music from his father and Charles Horn. In his 7th year he performed one of Viotti's concertos before the public; at 16 he performed the part of the Wicked Huntsman in 'Der Freischütz' at Drury Lane. In 1825 he went to Italy, wrote the music for a ballet, 'La Peyrouse,' for the Scala at Naples, and in the following year fulfilled an engagement to sing at the Théâtre-Italien, Paris, with moderate success. He returned to Italy, and at Palermo (1830) his first opera, 'I Rivali,' was produced. For five years, with somewhat careless haste, he continued singing and composing sundry operas for the Italian stage, which are now forgotten. In 1835 he came to England and had his 'Siege of Rochelle' brought out at Drury Lane. It hit the popular taste, and was quickly followed by others equally successful in this respect. Part of this success was no doubt due to the great artistes who took the leading characters, Malibran, Grisi, Lablache, Rubini, and other stars of that time; but the works had high merits of their own, being marked by brilliancy, melody, and fertility of invention. In 1846 he was appointed conductor of the London Italian Opera. If Balfe was wanting in depth and dramatic force, he had a very thorough knowledge of effects and command of orchestral resources; and his compositions are distinguished by fluency, facility, and melodic power. His operas continue popular in England and elsewhere, among the chief being 'The Bohemian Girl' (the most popular of all), 'The Rose of Castile'; 'The Daughter of St. Mark'; and 'Satanella.' His posthumous opera, 'The Talisman,' was brought out in London in June 1874, with great success.

Balfour, băl'foor, or băl'fêr, **Alexander,** Scottish novelist and poet: b. Monikie, 1 March 1767; d. 12 Sept. 1829. He was a frequent contributor to periodicals, and was author of 'Campbell; or the Scottish Probationer' (1819); 'Contemplations, and Other Poems' (1820); 'Farmer's Three Daughters' (1822); 'The Foundling of Glenthorn; or the Smuggler's Cave' (1823); 'Highland Mary' (1827), etc.

Balfour, Sir Andrew, Scottish botanist and physician: b. Fifeshire, 1630; d. 1694. After completing his studies at St. Andrews and London, and traveling on the Continent, he settled at Edinburgh, where he planned, with Sir Robert Sibbald, the Royal College of Physicians, and was elected its first president. Shortly before his death he laid the foundation of a hospital in Edinburgh, which, though at first narrow and confined, expanded into the Royal Infirmary. His familiar 'Letters' were published in 1700.

Balfour, Right Hon. Arthur James, English statesman: b. Scotland (son of Mr. Balfour of Whittinghame, Haddingtonshire, and a daughter of the second Marquis of Salisbury) 25 July 1848. He was educated at Eton and Trinity College, Cambridge, where he took his M.A. degree in 1873. He entered Parliament in 1874, sitting for Hertford from that time till 1885, since which he has represented East Manchester. He acted as private secretary to his uncle the Marquis of Salisbury at the Foreign Office during the period to which the Berlin Treaty belongs (1878–80), and accompanied him to Berlin. He was president of the Local Government Board from June 1885 till the beginning of the following year, and from July 1886 till March 1887 he discharged the duties of secretary for Scotland. He showed much ability as chief secretary for Ireland 1887–91, passing the Crimes Act and the Law Act, securing a free grant for railways, and creating the Congested Districts Board, but resigned this post in order to succeed Mr. W. H. Smith, who had lately died, as leader of the House of Commons and first lord of the treasury. On the defeat of the Unionist party at the general election in 1892 he relinquished this office, but returned to it when the Unionists again came into power in the autumn of 1895. On the resignation of Lord Salisbury 12 July 1902 Mr. Balfour became prime minister, but resigned with his Cabinet on 4 Dec. 1905. He was returned to Parliament from London on 27 Feb. 1906, by a majority of 11,340. In 1886 he was elected lord rector of St. Andrew's University, in 1890 the Glasgow students did him similar honor and in 1888 he became a Fellow of the Royal Society. He acted as chairman of the commission on the subject of bimetallism in 1887. In 1879 he published 'A Defense of Philosophic Doubt'; in 1893 a volume of 'Essays and Addresses'; and in 1895 'The Foundations of Belief, being Notes Introductory to the Study of Theology.'

Bal'four, Francis Maitland, embryologist: brother of the foregoing, b. 1851. He studied at Harrow and Trinity College, Cambridge. Articles on his special study gained him a high reputation while still an undergraduate, and after further work at Naples he published in 1874, in conjunction with Dr. M. Foster, 'Elements of Embryology, a valuable contribution to the literature of biology. He was elected a fellow of his college; fellow and member of council of the Royal Society; lecturer on, and finally, in 1882, professor of, animal morphology at Cambridge, a chair specially instituted for him. The promise of his chief work, 'Comparative Embryology' (1880–1) was unfulfilled, as 19 July 1882 he was killed by a fall on Mont Blanc.

Balfour, Right Hon. Gerald William, English statesman: b. 1853 (brother to the two preceding). He was educated at Eton and Trinity College, Cambridge, entered Parliament in 1885, and was chief secretary for Ireland in the Unionist ministry from 1895–1900; and President of the Board of Trade, 1900–1905. He piloted the Irish Local Government Bill of 1898 through the House of Commons.

ARTHUR J. BALFOUR.

Balfour, Isaac Bayley, Scottish botanist: b. Edinburgh, 31 March 1853. He was professor of botany in the University of Glasgow 1879–84, at Oxford University 1884–88, and since 1888 at the University of Edinburgh. He explored the island of Socotra in 1880, in behalf of the British Association and of the Royal Society of Edinburgh. He is King's botanist in Scotland and keeper of the Royal Botanic Garden in Edinburgh.

Balfour, Sir James, Scottish lawyer, and a conspicuous actor in the civil wars which ended in the dethronement of Mary, Queen of Scots: b. Fifeshire, Scotland, about the beginning of the 16th century; d. 1583. Originally brought up in the Roman Catholic Church, he had espoused the Protestant cause, and in 1547, for his share in the conspiracy against Cardinal Beaton, he was, with Knox and other reformers condemned to the galleys. After his escape and return to Scotland, the cause of Protestantism was apparently declining, and Balfour abjured his heresies and returned to his former faith. His abilities and tact gained him appointments and he was high in office on the arrival of Mary in Scotland, and was with the queen at Holyrood on the night of Rizzio's assassination. Popular rumor assigned to Balfour a prominent share in the murder of Lord Darnley, Mary's husband, but he contrived to outlive all suspicion. In 1567 he was appointed captain of Edinburgh castle. A change in Balfour's convictions was forced upon him, for he saw that a powerful party had been formed against Mary and the policy of an alliance with them overcame all scruples. He held the castle of Edinburgh against the queen, and was the means of delivering up Mary's letters into the hands of her enemies. He afterward surrendered the castle for various considerations. On the breaking out of the civil war Balfour sided with the regent Murray, but after Mary's imprisonment in England he took part in conspiracies for her restoration, although at the time professing adherence to the regents Murray and Morton. His last public act was furnishing the evidence of Morton's guilt in the murder of Darnley, for which Morton was condemned and executed. The 'Practicks of Scots Law' attributed to him, continued to be used and consulted in manuscript for nearly a century until it was supplanted by the 'Institutes of Lord Stair.'

Balfour, James, Canadian architect: b. Hamilton, Ont., 1852. He acquired his education in Canada and Edinburgh and began the practice of his profession in his native city. Among notable buildings of his designing are the Boys' Home and City Hall, in Hamilton; Alma Ladies' College, St. Thomas; and the Museum of Art, Detroit, Mich.

Balfour, John (OF KINLOCK, or OF BURLEY), one of the chief actors in the assassination of Archbishop Sharp in 1679, for which his estate was forfeited and a price set on his head. He fought at Drumclog and Bothwell Bridge, and is said afterward to have escaped to Holland. According to one account he died on a homeward voyage to Scotland; by another he never left the country, but settled in the parish of Roseneath, Dumbartonshire. He is described by Scott in 'Old Mortality.' Balfour of Kinlock is quite a different personage from Lord Balfour of Burleigh, who succeeded to the title in 1663, spent his youth in France, and died in 1688.

Balfour, John Hutton, Scotch botanist: b. Edinburgh, 15 Sept. 1808; d. 11 Feb. 1884. He graduated at Edinburgh University in arts and in medicine; in 1841–5 was professor of botany in Glasgow University; and in the latter year removed to Edinburgh to occupy a similar post, resigning his chair in 1879. He wrote valuable botanical text-books, including 'Elements,' 'Outlines,' 'Manual,' and 'Class-book,' beside various other works.

Balfour, Nesbit, British military officer: b. Dunbog, Scotland, 1743; d. same place, October 1823. He was promoted lieutenant-general 1798 and general 1803; distinguished himself during the American Revolution; was wounded in the battle of Bunker Hill; fought at the battles of Elizabethtown, Brandywine, Germantown, and Long Island; and was present at the capture of New York. He was appointed commandant at Charlestown in 1779.

Balfrush, băl-frōōsh', or **Barfurush** ("mart of burdens"), a town in the Persian province of Mazanderan, on the river Bhawal, 12 miles from the Caspian Sea. Balfrush is a centre of trade between Russia and Persia, exporting large quantities of silk, rice, and cotton, while the Russians supply iron and naphtha. It has excellent bazaars, numerous caravanserais, and several Mohammedan colleges. Pop. about 50,000.

Balg, bălg, **Gerhard Hubert,** philologist: b. Scandinavia, about 1850. He graduated at the University of Wisconsin, and resides at Mayville, in that State. He has translated W. Braune's 'Gothic Grammar, with Selections and Glossary' (1883); edited 'The First Germanic Bible, and Other Remains of the Gothic Language with Introduction and Glossary' (1891); and compiled 'A Comparative Glossary of the Gothic Language, with Especial Reference to English and German' (1887–9).

Bali, bä'lē, or **Bally,** an island of the Indian Archipelago, belonging to Holland, and lying east of Java. Its greatest length is 85 miles; breadth, 55 miles; area, about 2,260 square miles. It consists chiefly of a series of volcanic mountains, of which the loftiest, Agoong (11,326 feet), became active in 1843 after a long period of quiescence. Principal products, rice, cocoa, coffee, indigo, cotton, etc. The people are akin to those of Java and are mostly Brahmins in religion. It is divided into eight provinces under native rajahs, and forms one colony with Lombok, the united population being estimated, in 1897, at 1,044,757.

Balikesri, bä-lē-kĕs'rē, **Balu-kissar,** or **Balik-Shehr,** a town of Anatolia, 75 miles southwest from Brusa. It is built of unburnt bricks and contains the tomb of a celebrated Mohammedan saint and a manufactory of felt cloth for military clothing. It has considerable trade in silk fabrics. Pop. over 12,000.

Ba'liling, a principality of the island of Bali; pop. 130,000. The exports are rice and bullocks, and the chief trade is with the Bughis of Celebes. In 1847 the Dutch were signally defeated in an attack upon the fort of Djaga Raga in this principality.

Balinag, bä-lē-näg′, Philippines, a town of the province of Bulacan, Luzon. Pop. (1898) 14,122.

Baliol, bā′lĭ-ŏl, **Edward,** a king of Scotland, son of John Baliol of Scotland; d. Doncaster, 1363. In 1322 he made a successful invasion of Scotland and on 24 September of that year was crowned king of Scotland at Scone. Having privately rendered homage to Edward III. of England, he was routed by a party of Scottish nobles and dispossessed of his crown after a reign of three months. He regained it the next year, but was henceforth an instrument of Edward.

Baliol, or **Balliol, John,** king of Scotland: b. about 1249; d. 1315. On the death of Princess Margaret of Norway, grandchild of Alexander III., in 1290, Baliol claimed the vacant throne by virtue of his descent from David, Earl of Huntington, brother to William the Lion, king of Scotland. Robert Bruce (grandfather of the king) opposed Baliol; but Edward I.'s decision was in favor of Baliol, who did homage to him for the kingdom, 20 Nov. 1292. Irritated by Edward's harsh exercise of authority, Baliol concluded a treaty with France, then at war with England; but, after the defeat at Dunbar, he surrendered his crown into the hands of the English monarch. He was sent with his son to the Tower, but, by the intercession of the Pope in 1297, obtained liberty to retire to his Norman estates, where he died.

Baliol, or **Balliol, John,** father of King John Baliol, an English baron in the reign of Henry III.: d. 1269. In 1263 he laid the foundation of Balliol College (q.v.), Oxford, which was completed by his widow, Devorguila or Devorgilla. She was daughter and co-heiress of Allan of Galloway, a great baron of Scotland, by Margaret, eldest daughter of David, Earl of Huntington, brother of William the Lion. It was on the strength of this genealogy that his son, John Baliol, became temporary king of Scotland.

Baliol, Martha Bethune, the imaginary narrator of several of Sir Walter Scott's 'Chronicles of the Canongate.'

Baliol College. See BALLIOL COLLEGE.

Balisarda, bä-lē-sär′dą, a magic sword in Ariosto's 'Orlando Furioso,' stolen from Orlando by Brunello, and afterward given to Rogero.

Balisaur, băl-ĭ-sä′oor (Hindu, *balloosoor*), the sand-badger of India, called by Hindus the pig-like badger or "sand-hog," on account of its long snout. See SAND-BADGER.

Balis'ta, or **Ballista,** a machine used in military operations by the ancients for hurling heavy missiles, thus serving in some degree the purpose of the modern cannon. The motive power appears to have been obtained by the torsion of ropes, fibres, catgut, or hair. They are said to have sometimes had an effective range of a quarter of a mile, and to have thrown stones weighing as much as 300 pounds. *Balistæ* differed from *catapultæ*, in that the latter were used for throwing darts.

Balize, bą-lēz′. See BELIZE.

Balkan băl-kän′, or bäl′kăn, **Mountains,** (anciently called *Hæmus*), a lofty and rugged mountain range, extending from Cape Emineh Burum on the Black Sea, in eastern Roumelia, in a westerly direction to the borders of Servia, and forming the southern boundary of the basin of the Danube. In the west it is connected with the much ramified mountain-system of the southeastern peninsula of Europe. Its length is over 200 miles; the average elevation is about 3,000 feet, but the group of the Khoja Balkans in the west have a mean height of 6,500 feet. The highest summit is Jumrukchal, 7,786 feet. The Balkan forms the watershed between the streams flowing northward into the Danube, and those flowing southward to the Ægean. The chief of the latter is the Maritza. The range, which has a gradual descent on the north, presents on the south a somewhat steep escarpment, and has always been considered the greatest natural bulwark of the Ottoman empire against enemies on the European frontiers. Yet in the Russo-Turkish war of 1877–8 the Russian troops managed to cross it without any great difficulty, although they had to encounter a stubborn resistance at Shipka Pass (4,370 feet). Here a Turkish army of 32,000 men surrendered to the Russians. The range now forms the southern frontier of Bulgaria, dividing it from eastern Rumelia. The whole of the southeastern peninsula of Europe is known as the Balkan Peninsula.

Balkan Peninsula, a region thus named after the Balkan (Turkish "high ridge"), the ancient Hæmus (Greek ὁ Αἷμος) an important mountain range in southeastern Europe. It is the southeasternmost of the three great southern peninsulas of Europe, each of which is named after the central mountain system forming its backbone; namely, the Tyrenean, the Apennine, and the Balkan peninsulas. The northern boundary of the latter is not as clearly defined as that of the other two great peninsulas separated from central Europe by the gigantic mountain barriers of the Pyrenees and the Alps. Assuming that rivers also form a natural boundary, the Balkan Peninsula ends on the right bank of the Danube and her tributaries, the Save and the Una; it is bounded on the west by the Adriatic and the Ionian seas, on the east by the Black or Euxine and the Ægean. In a broader designation, however, the northern boundary is assumed to be the parallel of 45° N., adding to the peninsula more than one half of Rumania (Wallachia and Dobrudja) and a part of Austria (Dalmatia and a section of Croatia). Excluding the territory between 45° N. and the Danube, the peninsula comprises an area of about 175,000 square miles, which contains European Turkey proper with Novibazar, a Turkish district under Austrian military control. Bosnia, and Herzegovina (temporarily occupied by Austria; Montenegro, Servia, Bulgaria, an autonomous and tributary principality, with eastern Rumelia, under the suzerainty of Turkey and Greece. No other country in Europe is so richly provided with gulfs and excellent harbors of commercial and naval strategic value. An archipelago of numberless islands, the Cyclades and Sporades of ancient fame, forms a continuous bridge between the Balkan Peninsula and Asia Minor. The Black Sea is connected with the Sea of Marmora through the Bosporus,

a channel about 20 miles long, and so narrow that Constantinople, at the southwest extremity of the Thracian Bosporus, is but one mile distant from the Asiatic city of Scutari, eastward across the Bosporus. The Sea of Marmora is linked with the Ægean by the Dardanelles with an average width between three and four miles. The Balkan Mountains, a continuation of the Carpathian Mountain system, extend in a varied formation from the Adriatic to the Euxine, breaking up in their advance eastward into several parallel chains with many more or less, strong spurs north and south; several ranges extend southward almost to the Ægean: the Perim Dagh and the ancient Rhodope Mountains or Despoto Dagh. They are frequently broken by defiles or passes of a different degrees of serviceableness as routes. The principal passes are the Nadir-Derbend, Karnabad, the Basardshik-Sophia, the Trajan, Rosalitha, and Shipka, the latter famed by the heroic struggles between the Russians and Turks in 1877. The principal range of the Balkans is thus divided into several sections, like the Etropol, Kodja, and Shipka Balkans, and forms the boundary between Bulgaria and Rumelia. The main elevation of the chain is from 4,000 to 5,000 feet, but it rises much higher in various parts, the loftiest elevation of 9,700 feet above sea-level being reached by Mount Scargus in the Char Dagh. The Balkans are rich in minerals, especially rock salt, lead, iron-ore, copper, silver, but the treasures of the soil are yet very imperfectly known in spite of the geological researches, undertaken by German, French, and other travelers and scientists. The mountains are mostly of a granite formation, but the mountain system is very complicated, and its geologic and geostratic connections are hard to determine. There are numerous thermal and sulphurous springs, some of which are renowned and utilized as sanitary watering places. The mountains form the watershed separating the tributaries of the lower Danube and those of the Vardar and Maritza rivers, or, in other words, the watershed between the Black Sea and the Ægean. On account of the broken and irregular character of the peninsula the rivers are short and little navigable. The westernmost section of Turkey, Albania, separated from Montenegro and Novibazar by the North Albanian Alps, is a mass of parallel mountain ranges, irregularly traversed by the winding rivers, Boyana, Drin, Loum, Voiutza, and Arta, which flow into the Adriatic and Ionian seas. In the Turkish provinces of Scutari, Monastir, and Saloniki, there are a number of large and deep lakes, pre-eminently those of Scutari, Ochrida, Janina, Prespa, and Kastoria. The climate of the peninsula is exceedingly varied; it is rigorous with heavy snowfalls in the north and in the central plateau between Serajevo (Bosnia) and Sofia (Bulgaria), and the tableland of Janina, but becomes mild and sunny toward the south and east, tempered by the breezes of the Ægean. There is hardly any country in the world inhabited by such a number of different peoples as the Balkan Peninsula. Surviving there are all the races recorded at the beginning of history, with their national languages and distinct racial consciousness. They do not form, however, the whole people or even the great majority of their particular race in any one district, but are intermingled and live side by side, without ever blending together, so that the process of disentangling their various and conflicting aspirations, tendencies, and racial as well as religious distinctions, is well-nigh impossible. In eastern Rumelia (ancient Thrace) and Macedonia, there may be found a Greek, a Bulgarian, a Turkish, an Albanian village side by side. The Greeks or Byzantines, the Daco-Rumanians, who speak a distinctly Romance or neo-Latin language, and proudly derive their origin from the legionaries of Emperor Trajanus stationed in Dacia, yet undoubtedly from Dacian or Thracian mothers,—and the Albanians of Illyrian stock are the most ancient historic races of the Balkans. The Slavs are late-comers by migration and conquest. They became neither Greek nor Roman in speech or customs, political character or national proclivities, but remained distinctive in language and racial characteristics. At periods historically well determined, after the Gothic invaders in those regions had been defeated or absorbed or started on their world-stirring career, after the Turanian Avars had lost their overwhelming power, the Slavic tribes moved in great numbers into central and southeastern Europe. About 630 A.D. the Croats began to occupy the present Croatia, Slavonia, northern Bosnia. In 640 the Servians of the same race and language conquered the Avars and peopled Servia, South Bosnia, Dalmatia, Montenegro, whose inhabitants are pure Serbs in blood and language, only deriving their name from their national hero, Ivo the Black (Tsernoi), who gave the name of Tsernogora (Montenegro) to those desert rocks, a safe retreat to the Servians, after their defeat at Kossovo in 1389 inflicted by the Turks. The ethnic situation of to-day dates from that epoch. The origin of the Bulgarians is not quite clear. They appear to be of Finnish-Ugrian stock, and therefore related to the Turks and the Hungarians, but were Slavicized early in history. The great apostles of the Slavs, Methodius and Cyrillus, themselves Bulgarians, even brought Byzantine culture and the Greek-orthodox religion to the other Slavic races on the peninsula. The battle of Kossovo, already mentioned, made an end to the independence of the highly developed Slavic States, and with the fall of Constantinople in 1453, the last bulwark of the crumbling Byzantine empire, the Turkish sway over the entire Balkan Peninsula became a reality. Four centuries of racial strife between the Turkish conquerors and the various Greek, Rumanian, and Slavic races under their sway ended in the formation of the Danube States and the Hellenic kingdom, more or less according to races and nationalities, so far as this was possible at all in the case of peoples which are at least as far removed in sympathy and political aspirations from one another as they are from the Turks. The racial antagonisms are grievously accentuated in the attempted solutions of racial, political, and religious problems.

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Balkh, bälkh, a district of Afghan Turkestan. It corresponds to ancient Bactria, and is bounded on the north by the river Oxus, on the east by Badakhshan, on the south by the Hindu Kush, and west by the desert. Its length is 250 miles; its breadth, 120. Its situation was once important during the overland commerce between Indian and eastern Europe before the

sea route by the Cape of Good Hope was followed. The soil has the general characteristics of a desert land; only a few parts are made fertile by artificial irrigation; and such are the vicissitudes of climate that where grapes and apricots ripen in summer, and the mulberry-tree permits the cultivation of silk, in winter the frost is intense and the snow lies deep on the ground. The natives are Uzbegs, whose character differs in different districts.

Balkh, the capital of the district of the same name, situated in a district intersected by canals and ditches. It is surrounded by a mud wall; but though bearing the imposing title of "Mother of Cities," it has not in recent times had any of the grandeur of ancient Bactra, on the site of which it is built. It was twice destroyed by Genghis Khan and Timur. A terrible outbreak of cholera in 1877 caused the capital of Afghanistan Turkestan to be transferred to Mazar, west of Balkh; since which Balkh has been an insignificant village.

Balkhash, bäl-käsh′, a great inland lake, near the eastern border of Russian Central Asia. Lying about 780 feet above sea-level, it extends 323 miles west-southwest; its breadth at the west end is 50 miles; at the east from 9 to 4 miles; the area is 8,400 square miles. The water is clear but intensely salt. Its principal feeder is the river Ili. It has no outlet. The northern edge is well defined; but the south shores of the lake are labyrinths of islands, peninsulas, low sandhills, and strips of shallow water. Here grow masses of enormously tall reeds in which wild swine shelter. To the south, stretching toward the base of the Alatau Mountains, is a vast steppe almost devoid of vegetation. Balkhash seems to have at one time included in its immense area the smaller lakes Sossik-kul and Ala-kul, now far to the southeast.

Bal'kis, the Arabian name of the queen of Sheba who visited Solomon. She is the central figure of innumerable Eastern legends and tales.

Ball, Ephraim, American inventor: b. Greentown, O., 12 Aug. 1812; d. Canton, O., 1 Jan. 1872. He was brought up as a carpenter, but in 1840 he established a foundry for making plow castings; invented a plow, a turn-top stove, the Ohio mower, the World mower and reaper, and the New American harvester; and for many years before his death was president of an extensive manufacturing plant at Canton, Ohio.

Ball, John, English priest of the 14th century. He was a disciple of Wycliffe, upon whose religious doctrines he engrafted some political theories resembling the "liberty, equality, and fraternity" of later ages. He was intimately concerned in the Wat Tyler insurrection of 1381, and for his part in the affair was executed at St. Albans, 15 July 1381. See Morris, 'The Dream of John Ball.'

Ball, Sir Robert Stawell, distinguished English astronomer: b. Dublin, 1 July 1840. In 1865 he was appointed Lord Rosse's astronomer at Parsonstown. He has held many posts in connection with astronomy and mathematics, including those of professor of applied mathematics and mechanism at the Royal College of Science for Ireland; Andrews professor of astronomy in the University of Dublin; astronomer-royal of Ireland; and Lowdean professor of astronomy and geometry in the University of Cambridge, and director of the Cambridge observatory since 1892. The Royal Society elected him a Fellow in 1873, and in 1886 he was knighted. His numerous works include: 'The Story of the Heavens' (1885); 'Time and Tide' (1889); 'Star-Land' (1889); 'The Story of the Sun' (1893); 'Great Astronomers' (1895); 'A Treatise on the Theory of Screws' (1900); 'The Earth's Beginning' (1901); 'Popular Guide to the Heavens' (1905); etc.

Ball, Thomas, American sculptor: b. Charlestown, Mass., 3 June 1819. He studied in Italy; engaged in painting, 1840-52; adopted sculpture exclusively in 1851; resided in Florence, Italy, 1865-97; and afterward in Montclair, N. J. His best-known works are the equestrian statue of Washington in Boston; the Webster statue in Central Park, New York; and 'Emancipation' in Washington, D. C. He published 'My Threescore Years and Ten, an Autobiography' (1891).

Ball, as an article of ammunition, see Gunnery; Ordnance; Projectiles; Shot.

In connection with sports and games the ball in various sizes has been in universal usage since ancient times. The Greeks regarded ball-games as of much value in adding grace to the figure and giving elasticity to the muscles of the body, and the Romans also played a game of ball in connection with their baths for the same purpose. Several of the games then played resembled modern handball, football, and polo. Modern tennis and rackets undoubtedly had their beginnings in the *jeu-de-paume* of the Middle Ages, and lacrosse was originally played by the North American Indians, though the historical data concerning these and other games are meagre and new customs and rules have so changed games that their true history cannot be told with exactness. Of varieties of balls for use in the different sports there are many. The baseball is made of a sphere of rubber, 2½ ounces in weight, which is wound with yarn and covered with leather. The basket-ball is an inflated rubber ball, enclosed in leather and from 30 to 32 inches in diameter. The tennis ball is of rubber covered with white flannel, about 2½ inches in diameter and 2 ounces in weight. The lacrosse ball is made of india-rubber and is 8 or 9 inches in diameter. The polo ball is of wood and 4 or 5 inches in diameter. The football is a prolate spheroid in shape and consists of a rubber bladder encased in a leather cover. Billiard balls are of ivory and from $2\frac{5}{16}$ to $2\frac{7}{16}$ inches in size. See Baseball; Football; Basket-ball; Lawn Tennis; Rackets; Cricket; Handball; Lacrosse; Polo; Billiards; etc.

Ball and Socket, a joint used in machinery and piping. It consists of a spherical end of a rod or pipe fitting into a hollow sphere of the same size on a like piece. The object of this joint is to provide a close, movable connection, and to prevent leakage in pipes.

Ball Bearing, a mechanical bearing, consisting of a cup against the inner circumference of which steel balls are placed. A cone fitted to the steel bears against these balls. It is used

to a great extent in bicycles and light carriage wheels, and to a less extent in light machinery and wagon bearings. Its object is to reduce friction and the use of lubricants.

Ball Clay. See CLAY.

Ball Cock, a self-acting stop-cock, opened and shut by means of a hollow metallic sphere attached to the end of a lever connected with the cock. Its use is principally to regulate the supply of water to cisterns. The ball floats by reason of its buoyancy, and rising and sinking as the water rises and sinks, shuts off the water in the one case and lets it on in the other.

Ball Flower, an architectural ornament resembling a ball placed in a circular flower, the three petals of which form a cup around it; usually inserted in a hollow molding, and generally characteristic of the Decorated Gothic style of the 14th century.

Ball Nozzle. See HYDRODYNAMICS.

Ballad, a short narrative poem in stanzas, originally intended for singing. The name, which is derived from the Latin *ballare,* to dance, is frequently used very loosely, and applied to a variety of songs and verse-tales with no real bond of association. But in the stricter sense it belongs to a comparatively small body of anonymous traditional poetry, the production of which has practically ceased in English-speaking countries, though literary imitations of the type are still composed. Its most characteristic quality is impersonality. Not only is the author unknown, but in the pure ballad there is no trace of his individuality. The material of the poem is usually popular in origin, and the sentiment and point of view are those, not of a single person, but of the whole people. "People," in the sense here used, has reference not to the lower classes but to society in a period when in the matter of culture the community was homogeneous. Thus the origins of the kind of poetry of which the ballad is a survival are to be looked for in a comparatively primitive stage of society, before the "poetry of art" came into existence, when the tribal community could still express itself in simultaneous utterances accompanying the rhythmic movements of dance or march.

This view of the origin of ballad poetry is not universally accepted. Over against it there is placed the apparently simpler theory that the ballads are the production of minstrels, from the fifteenth century down, who derived from romances and other sources in artificial literature stories which they threw into crude stanzas, to chant sometimes in the houses of the great, sometimes at fairs and other popular gatherings. But the objections to this view are serious. First, minstrel ballads such as are here described were manufactured and still exist in abundant broadsides and chap-books, but they are universally lacking in precisely those qualities of impersonality and unconsciousness which constitute at once the mark and the charm of the true popular ballad. Second, the minstrel theory ignores the existence of a large mass of ethnological evidence, showing the indubitable and well-nigh universal existence of the practice of communal song, and the development in this song of a narrative element. Third, it is a matter of definite proof that the genuine ballads which have been collected during the last two centuries have come, with rare exceptions, not from the mouths or wallets of minstrels, but from humble unprofessional people, "the spinsters and the knitters in the sun," who have in so many branches of folk-lore proved the best conservators of the heritage of the people. A minstrel's addition to his stock of an occasional piece of more or less degraded popular verse in no wise overthrows the significance of this fact. There is no reason to believe that, in the centuries before ballad-collecting began, the medium of transmission was substantially different.

The argument on the other side has already been partly indicated. First, there exists the evidence of the wide-spread practice of accompanying communal activity—in labor, ceremonial, or festal dance—with rhythmic utterances; the gradual growth of these utterances in definiteness of form; the practice of making them the medium of narrating some episode known to all—*e. g.,* the story of some great deed accomplished by the hero whose death is being lamented, or the manner of the victory which is being celebrated, or some ludicrous incident in the season's labor happily finished,—the contribution of a new line or stanza now by this, now by that member of the dancing throng; the recurrent refrain sung by all; the final creation of a narrative song for which no one individual is responsible, but which is the expression of the thought and feeling of all. Second, the unindividual element is intensified by the method of transmission. Before any extant ballad came into the form in which we find it, it had been handed down from mouth to mouth through many generations, modified endlessly in detail, but by this very process losing whatever individual elements might at any stage appear in it, and keeping, with whatever change of matter or modernization of dialect, just those qualities of impersonality and unconsciousness of literary effect which have been noted as its characteristic traits. Third, the theory suggested by these facts receives corroboration from the refrain and from the characteristic narrative method of the ballad, the so-called "incremental repetition." The phrase is used to describe the method of telling a story by the repetition in a set of stanzas of the same words with just enough change to advance the narration one step. Thus the motive for the murder of the Bonnie Earl of Murray is gradually insinuated by this method in these stanzas:

He was a braw gallant,
And he rid at the ring;
And the bonny Earl of Murray,
Oh he might have been a king!

He was a braw gallant,
And he played at the ba;
And the bonny Earl of Murray
Was the flower amang them a'.

He was a braw gallant,
And he played at the glove;
And the bonny Earl of Murray,
Oh he was the Queen's love!

A moment's reflection will show how suitable such a device is to communal improvisation, and how naturally it is derived from it. As for the refrain, the part played by the crowd in the singing of it does not need to be argued.

It is not implied that all ballads showing incremental repetition and preserving refrains were thus composed by a throng. For most,

perhaps for all, of our extant ballads it is probably safe to assume a single original author, whose name and circumstances are now hopelessly lost, but who first gave each ballad a definite form. But even when making this assumption, we must bear in mind the fact that he worked after models which went back ultimately to communal products, that he worked in a period when it was still possible to compose in the communal spirit, that he used for the most part popular material, and, finally, that his product has been transmitted orally through generations who altered and modified till whatever of personal existed in the first form has been obliterated. Thus if the famous phrase, «das Volk dichtet,» can not be used of the ballads we read to-day in the sense in which it was true of the earliest communal chants, it still holds to this extent that, in so far as a given specimen approaches the pure ballad type, it fails to exhibit the marks of any handiwork but that of the folk.

The ballad thus stands at the remote end of that line of development at the hither end of which we find the modern subjective lyric such as the sonnet. The curve which lies between shows the tendency running through the history of poetry to have been to emphasize more and more the individuality of the author, to relegate the people more and more to the place of mere audience. We are prepared to find, then, many features in the history of ballads highly dissimilar and even contradictory to those of modern literature. Thus the life of a modern poem begins when it is committed to paper: a ballad then begins to die. It lives only while it is still being transmitted orally from generation to generation, receiving from each its stamp. A modern poem has one authentic text: a ballad may have many texts, varying in number with the extent of territory over which it was sung, but no single authoritative text. A modern poem avoids explicit borrowing: the ballad absorbs and assimilates freely numbers of «commonplaces,»—phrases, lines, and even sets of stanzas that appear with equal appropriateness in half a dozen different ballads, and are the exclusive property of none. Such are the formulas for sending a messenger,

O whaur will I get a bonny boy, etc.;

for ordering a horse,

O saddle me the black, the black,
O saddle me the brown;

for describing a journey,

They hadna' gaen a mile, a mile,
A mile but barely three;

for concluding a romantic tragedy,

The tane was buried in Mary's kirk,
The tither in Mary's quire,
And out of the ane there grew a birk,
And out of the ither a brier, etc.

A modern poet seeks novelty of epithet: the ballad clings to the traditional description; the gold is red, the lady is fair, her dress is grass-green, her hair is yellow, her tears are salt, the moon's light is clear, the porter is proud, brothers are bold, a bower is «bigly,» and so on.

Equally characteristic is the treatment of incident and plot in the ballad. There is seldom any introduction: we plunge at once into the midst of the action. The stanzas leap from peak to peak of the narrative, with no attempt to supply the less important links, yet seldom with any real sacrifice of clearness. The events in the uncontaminated ballad are unmoralized and unsentimentalized; the bald fact is left without comment or criticism from the singer. Conscious figures of speech are rare, and the background is seldom filled in. Thus the general result is that of rapidity of motion, directness and unconsciousness of effect, an absence of artistic suggestion. Whenever we find a moral drawn, or a dwelling on the pathetic, interpolation by a modern would-be artist is to be suspected.

From what has been said of origins, it is clear that little can be guessed as to the date of composition of ballads. Some, notably those simple, highly typical stories like 'The Twa Sisters,' written in a two-line stanza with a refrain, with stress upon situation rather than upon succession of events, may in some form be of almost any age. Others have an upper limit of date fixed by the historical event which occasionally forms the basis of the plot. The dates of ballad manuscripts, which are, of course, an entirely different thing, and a date of death rather than of birth, are more easily fixed. The earliest is 'Judas' (No. 23 in Child's collection) from a 13th century MS.; the next, 'Riddles Wisely Expounded' (Child, 1) about 1445; a little later, 'Robin Hood and the Monk' (Child, 119), 'St. Stephen and Herod' (Child, 22), and 'Robyn and Gandelyn' (Child, 115); two exist in copies of about 1500; two others about 1550. Less than a dozen are preserved in MSS. before 1600. The most important single MS. is the Folio which Bishop Percy used as a basis for his famous «Reliques of Ancient English Poetry,» and it is in a handwriting of about 1650. A few appear in early printed forms. 'A Lytell Geste of Robyn Hode' was printed about 1500, and broadside versions, usually in very degraded form, appeared frequently in the 17th and 18th centuries. The most important sources after the Percy Folio are the collections made directly from the mouths of the people, such as those of David Herd (1776), Mrs. Brown of Falkland (1783-1801), Sir Walter Scott (1783-1830), C. K. Sharpe (*c.* 1823), Motherwell (1825-7), Kinloch (1826), Buchan (1828), MacMath and Child (second half of the 19th century).

Ballads on historical occurrences apart, most of the plots belong to the mass of folk-tale which is the exclusive possession of no one nation or language. Many ballads tell stories versions of which are found in almost every known tongue. The explanation of this world-wide diffusion of story-material is one of the standing problems of folk-lore; but whatever theory of its cause be adopted, the fact that it is largely from this international treasury that the ballads derive their plots, is a strong reason for regarding them as essentially «popular» in matter as well as in manner.

Turning now to the nature of these stories, we find that by far the largest class is concerned with romantic love and its consequences. Many are tragic, the interference of fathers, mothers, or brothers being perhaps the commonest cause of the fatal issue. Both in these and in the romantic ballads with happy endings the sympathy of the audience with the lovers is in general assumed, and in cases of illicit love no moral judgment is passed or suggested. Some of the best are ballads of war by land or sea;

and the irregular warfare of the Borderland between England and Scotland has given birth to a number justly famous. The largest group connected with a single personality is that of the Robin Hood ballads. Of these, some like 'A Lytell Geste' and 'Robin Hood and the Monk' represent not only the finest of the outlaw group, but rank with the best of all ballads. The later members of this group, however, show serious deterioration, and they finally sink into the degradation of broadsides manufactured by printers' hacks. The 'Geste' itself is of especial interest as showing a significant stage in the process by which ballads are combined in the formation of the popular epic. In it four or more distinguishable ballad plots are woven together to form a miniature epic, the interweaving being clearly the work of a conscious artist who at the same time was in full sympathy with the popular spirit. The supernatural also plays an important part in the ballads, and it is possible to gather from them much information as to popular belief on such themes as fairies, witches, the return of the dead, transformation by enchantment, and the like.

The number of extant ballads in English may be gathered from the great final collection of Professor Child. Here, ignoring variants, we have three hundred and five, most of which are popular in the sense which has been defined, *i. e.* they fulfil these conditions, that even if written each by an individual author, that author belonged to the people, drew his material from the common stock of folk-tales, wrote in the popular spirit, and used the traditional method, had his product accepted by the folk and passed on and modified by them through centuries of oral transmission. Some few such as 'The Boy and the Mantle,' 'King Arthur and King Cornwall,' and 'The Marriage of Sir Gawain,' are closely associated with metrical romances, and are usually regarded as written by minstrels for more courtly audiences, but are yet enough in the popular style to justify their inclusion as ballads. More are traditional ballads corrupted for the printing press and represented by broadside versions because no purer form has survived. And in the case of almost every ballad surviving in several versions, some versions show a higher degree of purity from literary editing than others.

The localities from which the ballads have been gathered are widely scattered, versions of several having been picked up in America. But Scotland claims about two-thirds of the whole.

Bibliography.—The completion of F. J. Child's exhaustive 'English and Scottish Popular Ballads' (5 vols., Boston 1882-98), with its bibliographies and full account of the sources, makes unnecessary a list of previous less comprehensive collections. Every known version of every extant ballad in any English dialect was intended to be included by the editor, and little or nothing has escaped him. The introductions give an account of parallels and analogues throughout the world. An abridged collection has been edited by H. C. Sargent and G. L. Kittredge (1 vol., Boston 1904). On the question of origins, consult F. B. Gummere, 'Old English Ballads' (Boston 1894), 'The Beginnings of Poetry' (New York 1904), 'The Popular Ballad' (Boston 1907); T. F. Henderson's edition of Scott's 'Minstrelsy of the Scottish Border' (Edinburgh 1902), and his 'Scottish Vernacular Literature,' chap. xi (London 1898); and vol. i of Courthope's 'History of English Poetry.' An excellent condensed statement of the whole matter by G. L. Kittredge forms the introduction to the one-volume edition of Child's collection.

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Ballade, bą-läd′ the earlier and modern French spelling of «ballad,» but now limited in its use to a distinct verse-form introduced into English literature of late years from the French and chiefly used by writers of *vers de société.* It consists of three stanzas of eight lines each, with an «envoy» or closing stanza of four lines. The rhymes, which are not more than three, follow each other in the stanzas, thus: a, b, a, b; b, c, b, c, and in the envoy, b, c, b, c; and the same line serves as a refrain to each of the stanzas and to the envoy. There are other varieties, but this may be regarded as the strictest, according to the precedent of Villon and Marot.

Ballagi, bŏl′lō-gē, **Maurice,** or **Moritz, Bloch,** a Hungarian philologist and Protestant theological author, most widely known for his grammars and dictionaries of the Hungarian language: b. Inocz, of Jewish parents, 18 March 1815; d. 1 Sept. 1891. He was educated at Budapest and Paris; was converted to Protestantism in 1843; studied theology at Tübingen; and was professor of theology at Szarvas from 1844 to 1848 and from 1851 to 1855, and at Budapest from 1855 to 1878. His first large work was the translation of the Bible into the Hungarian language for the purpose of Magyarizing the Jews, but of this work only the Pentateuch and the Book of Joshua were published (Budapest 1840-43). The most important of his philological works are: 'Ausführliche theoretisch-praktische Grammatik der ungarischen Sprache' (1843; 8th ed. 1881); 'Vollständiges Wörterbuch der ungarischen und deutschen Sprache' (2 vols., 1854-7; 6th ed. 1890); 'Sammlung der magyarischen Sprichwörter' (2 vols., 1850; 2d ed. 1855).

Ballanche, bą-länsh′, **Pierre Simon,** French philosopher: b. Lyons, 4 Aug. 1776; d. 12 June 1847. His great work is the 'Palingénésie Sociale' (1828), in which he seeks to illustrate the workings of God in history and sketch how human society may and will be reconstructed so as to attain its highest development. His works are a strange mixture of mysticism, socialism, and the philosophy of history. His 'Vision d'Hébal' (1832) is a prophetic forecast of the world's history, Hebel being a second-sighted chief of a Scottish clan. He also wrote 'Le vieillard et le jeune homme' (1819); etc.

Bal'lantine, James, Scottish artist and poet: b. Edinburgh, 11 June 1808; d. 18 Dec. 1877. He was brought up as a house-painter, but afterward learned drawing under Sir William Allen and was one of the first to revive the art of glass-painting. He was commissioned to execute the stained-glass windows for the House of Lords, and in 1845 published a treatise on glass-staining, which was translated into German. Two prose volumes, 'The Gaberlunzie's Wallet' (1843), and 'The Miller of Deanhaugh' (1845), contain some of his best-known songs and ballads. He was author of 'Poems'

(1856 and 1865); 'One Hundred Songs with Music' (1865); 'Life of David Roberts, R. A.' (1866); and 'Lilias Lee' (1871).

Ballantine, William Gay, American educator: b. Washington, D. C., 7 Dec. 1848. He was graduated at Marietta College 1868, and at the Union Theological Seminary 1872; spent a year in study in Leipsic; was attached to the American Palestine Exploring Expedition of 1873; professor of chemistry and natural science in Ripon College 1874–6; professor of Greek and Hebrew in the University of Indiana 1878–81; professor of Old Testament language and literature at Oberlin Theological Seminary 1881–91; and president of Oberlin College 1891–6. Dr. Ballantine was one of the editors of the 'Bibliotheca Sacra' (1884–91).

Bal'lantyne, James, Scottish printer: b. Kelso, 1772; d. Edinburgh, 1833. Successively a solicitor and a printer in his native town, at the suggestion of Sir Walter Scott he removed to Edinburgh, where the high perfection to which he had brought the art of printing, and his connection with Scott, whose works he printed, secured him a large trade. The firm of James Ballantyne & Company included Scott, James Ballantyne, and his brother John (who died in 1821). For many years he conducted the Edinburgh *Weekly Journal.* His firm was involved in the bankruptcy of Constable & Company, by which Scott's fortunes were wrecked, but Ballantyne was continued by the creditors' trustee in the literary management of the printing-house. He survived Scott only about four months.

Ballantyne, James Robert, Scottish Orientalist: b. Kelso, Scotland, 1813; d. 1864. After receiving an education at Hailey Tury College he was sent to India, where he was placed in charge of the Sanskrit College at Benares. On his return to England he was made librarian of the East India office. Among his writings are 'The Practical Oriental Interpreter' (1843); 'Catechism of Sanskrit Grammar'; 'Synopsis of Science in Sanskrit and English, reconciled with the Truths to be found in the Nyaya Philosophy' (1856); 'Christianity Contrasted with Hindu Philosophy' (1859).

Ballantyne, Robert Michael, Scotch writer: b. Edinburgh, 1825; d. Rome, Italy, 8 Feb. 1894. He spent his youth in Canada in the service of the Hudson Bay Company, but in 1856 adopted literature as a profession. He became very popular in England as a writer of stories for boys. Among the best known are 'Deep Down,' 'The Coral Island,' 'The World of Ice,' 'Ungava,' 'The Dog Crusoe,' and others.

Ballarat', or **Ballaarat,** an Australian town in the colony of Victoria, the chief centre of the gold-mining industry of the colony, and the place next in importance to Melbourne, from which it is distant west-northwest 74 miles by rail. It owes its present importance and prosperity to its being the centre of one of the richest gold-yielding districts of the world. It consists of two distinct municipalities, Ballarat West and Ballarat East, which are separated by Yarrowee Creek. The town is well lighted with gas, abundantly supplied with water, and contains many handsome public edifices, among which may be mentioned the city hall, council-chamber, two town halls, a spacious hospital, an orphan asylum, a benevolent asylum, a lying-in hospital and refuge, public baths, a jail, mechanics' institute (with 22,500 volumes), a free library (with 15,000 volumes), a theatre, and several other places of amusement, post-office, extensive railway premises, forty churches, two cathedrals, the palaces of the Anglican and Roman Catholic bishops, two colleges, four grammar and various other schools, a school of mines, many banks, numerous fine hotels, etc. There are several iron-foundries, breweries and distilleries, flour-mills, woolen-mills, and other factories. Gold was first discovered at Ballarat in June 1851, and the extraordinary richness of the field soon attracted hosts of miners. When the surface diggings became exhausted it was discovered that richer deposits of the precious metal lay at greater depths, and now there are mines as deep as some coal-pits. They are worked by steam-pumping and other machinery, and give employment to over 6,000 men, about 1,000 of whom are Chinese. One of the largest nuggets ever found anywhere was discovered here, and was sold for $52,000. The surrounding district is also eminently suitable for farming and sheep-breeding. In addition to the line to Melbourne, Ballarat has railway connection with Geelong, Ararat, Maryborough, Castlemaine, etc. Pop. (1897) 46,137.

Bal'last. (1) Heavy matter, as stone, sand, iron, or water placed in the bottom of a ship or other vessel, to sink it in the water to such a depth as to enable it to carry sufficient sail without oversetting. (2) The sand placed in bags in the car of a balloon to steady it and to enable the aëronaut to lighten the balloon by throwing part of it out. (3) The material used to fill up the space between the rails on a railway in order to make it firm and solid.

Bal'lentyne, or **Bal'lenden, John,** Scottish poet, and translator of Boece's 'Latin History,' and of the first five books of Livy into the vernacular language of his time: b. Lothian toward the close of the 15th century; said to have died at Rome, 1550. He was in the service of James V. from the king's earliest years, and at his request he translated Boece's 'History,' which had been published at Paris in 1526, the translation being printed in 1536. As a reward he was made archdeacon of Moray and a canon of Ross. He was a bitter opponent of the Reformation.

Balleny (băl'lā'nę) **Islands,** a group of five small volcanic islands, discovered by Balleny, in the Antarctic Ocean in 1839, nearly on the Antarctic Circle, and in lon. 164° E. One of the islands, Young Island, contains a very lofty mountain, about 12,000 feet high.

Ballesteros, bäl-yĕs-tā'rōs, **Francisco,** Spanish general: b. Saragossa, 1770; d. Paris, 22 June 1832. He first served in Catalonia against the French during the campaigns of 1792 and 1795, and was appointed to a captaincy. Discharged in 1804 on account of embezzlement, he was nevertheless entrusted by the all-powerful Godoy, "prince of the peace," with one of the most productive offices in the custom-house, the direction of the *resguardo* at Oviedo. When the French army invaded Spain in 1808, Ballesteros was promoted to a colonelcy by the provincial junta of Asturia, and joined the Castilian army under Castaños and Black. The regency of Cadiz promoted him to the rank of lieutenant-general and put him in command of the army of

Andalusia. He had then to fight against some of the most skilful chiefs of the French army, and succeeded in avoiding their pursuit by peculiar tactics. When Wellington was entrusted in 1812 with the general command of all the armies in the Peninsula, Ballesteros showed such violent opposition that he was arrested as guilty of treason and sent as a prisoner to Ceuta. A few months later he was restored to liberty, but was not allowed to re-enter the military service. On the return of Ferdinand VII. to Spain Ballesteros made such a show of devotion to monarchical principles that he was appointed secretary of war, but was soon dismissed and sent to Valladolid, where he was placed under the strictest surveillance. When the struggle between the royalists and the constitutionalists commenced, he managed so artfully that each party thought Ballesteros was acting in concert with them. Commissioned by the chiefs of the latter to obtain the assent of the king to the constitution, he succeeded beyond their anticipations and became a member of the council of state, while he was at the same time admitted in the *communeros* association. This double-dealing seemed to be perfectly successful, for in 1823, on the entry of the French into Spain he was appointed to the command of the army; but instead of showing fight he concluded a capitulation with the Duke of Angoulême, which became the occasion of accusations of such a character that Ballesteros thought it imprudent to stay any longer in his own country, and took refuge in France, where he died a forgotten exile.

Ballestrem, băl'lĕs-strām, **Franz Xaver, Count von,** German statesman: b. Plawniowitz, in Upper Silesia, 1834. Entering the Prussian army he served during the Austro-Prussian campaign of 1866 and the Franco-Prussian war of 1870–1. At the close of the latter he was elected to the Reichstag, where he soon became prominent in the Centre party. Pius IX. appointed him a papal chamberlain for his activity in the Culturkampf, and he was first vice-president of the lower House, 1890–3.

Ballet, băl'lā, or băl'lĕt, (from *bal;* from the French *baller,* and the Italian *ballare,* to dance), a kind of dance now usually constituting an interlude in a theatrical performance. In its widest sense a ballet is the representation of a series of passionate actions and feelings by means of gestures and dancing. In a more confined sense we call ballets musical pieces, the object of which is to represent by mimic movements and dances, actions, characters, sentiments, passions, and feelings, in which several dancers perform together. According to the analogy of lyrical poetry those which rather represent feelings may be called lyrical ballets; those which imitate actions, dramatic ballets. The lyrical and dramatic ballets, together, constitute the higher art of dancing, in opposition to the lower, the aim of which is only social pleasure. Dramatic ballets are classed as historical, the subject of which is a real event; mythological, in which the subject is some fabulous action; and poetical, founded on poetical fiction, to which belong also the allegorical, necessarily the most imperfect. A ballet is usually divided into several acts, each of which has several *entrées.* An *entrée,* in a ballet, consists of one or several quadrilles of dancers, who, by their steps, gestures, and attitudes, represent a certain part of the action. In criticising a ballet we must consider, first, the choice of the subject, which must have unity of action or of passion, and be capable of being represented in an intelligible manner by means of mimic movements and dancing; secondly, the plan and execution of the single parts, which must have due proportion to each other; and, finally, the music and decorations, which must supply whatever dancing cannot bring before the eye. The ballet is an invention of modern times. Baltazarini, director of music to Catherine de' Medici, probably gave its form to the regular ballet, though pantomimic dances were not unknown to the ancients. The ballet owes much to the French, and particularly to Noverre.

Balliet, Thomas M., American educator: b. 1 March 1852. He was educated at Franklin and Marshal College (Lancaster, Pa.) and at Yale, was appointed superintendent of public schools in Springfield, Mass., and also became associate editor of the 'Pedagogical Seminary.' His writings include 'Some New Phases of Educational Thought.'

Balliol (băl'yŏl) **College,** Oxford, an important college founded between 1263 and 1268 by John Balliol (q.v.). The original foundation consisted of 16 poor scholars, and the revenue for their maintenance amounted for many years to only 8d. per week for each. From 1340 to 1830 the college was greatly enriched by various benefactions. The society consists of a master, 13 fellows, and 24 scholars. The number of members on the books is about 600. The master and fellows enjoy the privilege of electing their own visitor. John Wyclif was master of this college in 1361; among its scholars have been John Evelyn, Bradley the astronomer, Mathew Arnold Swinburne, and the late Archbishop Temple. The Snell exhibitions for students of Glasgow University attract annually to this college a few distinguished Scottish students.

Ballis'tic Galvano'meter, a galvanometer (q.v.) designed or used for the measurement of electric currents of very short duration. It does not necessarily differ in any essential particular from other galvanometers, except that the natural period of oscillation of its needle must be long in comparison with the duration of the transient currents that are to be measured. If C is the intensity of the current that is to be measured, and t is the time during which it passes, the general theory of the instrument is as follows: The magnetic moment tending to deflect the needle is proportional to C, and the angular velocity that such a magnetic moment can produce when acting upon a freely suspended body like the needle is proportional to t. Hence the angular velocity actually communicated to the needle is proportional both to C and to t; or, in other words, it is proportional to the product Ct. But an electric "current" (such as is here denoted by C) is defined as the quantity of electricity passing per second; and hence Ct is the quantity of electricity passing in the time t. The angular velocity actually communicated to the needle (which is inferred by observing the extent of the swing) is therefore proportional to the total quantity of electricity passed through the galvanometer during the short time t, and not to

the intensity of the current. This constitutes the chief peculiarity of the instrument. The ballistic galvanometer measures the total quantity of electricity passed through the instrument, and its readings are in coulombs; while other galvanometers measure the intensity of the current passing, and their readings are in amperes. If the needle of the instrument moves sensibly during the passage of the current, the magnetic movement exerted upon the needle will also vary, even though the current itself remains constant. It is for this reason that the period of free swing of the needle must be long if the instrument is to be used ballistically.

Ballis'tics. See ORDNANCE.

Bal'listite. See EXPLOSIVES.

Balloon', a bag-like receptacle filled with hydrogen, coal-gas, or other light gaseous matter, and designed to rise in the air. The first balloon was constructed by Stephen and Joseph Montgolfier, sons of Peter Montgolfier, a well-known paper-maker of Annonay, France. Observing the suspension of clouds in the air, they conceived the idea of filling a light bag with some substance of a cloud-like nature, and trying it to see if it would not ascend. After experimenting on a small scale with paper bags filled with smoke, they constructed a linen bag about 30 feet in diameter and inflated it with hot air from a fire fed with chopped straw. The attempt was entirely successful, and on 5 June 1783, the balloon rose to a height of about a mile and a half in the presence of a considerable number of amazed spectators.

As might be expected, an experiment of so novel a nature attracted a great deal of attention, and only two months later a balloon was constructed on more scientific principles by M. Charles, of Paris. The bag used by M. Charles was made of thin varnished silk, and inflated with hydrogen gas generated by the action of sulphuric acid upon iron filings. Some difficulty was found in filling the bag satisfactorily, but the task was completed at the end of four days, and on 27 Aug. 1783, the balloon rose from the Champ de Mars to a height of 3,000 feet, remaining in the air for about three quarters of an hour and eventually falling in a field about 15 miles away, where it was torn to shreds by terrified peasants. The excitement in Paris was very great, and plans were laid to build balloons large enough to sustain human beings. After several trials with a captive balloon of the hot-air or Montgolfier type, M. François Pilâtre de Rozier, satisfied that there would be no difficulty in maintaining a fire under the balloon while in the air, made an ascension from the Bois de Boulogne on 21 Nov. 1783, accompanied by the Marquis d'Arlandes. They remained in the air about 25 minutes, during which time they rose to a height of 500 feet and traversed a horizontal distance of over five miles. Ten days later, on 1 Dec. 1783, MM. Charles and Robert made a similar ascension in a balloon filled with hydrogen. They rose to a height of 2,000 feet, and returned to the earth, after about two hours, at Nesle, about 27 miles from their starting-point at Paris. M. Robert then left the car, and M. Charles made a second ascent alone. Owing to an error in the amount of ballast taken in to compensate for the weight of M. Robert, the balloon, when freed, rose rapidly to a height of about two miles, but no accident resulted, and M. Charles returned to the earth safely.

One of the most famous balloon ascents was that made by Glaisher and Coxwell on 5 Sept. 1862, its avowed object being to ascend to as great a height as possible. The balloon left the ground at 1.03 P.M. and at 1.49 it had attained an altitude of no less than five miles. The temperature then observed was 2° F., the temperature at the earth's surface being 59° F. Mr. Glaisher's own account is as follows:

> Up to this time I had taken observations with comfort. I had experienced no difficulty in breathing, while Mr. Coxwell, in consequence of the necessary exertions he had to make, had breathed with difficulty for some time. At 1.51 the barometer reading was 10.80 inches . . . I could not see the column of mercury in the wet-bulb thermometer; nor afterward the hands of the watch, nor the fine divisions on any instrument. I asked Mr. Coxwell to help me read the instruments, as I experienced a difficulty in seeing. In consequence, however, of the rotatory motion of the balloon, which had continued without ceasing since the earth had been left, the valve-line had become twisted, and he had to leave the car and mount into the ring above to adjust it. At this time I looked at the barometer and found it to read 9¾ inches, implying a height of 29,000 feet, and it was still falling fast. Shortly afterward I laid my arm upon the table, possessed of its full vigor, and on being desirous of using it I found it powerless. I tried to move the other arm and found it powerless also. I then tried to shake myself and succeeded in shaking my body. I seemd to have no limbs. I then looked at the barometer, and while doing so my head fell on my left shoulder. I struggled and shook my body again, but could not move my arms. I got my head upright, but for an instant only, when it fell on my right shoulder, and then I fell backward, my back resting against the back of the car, and my head on its edge; in this position my eyes were directed toward Mr. Coxwell in the ring. When I shook my body I seemed to have full power over the muscles of the back, and considerable power over those of the neck, but none over either my arms or my legs; in fact, I seemed to have no arms or legs. As in the case of the arms, all muscular power was lost in an instant from my back and neck. I dimly saw Mr. Coxwell in the ring and endeavored to speak, but could not; and in another instant intense black darkness came; the optic nerve finally lost power suddenly. I was still conscious, with as active a brain as at the present moment while writing this. I thought I had been seized with asphyxia, and that I should experience no more, as death would come unless we speedily descended; other thoughts were actively entering my mind when I suddenly became unconscious as on going to sleep. I cannot tell anything of the sense of hearing; the perfect stillness and silence of the regions six miles from the earth (and at this time we were between six and seven miles high) is such that no sound reaches the ear. My last observations were made at 1.54, at 29,000 feet. I suppose two or three minutes, fully, were occupied between my eyes becoming insensible to seeing fine divisions and 1.54, and then that two or three minutes more passed till I was insensible; therefore I think this took place at about 1.56 or 1.57. While powerless I heard the words "temperature" and "observation," and I knew Mr. Coxwell was in the car speaking to me and endeavoring to arouse me; therefore consciousness and hearing had returned. I then heard him speak more emphatically, but I could not see, speak, or move. I heard him again say, "Do try — now do." Then I saw the instruments dimly, then Mr. Coxwell; and very shortly I saw clearly. I rose in my seat and looked around, as though waking from sleep but not refreshed by sleep, and said to Mr. Coxwell, "I have been insensible." He said, "You have; and I too, very nearly." I then drew up my legs, which had been extended before me, and took a pencil in my hands to begin observations. Mr. Coxwell told me that he had lost the use of his hands, which were black, and I poured brandy over them. I resumed my observations at 2.07, recording the barometer reading at 11.28 inches and temperature — 2° F. I supposed that three or four minutes were occupied from the time of my hearing the words "temperature" and "observation" till I began to observe. If so, then returning consciousness came at 2.04, and this gives seven minutes for total insensibility. Mr. Coxwell told me that while in the ring he felt it piercingly cold; that hoar frost was all around the neck of the balloon; that on attempting to leave the ring he found his hands frozen, so that he had to place his arms on the ring

and drop down; that he thought for a moment I had lain back to rest myself; that he spoke to me without eliciting a reply; that he then noticed my legs projected and my arms hung down by my side; that my countenance was serene and placid, without the earnestness and anxiety he had noticed before going into the ring, and then it struck him I was insensible. He wished to approach me, but could not, and he felt insensibility coming over himself; that he became anxious to open the valve, but in consequence of his having lost the use of his hands he could not, and ultimately did so by seizing the cord with his teeth and dipping his head two or three times until the balloon took a decided turn downward. No inconvenience followed this insensibility, and when we dropped it was in a country where no conveyance of any kind could be obtained, so that I had to walk between seven and eight miles. The descent was at first very rapid; we passed downward three miles in nine minutes; the balloon's career was then checked, and it finally descended in the centre of a large grass field at Cold Weston.

Another extremely high ascension was made on 4 Dec. 1894, by Prof. Berson, from Berlin, Germany. His last reading showed a barometric height of 9.12 inches, and a temperature of —54° F. The temperature at the surface of the earth was 37° F., and the barometric height 30.02 inches. The calculated height attained was 28,750 feet.

The balloon, strictly speaking, is not a flying-machine, nor is it ordinarily under control, so far as its horizontal direction is concerned. It moves with the wind, and (to the aëronaut) is in a calm at all times. The first step in advance of the drifting balloon is to be found in one fitted with some form of propelling machinery, by which the movement is controlled and the balloon navigated and made to move to a certain extent independently of the direction and velocity of the wind. The difficulties lying in the way of a satisfactory solution of the problem of controlling the motion of a balloon are very great. The bulk of the balloon is necessarily vast, and a correspondingly large area is exposed to the action of the wind. Also, the motor that is used must combine great power with extreme lightness.

In working this problem out, France has maintained the lead that her early experiments gave her. A regular balloon corps is attached to the army, both in France and in Germany; and for many years special attention has been directed to the design and construction of dirigible balloons. The details of the mechanisms employed, as well as of the exact contour of the gas envelope, are guarded as military secrets, but enough is known about them to give a general idea of what has been done. Attention was first publicly directed to the success attained with the dirigible balloons of the French army in 1893, by an article in the *Mémoires de la Société des Ingénieurs Civils*. The true progenitor of the dirigible balloon was Gen. Meusnier, who, in a series of papers published in 1783, set forth a scheme for a balloon of this sort. It was not until 1852, however, that Henri Giffard made a rational attempt to construct one. His balloon was spindle-shaped and measured about 144 feet from point to point. His motor was, however, too weak to permit of making any headway against even a moderate breeze, though the balloon could be steered and made to describe circles while drifting. His general form of envelope-construction has been followed by all experimenters since that time.

In 1870 M. Dupuy de Lome undertook the task of constructing a dirigible balloon. The propeller used was two-armed, 19 feet 8 inches in diameter and was turned by eight men. The spindle shape was used for the envelope. A trial was made at Vincennes in 1872, where in a breeze of 39 feet per second a deviation of 12° was obtained. The stability was perfect despite the exertions of the eight men at the crab; still the balloon was a drifting one, and was dirigible only in the sense that it could be made to deviate to a slight extent from the true course of the wind. To an outside observer the problem seemed as far from solution as ever; but when taking into consideration the insufficiency of the motor, the committee appointed to be present at the trial said: "It serves as a starting-point for all who wish to continue in this direction."

Others have endeavored to continue the improvement, and the first to achieve results that even approached success was M. Gaston Tissandier, who, with his brother Albert, in 1884, constructed a balloon that was fitted with a Siemens motor driven by a bichromate of soda battery, very ingeniously arranged so as to minimize the weight and at the same time produce the greatest possible effect. The motor weighed 121 pounds and the cells weighed 496 pounds, and contained liquid enough to work for 2½ hours, generating during that interval 1⅓ horse-power. The screw had two arms and was a little over nine feet in diameter. Several ascensions were made with this balloon. In one, undertaken in 1884, the motor developed 1½ horse-power and was sufficient to propel the structure through the air at a rate of 13 feet per second. After having practically followed the direction of the wind, which had a velocity of about 10 feet per second, during which the rudder turned it aside a little, the balloon was made to describe a semi-circle, and brought up with its head into the wind, where it was navigated for about 10 minutes directly above Grenelle, and the same evolution was repeated above the observatory. Through the exhaustion of the battery it became impossible to return to Paris. These experiments were quickly followed by the work of Commandant Renard of the French balloon corps. With a spindle-shaped balloon, but with a more powerful motor, and the screw placed at the front instead of at the rear, he succeeded in making several ascents and returning to the point of departure. The motor developed 8.5 horse-power, with a weight of 220.5 pounds. In an ascension made on 23 Sept. 1885, the balloon started from Chalais-Meudon against the wind, and went to Paris, where it was easily handled, afterward returning to Chalais.

This work has been continued by the French balloon corps until now the army is possessed of a dirigible balloon that may be considered controllable in light airs. The problem has not been left solely to the military departments of the several nations of the the earth for solution, however, for private investigators have been constantly at work upon it. In 1901 a young Brazilian named Santos Dumont made a series of brilliant experiments in France, constructing several balloons, one after another, each being an improvement on its predecessor. In striving for a prize of $20,000 offered by M. Deutsch for the first dirigible balloon that should start from the Parc d' Aérostation at St. Cloud and be sailed around the Eiffel Tower in Paris and brought back to

the starting-point in thirty minutes, Santos Dumont succeeded in covering the ground in but 40 seconds above the stipulated time. The total distance is a little less than nine miles. This balloon (his sixth) had a length of 108 feet and a diameter of 19 feet 6 inches, and was driven by a 4-cylinder petroleum motor weighing 216 pounds and developing 20 horse-power. The screw was a little more than 13 feet in diameter, and was turned at a speed of 300 revolutions per minute. Instead of the old-fashioned network, the basket and machinery were suspended directly from the envelope by strong piano wire. Japanese silk was used for the envelope itself, and was made impervious to the gas by four coats of linseed oil. See also AËRIAL LOCOMOTION; FLYING-MACHINE.

Balloon Vine (*Cardiospermum Helicacabum*), a tropical American and East Indian climbing annual herb of the natural order *Sapindaceæ*, with racemes of small white flowers followed by bladder-like seed-vessels from which the plant is named. It is a general favorite of easy garden culture.

Bal'lot ("little ball"): essentially, a secret as distinguished from an open vote, to secure the voter from previous intimidation or subsequent revenge. Recent methods of ballot-reform, therefore, are only devices to obtain the result inherent in its very nature, a non-secret ballot being a contradiction in terms and the same as *viva voce* voting. The various forms of ballot reduce to two in essence: ballots themselves indicating choice,—as colored balls, printed tickets, or mechanical devices showing names,—and depositories indicating the choice. The former is universal in modern times and most general in ancient.

The ballot must be nearly as old as the practice of voting by unprotected bodies of citizens; but our first knowledge of it is in classic Greece, where the *dikasts* (popular courts and juries) voted "yes" or "no" by balls of stone or metal (white or unpierced meaning acquittal, black or pierced indicating condemnation), by marked shells (*ostrakoi*, whence "ostracism" or banishment of an unpopular leader), or by olive leaves ("petalism"). In the assemblies the common voting was by show of hands, to secure public responsibility; in cases of privilege or ostracism it was by ballot. In Rome the first ballot law (though far from the first balloting) was the Gabinian, 139 B.C., and the machinery is very modern: *tabellæ*, or tickets, with candidates' names, or "yes" and "no" ballots for changes in the laws; boxes, inspectors, and check-lists; but in case of a tie the candidates drew lots. In the mediæval republics the ballot was a regular machinery; but it has been bitterly fought and slow of introduction in all non-republican countries, the governments and the privileged classes being loth to weaken their power of dragooning their officials or the lower classes into obedience. In Scotland it was used in 1662 under the name of "billeting," to banish political opponents (ostracism); but the English government disallowed the act. In England it was first put forward to protect members of parliament against government revenge for voting against its bills, not the electors against the classes which furnished the members of parliament; in 1710 the House of Commons passed a ballot law, but the Lords threw it out.

In the modern world the American colonies of England were by far the first to make the ballot (voting "by papers") the foundation of the governmental system: they used it from the first, and it was made obligatory in several of the State constitutions adopted in 1776. New York, with its great landed aristocracy, was slower, using it only for the governor and lieutenant-governor in 1778, and not extending it to the legislature till 1787. The southern States held to the *viva voce* system for many years after, and Kentucky till 1891, its constitution providing for it, though the United States statutes compelled it to use written or printed ballots for Congressional elections. All the State constitutions now provide for elections by ballot.

In Great Britain it was not only fought by the privileged classes as overthrowing their leadership of the tenants and artisans, but by a large part even of the Liberals as undermining the manliness of the English character. The vanguard of the movement were the Benthamites, and it stood foremost in the programme of reform put forward by the more radical Whigs early in the 19th century. It was in the first draft of the Reform Bill of 1832; in 1833 Grote the historian introduced it, and repeated the attempt every year till 1839 with a fresh speech of immense force and learning. It was supported by Macaulay with his usual effectiveness, but was sneered at by so good a Liberal as Sydney Smith, and heartily supported by none but the Chartists, whose support alone would have killed it. They made it one of the "six points" of their "People's Charter." In 1851 it was carried in the Commons by 51 majority against Lord John Russell and his Liberal government, but went no further. In 1869 it was tried at Manchester as a test, and worked well; was adopted at school-board elections in 1870; and the same year a select committee of the House, headed by Lord Hartington, reported in its favor as a means of lessening corruption, "treating," and intimidation. In 1872 Mr. W. E. Forster's ballot act made printed ballots compulsory at all national and municipal elections except those of university candidates for parliament. This put an end to the drunken riots attending the previous public nominations at the hustings, so keenly satirized by Dickens and others.

In France, Spain, Belgium, Switzerland, and Cisleithan Austria the ballot is now used; in Hungary it was formerly employed in all elections, but in 1874 was restricted to municipal councils.

The interest of governments and privileged classes in aristocratic countries to defeat the secrecy of the ballot is replaced in democratic ones, of which the United States is chief, by the interest of party managers, who wish either to prevent independent voting through fear of loss of employment or favor, or to make sure of purchased votes being given as promised; they have therefore devised various methods of evading the nominal secrecy of the vote, such as ordering the voter to write his name or some understood sign on the ballot before depositing it, holding it in sight of the party watcher while casting it, having a "friend" accompany him to the polls on pretense of his illiteracy and inability to go through the legal forms without help, etc. These enforce as constant a struggle from

the guardians of political honesty to circumvent them: the first has been stopped by throwing out as illegal all ballots with distinguishing marks on them; the second by compelling them to be cast in sealed official envelopes, and by forbidding any but the official registrars to come within a certain distance of the polls for any purpose but to vote, and later by providing booths in which each voter prepares his ballot in privacy; the third is practically confined to certain States and cities with a large percentage of real illiteracy under which the feigned article can cover itself and cannot well be directly reached by law, but only by the vigilance of each party in exposing the fraudulent practices of the other. The ballot itself also has brought in many frauds for which the *viva voce* system gave no opportunity, which are reducible to three kinds: (1) counterfeiting, either by printing the name of one party over the candidates of another, or by substituting one or more names on the opposite party's ticket; (2) "stuffing" the ballot-box by folding two or more ballots, all but one being sometimes of tissue paper, to look like one; (3) "repeating," one man voting at different polling-places more than once or at the same one under different names. The first must be defeated by party vigilance; the second is used only where one party has the control of ballot inspection, though the law usually provides that both the chief parties shall have a share in this; the third and second are punishable by law.

Another evil, as diminishing individual responsibility for votes and building up unprincipled and corrupt party dominance, though not direct fraud like the others, is the "party ballot." This is due to the great multiplication of candidates to be voted for at one time, and the consequent cost of printing and distributing the ballots to voters, which has led to the abandonment of the candidates themselves doing this work, and the forming of party organizations for it, which, in return for their efforts insist on subservience and are apt to have slight scruples about gaining their ends. All these evils together — the misuse of ballot methods to pervert their intent, the only partial secrecy, and the supremacy of party in the voting — have latterly built up a great body of opinion that some better methods should be devised, the general movement being known as "ballot reform."

The party ballot has in many States been set aside by some form of the so-called "Australian ballot" (from its first use in South Australia), or official ballot, furnished by the State. The essential feature of the plan is that all candidates in the field for any office shall be placed on one ballot, and the voter compelled to indicate his preference by a mark against one; thus forcing him to think personally concerning each one, inviting to independence of judgment, breaking down the tyranny of the party vote, and putting some intelligence into the "brute vote" even though the name of the party of each candidate is added. The first States to adopt the system were Massachusetts for the whole State, and Kentucky for Louisville, in 1888; and in 1895 every State in the Union except Georgia, Louisiana, and North and South Carolina had adopted some modification of the system. But the modifications were important; they were due to struggles of the local party organizations for one of two objects, or both,— to defeat the secrecy of the new régime and keep track of the purchased votes, or to prevent "scratching" and ensure that their voters should cast "straight tickets"; in other words, to emasculate the system of its vital principle. The ideal and typical form is the "blanket ballot," wherein all candidates are given in the alphabetical order of the offices without regard to party; but this is strongly opposed on the nominal ground that the illiterate voters, and a large part of those not technically such, do not wish to vote anything but the straight party ticket, and should not be hindered in their choice, much less deprived of it. In concession to this useful element of citizenship, most of the States group the names and offices by parties. In general there is a blanket ballot with all parties on it, but each party given a column by itself, with some conspicuous device, like an eagle or a star, at its head, which the illiterate can be taught to recognize; the voter, in order to vote the straight ticket, making a cross in the circle under the emblem, while for a scattered or split vote he makes the cross in the space before the desired name. In New York and New Jersey this is carried further still, each party having a separate ticket and pasters being allowed; which is in fact the old-fashioned sort, the modifications having taken all the distinctive features out of the system, except the State supply.

A newer feature of ballot reform is the substitution for the ballot paper, which is folded and deposited by hand, of voting-machines, which are contrivances that both record the votes and count them, enabling the inspectors to see at any moment how many votes have been cast, and for whom. Several States have authorized the use of machines, and others are considering the matter. Three varieties of the voting-machine have been legally sanctioned: (1) The Myers, in which the single ballot is placed in a frame having a push-knob for each candidate, the voter indicating his choice by pushing the knob opposite his candidate's name, when the machine indicates the vote on a dial at the back of the frame, and locks the knobs of all other candidates for the same office (before a second voter is ready, all knobs are unlocked); (2) the McTammany, which contains on its face a slot for each office, beneath which is a card bearing the names of the candidates for the office seen through the slot, the voter's choice being indicated by turning a wheel till the name of his candidate appears, when he pushes a knob which punctures the tally-sheet; and (3) the Rhines, in which the names are arranged as in the Myers, by parties and offices. Slip names are inserted in the push buttons; and separate tally-sheets for each candidate, with vertical serial numbers, are placed beneath the face, the voter pushing a button which places a punch in such a position for each name that when the lid of the machine is closed the next number on each tally-sheet is punctured. See UNITED STATES, BEGINNINGS OF PARTY ORGANIZATION IN THE.

Ballou', Hosea, American clergyman and author: b. Richmond, N. H., 30 April 1771; d. Boston, Mass., 7 June 1852. His boyhood was spent in the greatest poverty, but at 21 he began to preach, having adopted the Universalist doctrines. He was successively pastor of congregations in Dana, Mass.; Barnard, Vt.; Ports-

mouth, N. H., and Boston, Mass., in which latter place he held his pastorate for more than 35 years. He founded the 'Universalist Magazine,' subsequently called 'The Universalist Expositor,' and again the 'Universalist Quarterly Review.' A voluminous writer, his chief works are: 'Notes on the Parables' (1804); 'Lecture Sermons' (1831); 'Examination of the Doctrine of Future Retribution' (1834), his most important contribution to theological literature. His published works would make more than a hundred 12mo volumes.

Ballou', Maturin Murray, American journalist, son of Hosea Ballou: b. Boston, 14 April 1820; d. 27 March 1895. Besides editing 'Ballou's Pictorial,' 'The Flag of Our Union,' 'Ballou's Monthly,' etc., and making a valuable compilation of quotations, he wrote 'History of Cuba' (1854); 'Biography of Hosea Ballou,' 'Life Work of Hosea Ballou.' Becoming in later life an extensive traveler, he wrote a number of books of travel, including 'Due West,' 'Due South' (1885); 'Due North,' 'Under the Southern Cross,' 'Footprints of Travel,' etc. In 1872 he became one of the founders and the editor-in-chief of the Boston *Globe*.

Ball's Bluff, Va., a point on the Potomac River, about 33 miles above Washington, where the bank rises about 150 feet above the level of the river. It is noted as the scene of a battle between a Union force under Col. Edward D. Baker, and a Confederate force under the command of Gen. Evans, 21 Oct. 1861. The battle resulted in the serious defeat of the Union force and the instantaneous death of Col. Baker.

Ballston Spa, N. Y., county-seat of Saratoga County, on the Delaware & Hudson R.R., seven miles south of Saratoga Springs. It is noted for its mineral springs, which rank among the best acidulous chalybeate springs in the country, and was formerly a popular summer resort, but is now most important for its manufactories, which include one of the largest tanneries in the world; extensive pulp and paper mills, and agricultural implement factories. It has two national banks, several churches, public high school, and daily and weekly newspapers. Pop. (1900) 3,923.

Ballyme'na, a market town in County Antrim, Ireland, on the River Braid, 25 miles northwest of Carrickfergus. It has a cotton-spinning mill, a distillery, numerous bleaching-grounds, a church, chapels, large public schools, several branch banks, and a United States consular agency. Pop. (1900) 9,000.

Balm (*Melissa officinalis*), a perennial herb of the natural order *Labiatæ*, native of southern Europe, cultivated for culinary use and found wild as an escape in many countries. It attains a height of about 18 inches, is much branched, has ovate leaves and whorls of white or yellowish axillary flowers rich in nectar, for which the plant is sometimes cultivated as bee-forage. Its foliage, which has a lemon-like odor and slightly aromatic taste, is used to flavor wine and to a small extent in domestic medicine. Some other members of the *Labiatæ* are called balm — for instance: Bastard balm (*Melittis melissophyllum*), a handsome member of the same family, often dried for its long-enduring fragrance. Moldavian balm (*Dracocephalum moldavica*), a Siberian annual of less pleasant qualities than true balm, largely used in Germany for flavoring. Horse balm (*Collinsonia canadensis*) and tea balm (*Monarda didyma*) are American species of little importance. A variety of catnip (*Nepeta cataria*) so closely resembles true balm as often to be mistaken for it. For cultivation see HERBS (*Culinary*).

Balm of Gilead, a liquid resinous balsam highly reputed in the East since Bible times for its fragrance and supposed medicinal properties, believed to be derived from *Commiphora opobalsamum*, a small Abyssinian and Arabian tree. Balm of Mecca, or opobalsam, is a specially high grade of balm of Gilead obtained from incisions in the bark. The wood and fruit are boiled to obtain the inferior grades. The balm of Gilead of the United States is a variety of poplar (*Populus balsamifera*, var. *candicans*). See POPLAR.

Balmaceda, bäl-ma-sā'da, **José Manuel,** Chilean statesman: b. Santiago, 1840; d. 18 Sept. 1891. He was educated at the Seminario Conciliar in Santiago; early became noted as an orator, urging radical reforms in the Constitution of 1833; and was a founder of the Reform Club in 1868. As deputy for five terms, 1870–85, he urged the separation of Church and State and became the leader of the Progressives. He was Chilean minister at Buenos Ayres in the early part of the Chile-Peru war, 1879–83, and secured the neutrality of Argentina. In 1882 he was made minister of the interior, and introduced liberalizing bills, as for civil marriage, etc. In 1885 he was elected senator and appointed minister of foreign affairs. Elected president in 1886, he carried out large schemes of reform and democratization; popular education was extended, civil marriage carried in 1888, railroads and other internal improvements forwarded. But both his measures and men involved war against the clerico-oligarchy which not only ruled the state but monopolized the offices, and comprised the bulk of the property and influence; and when he tried to prevent the ruin of his work by «influencing» the election of a like successor, his opponents blocked the administration. He appointed a ministry of his own stripe and dissolved Congress, virtually making himself dictator; but the Congressionalists, having the naval officers on their side, began war 7 Jan. 1891, secured the nitrate provinces, and, using their revenues to buy the best arms and munitions, utterly routed Balmaceda's forces in a decisive battle near Valparaiso, 7 August. He took refuge in the Argentine legation at Santiago, and committed suicide there a few weeks later.

Balme, bäm, **Col de,** an Alpine pass, forming the boundary between Savoy and the Valais, 7,218 feet above sea-level. It is much visited, and has a travelers' refuge.

Balmerino, bäl-mer-ē'nō, **Arthur Elphinstone, Lord,** Scottish Jacobite: b. 1688; d. 1746. He took part in the rebellion of 1715, and fought at Sheriffmuir. Having joined the Young Pretender in 1745, he was taken prisoner at Culloden, tried at Westminster, found guilty and beheaded. His title was from Balmerino, in Fife.

Balmez, bäl'měth, or **Balmes,** bäl'mes, **Jaime Luciano,** Spanish priest and author: b. Catalonia, 28 Aug. 1810; d. 9 July 1848. His works include 'Protestantism Compared with

Catholicism in Its Relation to European Civilization' (3 vols. 1848); 'Filosofia Fundamental,' 'Letters to a Sceptic.'

Balmoral (băl-mŏr'al) **Castle**, the favorite Highland residence of the late Queen Victoria, beautifully situated on the south bank of the Dee, 48 miles west of Aberdeen, and in the county of the same name. The site on which it stands is almost completely hemmed in by majestic mountains, and the views from the castle are magnificent. Balmoral was originally a shooting-lodge of the Earl of Fife, but was leased to, and greatly enlarged by, a brother of the Earl of Aberdeen, and in 1848 the reversion of the lease was purchased by Prince Albert. The accommodation furnished by the old building was very inadequate, and accordingly, the property having been purchased in 1852, the present mansion was erected shortly afterward. It underwent some enlargement in 1888. It is built of gray granite, in the Scottish baronial style, and has a massive and imposing appearance in the distance. It consists of two blocks connected by wings, and has a massive tower 80 feet high, with a turret of 20 feet high. The estate, which was the queen's private property, comprises some 40,000 acres, three fourths being deer-forest.

Balnaves, băl-năv'ĕs, **Henry,** Scottish reformer: b. Kirkcaldy, 1520; d. 1579. He was educated at St. Andrews, and though at first a Roman Catholic he became a Protestant and made open profession of his faith in 1542; joining the English against Gov. Arran. He was accused of connection with the conspiracy to murder Cardinal Beaton, and was declared a traitor and excommunicated. In 1547 he was one of the prisoners taken in the Castle of St. Andrews and exiled to France, where he wrote his 'Confession of Faith.' Recalled in 1559, he busily engaged in the establishment of the reformed faith, assisted in revising the 'Book of Discipline,' and accompanied Murray to England in connection with Darnley's murder.

Balneol'ogy. See BATHS; HYDROPATHY; HYDROTHERAPY.

Balolo, bä-lō'lō, a large Bantu nation in the Equatorial Province of the Congo Free State, inhabiting the forests on the banks of the Chuapa, Bussera, and Lomami. Its settlements are interspersed with the villages of the Batwa dwarfs. The principal tribes of the Balolo are the Boruki, Bangombe, Dulingo, Imballa, and Kimoma. Agriculture exists among them to a certain extent, but they follow no pastoral pursuits. According to V. François all Balolo tribes are addicted to cannibalism. The territories inhabited by the Balolo belong to the most promising of Equatorial Africa, especially as the climate is more favorable to Europeans than it is in many other parts of the Congo Free State.

Balsa, băl'sa, a kind of raft or float, of the nature of a catamaran (q.v.), used on the coasts and rivers of Peru and other parts of South America for fishing, for landing goods and passengers through a heavy surf, and for other purposes where buoyancy is chiefly wanted. It is sometimes formed of two inflated hides connected by a sort of platform on which the fisherman, passengers, or goods are placed; and sometimes of a very light wood.

Balsam (*Impatiens balsamina*), an East Indian herb of the natural order *Geraniaceæ,* cultivated in gardens for more than 300 years. The plant is an erect free-branching annual sometimes 30 inches tall; bears axillary, diversely tinted yellow, white, or red single or often double flowers, the latter of which are called camellia-flowered varieties. The plant is a general favorite of easiest culture.

Balsamo, Joseph. See CAGLIOSTRO.

Balsamodendron, băl-sa-mō-den'drŏn, a genus of trees or bushes of the order *Amyridaceæ,* species of which yield such balsamic or resinous substances as balm of Gilead, bdellium, myrrh, etc. See BALSAM.

Balsams, mixtures of resins in volatile oils, the term, however, being popularly applied to any aromatic compound with volatile oils. Balsams are very widely distributed throughout the plant kingdom. They are particularly abundant in the members of the pine family. The araucarias yield a copal that is almost a pure resin; many species of pine yield turpentine and resin; Canada balsam is derived from *Abies balsamea;* the balsam-like sandarach is from a cypress. The *Hamamelis* family gives balsam of styrax, and balsam of copaiba is derived from a large number of the legumes and from the *Dipterocarpeæ.* Styrax benzoin is from the *Storax* family. The resins and balsams of commerce are very closely allied. They may be divided into three groups: gum resins, such as asafœtida and ammoniacum; balsams, and resins, such as turpentine, resin, copaiba, mastic, elemi, copal, dammar, and sandarach; and the balsams and resins that contain cinnamic or benzoic acids, from which they derive their aromatic odor. It is to this latter group that the word balsam is popularly applied. These are balsam of tolu, balsam of Peru, storax, benzoin, dragon's-blood and xanthorrhea resin.

These various bodies are for the most part secreted in special passages in the plants. Sometimes they are formed in the leaves, but for the most part the resinous solution collects in specially designed portions of the stem, usually in the woody portion. It is obtained in a variety of ways from simple incision to boiling chips of the wood with water.

In medicine most of these bodies are active. They are energetic oxidizers,—hence the traditions about ozone and pure air in pine-clad hills, —and several of the hydrocarbons in the volatile oils are stimulating to the skin and mucous membranes, turpentine being an excellent example. It is an excellent external antiseptic, and manifests similar properties on the respiratory, intestinal, and genito-urinary tracts. Those resinous or balsamic mixtures containing cinnamic and benzoic acids—notably balsam of tolu (from *Toluifera pereiræ*) and balsam of Peru (from *Toluifera balsamum*) possess similar antiseptic and stimulating properties. They are more powerful in proportion to the aromatic acids contained. Balsam of storax is derived from a tree, *Liquidambar styraciflua.* It has similar properties to the balsam of Peru.

The chrism (see SACRAMENTS) used for consecration and sacramental services should be made of balsam from Syria or Mecca; when this is difficult to obtain, **balsams** from Brazil or Peru may be used.

Balta, bäl'ta, **Jose,** Peruvian statesman: b. Lima, 1816; d. 26 July 1872. He retired from the army with the rank of colonel in 1855; was minister of war in 1865; one of the leaders in the insurrection which overthrew the unconstitutional president, Prado, in 1868; and was president of Peru, 1868–72. He was murdered in a military mutiny in Lima.

Balta, a town of Russian Poland, on the Kodema, one of the tributaries of the Bug, in the government of Podolia, 132 miles east-southeast of Kamieniec. Pop. about 32,000.

Baltard, bäl-tär, **Louis Pierre,** French architect and engraver: b. Paris, 9 July 1765; d. 22 Jan. 1846. He was appointed architect of the Pantheon and of the Paris prisons, and designed the chapels of the houses of detention of St. Lazare and St. Pelagie. The great hall of justice in Lyons, founded in 1834, was devised and almost completed by him. He also acquired fame as an engraver and as the author of many superb works descriptive of monuments and illustrated by his own plates. Among his most notable works in this line are 'Paris and Its Monuments'; 'La Colonne de la Grande Armée'; and illustrations in Denon's 'Egypt.'

Baltard, Victor, French architect: b. Paris, 19 June 1805; d. 14 Jan. 1874. He was son of Louis Pierre Baltard, and became government architect of France and a member of the Academy of Fine Arts. He built the church of St. Augustine and other beautiful edifices, and was author of 'Monographie de la Villa Medius' (1847), etc.

Balthazar, bäl-thā'zär, (1) one of the wise men of the East who came to worship Jesus at Bethlehem. (2) A character in Eichberg's opera, 'The Doctor of Alcantara.' (3) Chaucer's name for Belshazzar in "The Monk's Tale." (4) The name assumed by Portia in Shakespeare's 'Merchant of Venice'; also the name of minor characters in several of Shakespeare's plays.

Baltic (bâl'tĭc) **and North Sea Canal, or Kaiser Wilhelm Canal.** See CANALS.

Baltic, Battle of the, a poem by Thomas Campbell, celebrating the victory of Lord Nelson over the Danish fleet, 2 April 1801. In history this action is generally known as the battle of Copenhagen.

Baltic Lake Plateau, a low plateau extending from East Prussia to Schleswig-Holstein and Jutland, parallel to the south coast of the Baltic Sea; 750 miles long. In its eastern part the highest points are the Thurmberg, near Dantzig (1,086 feet), and the Kernsdorf Mountain (1,027 feet); more to the west, in Mecklenburg and Schleswig-Holstein, the altitudes decrease and the elevations become less defined, but even the last offshoots of the plateau in Schleswig and Jutland are of importance, as they form the watershed between the basins of the Baltic and North Sea. A characteristic feature of the region is the large number of lakes and ponds, some with very irregular outlines, others occupying wide basins or narrow river-like channels. The largest of these lakes are the Müritz-See (93 square miles) in Mecklenburg, and the Spirding-See (46 square miles) in East Prussia. Many of these lakes (mostly very small) in the eastern section (Pomerania and West Prussia) are without visible outlet. According to the most recent investigations the lake basins date from the glacial period, when a massive sheet of ice covered North Germany, the ridges and hollows of this plateau being due to the action of the ice.

Baltic Provinces (in Russia), a term generally given to the five Russian governments bordering on the Baltic, namely, Courland, Livonia, Esthonia, Petersburg, and Finland; in a restricted sense it often designates the first three. The Baltic provinces once belonged to Sweden, except Courland, which was a dependency of Poland. They came into the possession of Russia partly in the beginning of the 18th century, through the conquests of Peter the Great, partly under Alexander in 1809. No pains have been spared to Russianize them, and since 1876–7 they have lost their remaining privileges and been thoroughly incorporated in the Russian empire. They form, however, a borderland between the Germanic and Slavonic areas, and have been a frequent cause of difficulty between Germany and Russia. The bulk of the population is composed of Esths and Letts; the Germans number above 200,000, the Russians only 65,000. The five provinces combined have an area of 191,526 square miles, and a population (1897) of 7,015,126.

Baltic Sea, an inlet or gulf of the North Sea, with which it is connected by the Skagerrack and Kattegat. It washes the coasts of Denmark, Germany, Courland, Livonia, and other parts of Russia and of Sweden, and extends to lat. 65° 30′ N. It is nearly 900 miles long, from 40 to 200 broad, and its superficial extent, together with the contents of the gulfs of Bothnia and Finland, amounts to 160,000 square miles. Its small breadth; its depth, amounting on an average to from 40 to 50 fathoms, but in many places hardly half so much; its shallowness toward the Prussian shores, and the rugged nature of the Swedish coasts; but above all, the sudden and frequent changes of the wind, accompanied by violent storms, render this sea dangerous for navigators, although its waves are less powerful than those of the North Sea. A chain of islands separates the southern part from the northern, or the Gulf of Bothnia. In the northeast the Gulf of Finland stretches eastward and separates the province of Finland from Esthonia. A third gulf is that of Riga or Livonia. The Kurisches Haff and the Frisches Haff are inlets or lagoons on the Prussian coast. The water of the Baltic is colder and clearer than that of the ocean; it contains a smaller proportion of salt, and ice obstructs the navigation three or four months in the year. The ebb and flow of the tide are inconsiderable, as is the case in other inland seas, the difference between high-water and low-water mark being only about a foot; yet the water rises and falls from time to time, probably owing to the varying rainfall and evaporation. In stormy weather amber is often found on the coasts of Prussia and Courland, which the waves wash upon the shore. Many streams empty themselves into the Baltic; among them are the Neva, Dwina, Oder, Vistula, Niemen, and a number of Swedish rivers. Between the Kattegat and Baltic are the large Danish islands Zealand and Funen; others in the sea itself are Samsoe, Moen, Bornholm, Langeland,

Laaland, which belong to Denmark; the Swedish islands — Gottland and Oeland (besides Hveen in the sound, with the ruins of Oranienburg, the observatory built by Tycho Brahe); Rügen, belonging to Prussia; the Aland Islands at the entrance of the Gulf of Bothnia, and Dagoe, together with Oesel, on the coast of Livonia, all of which belong to Russia. The sound, the Great and the Little Belt lead from the Kattegat into the Baltic. The Baltic and North Sea are now connected by the great ship canal constructed between the Elbe, near its mouth, and Kiel Bay, and opened in 1895. The canal is a work of the German government, and is intended for the use of war-vessels as well as trading-ships, many of which, bound to or from Baltic ports, will be able to effect a great saving by means of this water-way. The chief seaports of the Baltic are St. Petersburg, Kronstadt, Riga, Revel, Narva, Libau, in Russia; Stockholm, Gefle, Karlskrona, in Sweden; Memel, Königsberg, Danzig, Stettin, Lübeck, and Kiel, in Germany; Copenhagen, in Denmark.

Bal'timore, Barons of, or Lords Baltimore. See BALTIMORE FAMILY.

Baltimore Family, founders and proprietors of Maryland, consists of seven successive lords of the barony of Baltimore in the Irish peerage, and a cadet who was governor has been added.

GEORGE CALVERT, the first lord: b. 1580, Kipling, near Bolton Castle, Yorkshire; d. 15 April 1632. He graduated from Trinity College, Oxford, 1597; traveled abroad, and after his return became secretary to Sir Robert Cecil (afterward Lord Salisbury), clerk of the Crown in Ireland, 1606, and clerk of the Council, 1608. He assisted James in his controversial writings, had charge of the Spanish and Italian correspondence during the secretary of state's absence in 1613, was on a committee to investigate Irish Catholic grievances the same year, was knighted 1617, and in 1619 was made secretary of state by Buckingham's favor. He represented Yorkshire jointly with Sir Thomas Wentworth (afterward Lord Strafford) in the parliament of 1621, and in the stormy times that followed was a mediator between Parliament and king, with the usual fate of being thought a spy by the one and lukewarm by the other. The French ambassador styled him an honest, sensible, well-intentioned man and zealous patriot, and therefore without influence. He had principal charge of the foreign negotiations while James was chasing the will-o'-the-wisp of the Spanish marriage and making England a nullity in the Thirty Years' war; Calvert's later Catholicism made him suspected as favoring the latter policy, but in fact he wished a more energetic one. On 14 Jan. 1624 he was one of the nine councilors who opposed a breach with Spain. In January 1625 he announced himself a Roman Catholic; his conversion is credited to Gondomar, the famous Spanish ambassador, and Lord Arundel of Wardour, his son's father-in-law. On 12 February he resigned his office and was given the barony of Baltimore; which, as James hated «apostasy,» measures his esteem for Calvert. On the accession of Charles I., in 1625, Baltimore refused, from conscientious scruples, to take the oath of supremacy and abjuration, and Charles gave him a handsome letter to the Lord Deputy of Ireland. In 1627 he was summoned to court to consult on the peace with Spain, but thenceforth took no part in public business, devoting himself to colonization. Already in 1621–2 he had planted a colony in Newfoundland, chartered in 1623 as Avalon; in 1627 and 1628–9 he visited it, but the severe climate disappointed him and he begged for a grant in a milder one. Without waiting for a reply he attempted to explore Virginia for a settlement; but the Jamestown officials of the old Virginia Company refused permission unless he would take the oath above. The region satisfied his ideal, however, and he persisted in asking a grant there against the dissuasions of Charles, who finally assigned him a northeastern tract, now the States of Maryland and Delaware; but the same interests delayed the proceedings, and before the charter was signed, 20 June, Baltimore died. The usual assumption that he intended the colony for a Roman Catholic establishment is not only absurd in itself, as public feeling would not have allowed it to be thought of, but is answered by the fact that the charter established the Church of England and did not even specify toleration for other creeds, which was not made a provision of law till 1649, though of course intended, and proclaimed at once on the establishment of the colony. Baltimore thought — wrongly, as it turned out — that the proprietary's power and the religion of the chosen colonists would prevent the persecution of his own faith, and had neither wish nor power to persecute others. That he meant it as an asylum and breeding-ground for his religion is a matter of course. It was also to be a feudal aristocracy, but with an assembly of freemen whose consent was necessary to the validity of laws. In a word, Baltimore was a conservative of high principles and moderate temper.

CECILIUS, or CECIL CALVERT, the second lord: b. about 1605; d. 30 Nov. 1675. He married Anne Howard, daughter of Lord Arundel of Wardour (after whom Anne Arundel County of Maryland is named), about 1623. The charter of Maryland granted to his father was transferred to him as heritor; but he never visited it during the 43 years of his life thereafter, sending deputies in his place, and managing its business and political affairs judiciously from England, settling disputes of natives or colonists sensibly and placably, and esteemed a worthy successor to his father. Down to the civil war of 1642 he had little to do but support his brother, Leonard, as governor; but his policy then became difficult. He tried to steer a middle course, and avoid either for himself or the colony any pronounced declaration of sympathies or allegiance which might expose it to confiscation; but Ingle's upset of the colonial government (see LEONARD CALVERT), and the parliamentary triumphs at home, showed him at last that this could not be maintained, and that with the Puritans at the head, the Roman Catholic supremacy, though used only to preserve themselves from persecution, must be given up. On 9 June 1647 Leonard died, after appointing as his provisional successor an ardent Churchman and loyalist, Thomas Green; but Lord Baltimore in 1648 appointed Capt. William Stone and had him settle some 500 Puritans, harried by the Vir-

ginia Cavaliers, in Maryland. When the news of the king's death arrived, Green, in Stone's absence, proclaimed Charles II. king, as did Virginia; on which William Claiborne (q.v., and below), the treasurer of Virginia, joined the Parliamentary party, obtained a commission to reduce the two rebellious provinces, and, after overthrowing the Virginia government, forced Gov. Stone to renounce his allegiance to Lord Baltimore and give it to the «keepers of the liberties of England.» When Cromwell dispersed the Long Parliament Stone repudiated the agreement; Claiborne marched against him, deposed him, and appointed a Puritan government which at once most ungratefully disfranchised all Catholics and repealed the colonial toleration act of 1649. In January 1654 Cromwell himself intervened, and forbade the Virginia authorities to molest Lord Baltimore or his officers in Maryland. Baltimore thereupon ordered Stone to overturn the Puritan government, but Stone's force was defeated and himself captured. Baltimore, however, kept his favor with the Puritan administration; the commissioners of plantation decided that the province was his, and in 1658 it was restored to him. Claiborne's influence was at an end, and Baltimore had no further troubles over Maryland.

Leonard Calvert, younger brother of Cecilius, was sent out by the latter as first governor of the new colony: b. about 1606; d. June 1647. He set sail 22 Nov. 1633, in the Ark and the Dove, with about 200 Roman Catholic settlers of good families; arrived 24 Feb. 1634, at Point Comfort, landed 25 March on an island in the Potomac, which they named St. Clement's, and founded on the site of an abandoned Indian village a town, St. Mary's, long since deserted. He met an Englishman, Capt. Henry Fleet, who had lived some years among the Indians, and helped him to gain their consent to the settlement. But he found Kent Island in the Chesapeake, the great island opposite Annapolis, settled by one William Claiborne (q.v.), under a grant from the dissolved Virginia Company, effectively enough to have a representative in the Virginia legislature. Calvert claimed right of property and political jurisdiction over the island, Claiborne denied both, and Virginia upheld him; and the warfare that ensued embroiled the two colonies for many years, complicating itself with the issue of Churchmen against Catholics, then (by the oddest irony of fate) with Cavaliers in Virginia against the Puritans who had overborne the Catholics in Maryland, and finally with a rankling boundary dispute. Claiborne poisoned the Indians' minds against the Marylanders as a set of treacherous Spaniards; Calvert sent an expedition against him, which captured two boats, with mutual loss of life, in April and May 1635. Claiborne had further losses, and became bankrupt, but in 1637 bought of the Indians Palmer's Island, at the head of Chesapeake Bay, as beyond Baltimore's grant, and petitioned for an injunction against Baltimore's interfering with him. The commissioners of plantation refused him the grant, despite his purchase, on the ground that he had only a trading license. Meantime Kent Island continued insubordinate, and Calvert had to make an expedition against it in person, reducing it and occupying Palmer's Island also, and capturing one of Claiborne's lieutenants, who was put to death for piracy and murder in the former troubles. Calvert now undertook to introduce the feudal system contemplated by his father's charter; but as the freemen's consent was necessary to this, and they refused to give it their own abasement, the scheme was blocked and in fact never was carried out. The civil war of 1642 having broken out, cautious steering was needed to avoid risking confiscation from one side or the other, and Calvert went to England to consult his brother, leaving one Brent as deputy; who brought on the very catastrophe dreaded, by seizing a Parliamentary vessel and imprisoning the captain, Richard Ingle. Ingle escaped, obtained letters of marque from Parliament, allied himself with Claiborne, who had been made the treasurer of Virginia for life by the king, but had no politics except for his own hand, and by the time Calvert returned with a new commission in 1644 had possession of the colony and was plundering right and left. Calvert, in an attempt at repossession, was defeated and fled to Virginia, which had remained loyal to the king, and appealed to the colonial government for help; they refused to give it; finally he got a force together, and in December 1646 returned and drove Ingle out — one of the flying rebels, however, carrying off all the early records of the colony, which have never reappeared. He died the next year, leaving an unfortunate provisional appointment of a successor, which made even worse trouble for the colony than the last deputy.

John, the third lord; Charles, the fourth; Benedict, the fifth; Charles, the sixth; and Frederick, the seventh and last, complete the roll. Frederick was a foolish and worthless rake, and perhaps worse. Born in 1731, he died 14 Sept. 1771, leaving no legitimate heirs, but apparently a natural brood of some ability. The proprietary rights in Maryland were bequeathed to a child, Henry Harford, but four years later were rendered worthless by the Revolution.

Baltimore, Md., the chief city of the State, the sixth in population of the United States, and the commercial head of the Atlantic seaboard south of New York: on the Pennsylvania (P., W. & B.), Baltimore & O., W. Maryland, Baltimore & P., Northern Cent., and other R.R.'s.; 38 miles n.e. of Washington, 97 s.w. of Philadelphia.

Topography.— The city is most admirably situated at the head of tide-water on an arm of the great Chesapeake Bay, of most ample proportions and in former times known as «Patapsco Bay,» and that designation is fully justified by its dimensions; 12 miles long by an average of 3 miles wide, forking at the peninsula on which Fort McHenry stands, and thereby creating the land-locked harbor known as the Northwest Branch. This celebrated harbor is noted for the ease with which ships of great burden may be docked or moored at any stage of the tide, the tidal movement being only from 1 foot to 1 foot 6 inches. The ship channel from this inner harbor to the sea has been for many years of sufficient depth to permit the passage of ships drawing 31 feet of water and over to the docks and elevators of the Baltimore & Ohio Railroad on the western side as you enter, and the Pennsylvania Railroad sys-

tem on the eastern side of the harbor. South of the above mentioned peninsula is another wide fork of the greater harbor, known as the Middle Branch, on which are located the great terminals of the Wabash Railroad system; this again forks, receiving the waters of the small Patapsco River and Gwynn's Falls, on either hand.

Through the centre of the city flows a stream which, rising some distance north of the inner harbor, has its fountain-head at springs which flow 500,000 gallons per day. It is known as "Jones' Falls," after David Jones, who built himself a house on its banks about 1680. Over this stream in the city proper have been erected 23 bridges, of which may be mentioned those over Eager, Calvert, North, and Saint Paul streets and Cedar avenue, as beautiful and costly. But the great white marble bridge which spans not only the stream and its valley but crosses over three railroads and carries the roadbed of North avenue is one of the great engineering triumphs of the times, its western abutment embracing the entrance of the Baltimore Railroad to Washington and the South. Massive walls of white marble confine the water of this small Tiber in its passage through the city. On its banks are located the union station of the Pennsylvania Railroad Company, whose grounds bordering on the stream are embellished with tasteful gardens, and the city has beautified the other shore by constructing "sunken" gardens.

The land area of the city in 1888 was 13,202 square acres, of property annexed in 1888 was 16,939 square acres, of the harbor 1,507 square acres, making the total area of the present city 31,648 square acres.

The total mileage of streets and alleys in the city is 546.7, of which 495.8 miles are paved and 50.9 unpaved; of the total miles of paved streets 71.9 miles are paved with cobblestone, 43 with belgian block, 9 with sheet asphalt, 13.5 with asphalt block, 6.1 with vitrified block, 1.8 with mosaic block, 0.6 with wooden block and 49.9 with macadam.

Monuments and Statues.—The first monument erected in Baltimore was in memory of Christopher Columbus and was dedicated 12 Oct. 1792, the 300th anniversary of his landing. It stands in the grounds of the Ready Asylum, on Boundary avenue. One of the grandest monuments in the world stands at the intersection of Mount Vernon and Monument squares—the Washington monument, the erection of which was conceived in the year 1809, the design furnished by Robert Mills, and the cornerstone laid on 4 July 1815. It rises above these squares about 200 feet, and is of the Greek Doric inspiration. The figure of Washington is by Causici.

The next in importance is the "Baltimore Monument," known as the "Battle Monument." It was erected to the memory of those who fell at the battle of North Point in 1814, and is the work of Maximilian Godefroy. It is 52½ feet high. The principal column represents a fasces, upon the bands of which are placed in bronze letters the names of those who fell, the whole being crowned by a female representing the city, holding in her hand a wreath of laurels, capellano.

The Thomas Wildey monument on North Broadway is dedicated to him as the founder of the Order of Odd Fellows, and may be described as a Grecian Doric column 52 feet high, on which stands a figure of Charity. Other monuments are the Wells and McComas monument at Ashland square; that on Federal Hill erected to the gallant soldier Armistead who defended Fort McHenry at the same time, 1814; the monument to the Marylanders who fell in Mexico, located in Mount Royal avenue; the monument at the intersection of Mount Royal avenue and Cathedral street, recording the deeds of the Maryland Line, the only troops who fought from Bunker Hill to Savannah during the Revolution; and the monument, by Ruckstuhl, erected by the Daughters of the Confederacy, to the Confederate soldiers of the state.

Mr. William T. Walters has given the city the famous bronzes of Barye including the great lion, and the masterful bronze by Dubois, "Military Courage"; the sitting statue of Chief Justice of the United States, Roger Brooke Taney (q.v.) in his official robes; and the equestrian statue of John Eager Howard (q.v.).

Public Buildings.—First in municipal importance, though possibly not in the cost or beauty of design, is the city hall, built of Maryland white marble, the style of architecture being the Renaissance. Cost of construction $2,271,135.64; cost of furnishing $104,264.79. The new court-house is 200 feet front by 325 feet depth. The material is white Maryland marble, and the architectural style is a free Renaissance treatment of the Ionic order. The cost of this building completed was $2,753,003.18. The post-office, located opposite the court-house, is also a recent erection, Italian in general treatment. The building contains the United States and District courts. The cost was $2,011,835. The new custom-house is not yet completed, but will be a most beautiful addition to the great public buildings. Its cost will be several millions dollars.

Educational Institutions, Art Galleries, Libraries, etc.—The Maryland Institute of Art and Design, which was for many years in the heart of the commercial centre of the city, was incorporated in 1826. The library contains 20,000 volumes, relating to the arts and sciences. The new home of this school is located on Mount Royal avenue. It has been most liberally endowed by the Jenkins family of Baltimore, and Andrew Carnegie. The Academy of Sciences, located in the fine old mansion of ex-Governor and ex-Senator Thomas Swann, on West Franklin street, contains a large collection of the bird life of this country, and a large collection of Indian remains. The Peabody Institute (q.v.), a white marble building standing within the shadow of the Washington monument, is a donation from the philanthropist George Peabody (q.v.). It contains a large reference library, an academy of music and a gallery of art. The entire building is 170 by 150 feet. The library room accommodates about 300,000 volumes.

The Walters Art Gallery, located within 100 yards of the last named institution, contains the finest private collection of paintings and ceramics in the United States, and also a special collection of ancient arms and armor and lacquer

work of the Japanese. In the same block, southeast of the original gallery and on the corner of Centre street and Washington place, is now being erected an art gallery for the Walters Collection of Old Masters, recently purchased by Mr. Harry Walters, at a cost of $1,000,000.

The Enoch Pratt Free Libraries, of which the city has six, were the free gift of Enoch Pratt (q.v.). The central library is located on West Mulberry street, near the centre of the city. It has six branch libraries and some substations. Other libraries are the Maryland Historical, the Peabody reference library, those of the Maryland Institute, the Maryland Episcopal Diocese, the Bar Association, the Archbishop's, Odd Fellows, New Mercantile, Baltimore & Ohio Employees' Free Circulating, and others.

The Johns Hopkins University (q.v.) makes no pretensions in the way of architecture, McCoy hall being possibly the most imposing edifice so far erected. The new home of this great school will leave nothing to be desired. Placed at an elevation of some 300 feet and occupying the estate of one of the Carroll family, known as "Homewood Park," it overlooks the city and harbor. On North Broadway, facing the west, stands the group of buildings known as the Johns Hopkins Hospital. The architectural appearance of the central group of buildings is majestic, standing 114 feet above tide. The cost of the original buildings was $2,250,000, which has been very largely added to since the founding. Other medical schools are those of the University of Maryland (1807), the College of Physicians and Surgeons, and the Baltimore Medical College. The oldest dental college in the world is the Baltimore College of Dentistry and Surgery, chartered 1839. The chief law school is that of the University of Maryland.

The Woman's College (Methodist Episcopal, 1888) is another institution of which the citizens are proud. The buildings are throughout in the Romanesque style, of the Lombard variety, with adaptations from that order to which Vitruvius gave the name Tuscan. They are built of dark undressed granite and are surmounted by roofs of Roman-red tiles. The church is the most southern member of the group of buildings, its massive tower the most conspicuous object in the northern part of the city. This tower is almost an exact counterpart of a campanile to be seen just outside of the city of Ravenna, Italy. There are also many other colleges and preparatory schools of good rank, making the city a leading educational centre. Among these are Morgan College (Methodist Episcopal, 1876); Baltimore City College; Bryn Mawr School (1885); and four Roman Catholic institutions—St. Mary's (Seminary of St. Sulpice, 1791); Loyola (1852), under Jesuit management; Notre Dame of Maryland (1873); St. Joseph's (1888). The public school system has about 118 schools, 1,750 teachers, and 75,000 pupils, and about $1,200,000 is annually expended in its support. The first manual-training schools for white or colored pupils were established here. There is also a State Normal School and an institution for training colored teachers.

Parks and Cemeteries.—The beautiful Druid Hill Park consists of 671.2 acres. Other parks are: Clifton Park, 252.07 acres; Clifton Lake, 44 acres; Patterson Park, 106 acres; Carroll Park, 83 acres; Riverside Park, 17.02 acres; Federal Hill Park, 8.02 acres; Wyman Park, 132.08 acres; Swann Park, 11.03 acres; Latrobe Park, 10.05 acres; Gwynn's Falls, 57 acres, besides 32 small squares dispersed all over the city, containing 58.12 acres, making a grand total of about 1,450 acres. In natural beauty Druid Hill Park is unsurpassed by any in the world. It is filled with springs of pure water, some of which are medicinal. A great artificial lake, a part of the city's waterworks, with a depth of more than 80 feet, occupies many acres, and around it has been constructed a fine drive. Near the head of this lake on the driveway stands the colossal statue of the Scottish hero, Sir William Wallace. In the rear of this is the full-length marble statue of Washington, executed by Bartholomew. A short distance from the latter is a costly and graceful pedestal surmounted by a life-size figure of Christopher Columbus, by Achille Canessa.

Patterson Park, on the eastern rim of the city, contains 106 acres, overlooks the harbor and still retains some of the earthworks thrown up by the American Army in the defence of the city 1812-14, some of the guns being still in position.

The various churches maintain 62 cemeteries, many of them on the outskirts of the city proper, but on various lines of electric car service. Nine of these cemeteries are Hebrew and four negro. The largest is Baltimore cemetery, in the extreme northeast near Clifton Park; the most beautiful are Greenmount in the north centre, containing the McDonough monument, and Loudon Park in the extreme west. Near the latter is Mount Olivet. Saint Peter's (Roman Catholic) is on the northwest.

Churches.—There are some 489 church buildings in the city, many of great beauty both externally and internally; notably the First Presbyterian church on Madison street, with its wonderful Gothic spire 300 feet high; the Mount Vernon Methodist Episcopal church within the shadow of the Washington monument, and the Roman Catholic cathedral commenced in 1800. The style and decorations of the last named are of the Grecian-Ionic order. The great dome is 207 feet in circumference internally, and 231 feet externally. The side aisles in the church are terminated by two pictures. That on the right is the "Descent from the Cross," painted by Pauline Guerin—a present from Louis XVI. to the archbishop—and that on the left, "St. Louis Burying his Officers and Soldiers Slain Before Acre," the work of Steuben, and presented by King Charles X. of France. There are also the stately Methodist church described with the Woman's College; the beautiful white marble synagogue, Oheb Shalom, on Eutaw Place, oriental in style, and a short distance away the great Har Sinai temple on Bolton street, and the Byzantine temple on Madison avenue. The Episcopalians have many fine churches, among them Saint Paul's on Charles street, and Grace church on Monument street.

The following is a list of the churches of the various denominations: Baptist, 59; Christian Science, 2; Congregational, 4; Disciples of Christ, 7; Evangelical Ass'n, 4; Evangelical Lutheran, 57; Friends, 2; Orthodox, 2; Independent Roman Catholics, 1; Independent Ger-

1. Cathedral.

2. Battle Monument.

man, 1; Jewish Synagogues, 22; Methodists of various kinds and color, 119; New Jerusalem, 1; Ark of the Covenant, 1; Presbyterian, 33; Protestant Episcopal, 45; Reformed Church, 14; Reformed Episcopal, 43; Roman Catholic, 55; Seventh Day Adventists, 2; Swedenborgian, 3; Union Evangelical, 3; Unitarian, 1; United Brethren in Christ, 7; Universalist, 1; total 489.

Clubs.—Baltimore cannot be called a club city; however, the time-honored Maryland Club is a great social organization occupying a superb new building on Charles and Eager streets. There are also the younger Baltimore Club, on Charles street, opposite, composed largely of the sons of members of the Maryland Club; the Catholic Club; the Charcoal Club; Germania Club, for German merchants; the Merchants' Club and the Phœnix Club, a refined Jewish organization.

Charitable Institutions.—The city has a body of gentlemen, known as Supervisors of City Charities, who serve without pay, and who look into every form of charity and direct to a large extent its distribution. There is also a State Board of Charities, non-paid. Among the institutions to aid suffering humanity are Johns Hopkins Hospital (already mentioned), Maryland Hospital for the Insane; Female House of Refuge; Springfield State Hospital; House of Refuge (male); Aged Men's Home; All Saints Home for Children; Augusburg Home; Baltimore Association for the Improvement of the Condition of the Children of the Poor; Baltimore Orphan Asylum (more than 100 years old); Boys' Home Society; Briska Help Association; Charity Organization Society; Christian Tribune Home for Young Ladies; Dolan Children's Aid Society; Egenton Female Orphan Asylum and School; Female Christian Home; and Free Summer Excursion Society. The various charitable institutions are too numerous to mention all by name, but among them are the blind asylum, a fine white marble building; and the city almshouse, accommodating 1,300 inmates.

Water and Fire Departments.—The city owns its waterworks system, which is self-sustaining. There are 645 miles of water mains in the city. The water comes from two sources: (1) the Big Gunpowder River, average daily flow 170,000,000 gallons; (2) Jones' Falls, 35,000,000 gallons. The service has two impounding reservoirs—Loch Raven on the Gunpowder River, capacity 410,000,000 gallons, and Lake Roland in the bed of Jones' Falls, capacity 400,000,000 gallons. The department has two stand pipes with a maximum capacity of 300,000 gallons. The expenses of the fire department are about $600,000 per annum. Equipment: 29 engine companies, 14 hook and ladder companies (one of the engine companies is double—two engines and one tower; one is a powerful fireboat).

Transportation.—Baltimore has a very modern and excellent street car service; it can boast of the fact that it had the first electric sreet railway and the first electric elevated railway in the world. The street railways have about 400 miles of rails now being operated on the streets and suburban points within the radius of its operations. More are contemplated. The Delaware and Chesapeake ship canal, across the narrow strip of Delaware, gives it a direct water outlet to Philadelphia. The Baltimore & Ohio Railroad system (q.v.) follows almost without change the route of the old national pike, which extended from Baltimore to Saint Louis; it was the first road to the Atlantic seacoast and the corner stone was laid 4 July 1828. The facilities provided by this road are the great terminals located at Locust Point, consisting of freight sheds, elevators, and the proper loading docks with a depth of 30 feet in 1906, but now being enlarged to 35 feet, connecting with the ship channel to the sea of the same depth. Within the last two years they have erected an emigration pier and necessary buildings.

The terminals of the Pennsylvania Railroad are on the opposite side of the harbor from the B. & O. terminals, or, in other words, the eastern side. They have the same depth of water in the freight slips and have direct communication with the 35-foot channel. The principal road of this system passing through this city is the Philadelphia, Baltimore & Washington Railroad, and its branches. Running a little west of south from this city is still another important feeder, the Baltimore & Potomac Railroad, which passes through Washington, terminates at Quantico, Va., branching at Bowie, Md. The Board of Trade had much to do with the introduction of another great railway system into this city, in the matter of the sale of the city's interest in the Western Maryland Railroad to what was known as the "Fuller Syndicate" together with the purchase of the Pittsburg and West Virginia Central and the acquisition of the Wabash system. The Baltimore & Potomac has a tunnel 7,400 feet long through the west side of the city; the Northern Central one 3,500 feet long through the northeast; the Baltimore & Ohio one 1 2-3 miles long through the city north to south. The Baltimore & Ohio road draws its trains through by electric motors. Twenty-one steamship lines use the docks and piers of the Baltimore & Ohio Railroad or the Pennsylvania Railroad Co. These lines run to Europe and South America and other ports. Besides these there are steamship lines to Boston, Halifax, Providence, New York, Wilmington, N. C., Charleston, Savannah, New Orleans, etc.; and steamboat lines to Philadelphia, Washington, Norfolk, Richmond, and other points on the bay and its tributaries. There are 8 or 10 coasting lines on the bay alone, chief of them the Old Bay Line to Norfolk.

Commerce.—The report of R. L. Hoxie, United States engineer in charge of the harbor improvements, speaking of the year 1905, says that there was an increase of imports over the year previous of $852,440, and that 249,376 tons of grain, 266,109 tons of coal, 272,421 tons of iron and steel, and 120,000 tons of oils were exported. Exports from the port of Baltimore during the fiscal year from 1 July 1904 to 30 June 1905, were valued at $91,172,888; during the fiscal year from 1 July 1905 to 30 June 1906, $109,801,118. Imports for the same period 1905, free, $12,488.992; dutiable $8,692,247; total $21,-181,239; 1906, free $14,318,075; dutiable $16,336,-942; total $30,655,017; total increase $9,473,778.

Baltimore is the foremost corn-exporting port in the country, handling an average of 40,-000,000 bushels a year, with 20,000,000 of other

grain; one of the first in flour, handling about 3,500,000 barrels; it also sends out enormous amounts of other provisions, live stock, tobacco, boots and shoes, coal, naphtha, drain-pipe, copper, etc. Its imports are copper (mainly to be re-exported), iron and manganese ores, cotton, coffee, West India products, etc.

During the year 1905 there were 80 sailing vessels of 42,502 tons, and 638 steam vessels of 1,182,458 tons entered at the port, and the clearances comprised 63 sailing vessels of 27,228 tons and 627 steam vessels of 1,222,470 tons.

Manufactures.— The official figures for Baltimore in 1905 were as follows: total number of establishments, 2,162; capital, $148,106,726; number of salaried officials, clerks, etc., 6,766; salaries, $7,001,232; number of wage-earners, 65,013; wages, $25,548,343; miscellaneous expenses, $18,855,372; cost of materials used, $80,184,704; value of products, including custom work and repairing, $150,248,021. Among the numerous industries in which the city stands in the front line of the big cities of the United States, the ready-made clothing business shows one of the greatest increases since the big fire of 1904. The business has increased, according to prominent manufacturers, at least 25 per cent, and is now worth about $18,000,000 to the city. There are about 40 factories in Baltimore manufacturing men and youth's clothing. They employ from 10,000 to 12,000 hands, and pay out in salaries yearly from $5,000,000 to $6,000,000. Other important industries are besides bread, shirts, carpenter and mason work, etc., tobacco products, canning of fruits and vegetables, canning of oysters, foundry and machine-shop work, slaughtering and meat-packing, fertilizers, malt liquors, furniture, confectionery, lumber and planing-mill products, etc.

Finances, Banking, etc.— The estimated basis of taxation for 1906 was $548,522,063; additional real estate assessments involving easements, $23,350,000. The funded debt of the city 1 Jan. 1906 was $43,313,182.95; productive assets, $25,586,690.45; unproductive assets, $20,000,000. The clearing house transactions average about $1,200,000,000, the total for 1905 being $1,249,411,909. On 18 June 1906 there were 18 National banks, with a capital of $12,590,700, surplus $6,510,800, undivided profits $2,204,426.85, and total deposits of $74,404,338.37. There are also a large number of state and private banks and loan and trust companies. Baltimore is the great United States centre of the fidelity and security business; its trust, bonding and surety companies have an aggregate capital of $15,531,250, surplus and undivided profits of nearly $25,000,000 and deposits of about the same amount.

Government.— The charter provides that «the executive power of the mayor and city council of Baltimore shall be vested in the mayor, the departments, sub-departments, and municipal officers not embraced in a department herein provided for, and such special commissioners or boards as may hereafter be provided for by laws, or ordinances not inconsistent with this article.» The mayor holds office for four years; he has a veto which can be overridden by a three-fourths vote of the council, which is composed of two branches; the lower, of 22 members, one from each ward; the upper, of 11 members, each from two contiguous wards. The bulk of the city officers are appointed by the mayor with the consent of the higher branch. The council has the right to appoint the city register and public printer; and the comptroller and surveyor are elected by popular vote.

The principal city officials are the comptroller (head of department of finance); city register; board of estimates; commissioners of finance; city collector; collector of water rents and licenses. The chief departments are public safety (fire, health, buildings, and street cleaning), public improvements, parks, and squares, education, charities, and corrections, and review and assessments.

Population.— The city stands sixth in population among the cities of the United States, the growth being as follows: (1775) 5,934; (1790 first U. S. census) 15,530; (1800) 26,514; (1810) 46,454; (1820) 62,738; (1830) 80,620; (1840) 102,513; (1850) 169,054; (1860) 212,418; (1870) 262,854; (1880) 332,313; (1890) 434,439; (1900) 508,957. The police census of March 1906 makes the population 543,034, with two large cities only separated by a curb line on the eastern boundary, containing about 50,000 inhabitants. They cannot, however, be counted because they are part of Baltimore county.

History.— The first settlement of land included in the present site of Baltimore was made in 1662. Charles II. was King of England, and Charles Calvert Governor of the province. The English people had been making history very fast, and among their most brilliant achievements was the planting of successful colonies in various parts of the world, notably the Virginia colony, the Massachusetts plantations and the province of Maryland, founded in 1634. So that the first actual settlement on land, within the present city limits, was made only 28 years after the landing of the first colonists at Saint Mary's.

During the 17th century we find statute books burdened with many laws creating town after town on paper, as many as 33 having been created, three of them being within the boundary of what was then called Baltimore county. By the act of the General Assembly of 1706 a town was to be established on Whetstone Neck on the Patapsco river. No name was given to the town in the act. Another town, called Baltimore, was located near the mouth of Bush river on its eastern side. This town is shown in the map made by Augustus Herrman, the Bohemian, in 1670, and some 14 years after the actual founding of the present city, the General Assembly ordered another Baltimore to be laid out on Indian river in Worcester county. Nothing was ever done in regard to this last town, the county surveyor refusing to proceed with the work.

Then came the true founding of the city of Baltimore, by the passage of an act entitled «An act for erecting a town on the north side of Patapsco, in Baltimore county, and for laying out in lots of 60 acres of land in and about the place where one John Flemming now lives.» (1729, chapter 12.) About two years after the founding of Baltimore town an act was passed entitled «An act for erecting a town on a creek, divided on the east from the town lately

1. Washington Monument.
2. Johns Hopkins Hospital.

laid out in Baltimore county, called 'Baltimore Town,' on the land whereon Edward Fell keeps a store." (1732, c. 14.)

The next step for the enlargement of the original town was the passage by the General Assembly of the act of 1745, c. 9, 15 years after the founding. This act was passed on the joint petition of the inhabitants of Baltimore and Jones's Town, that the two towns be incorporated into one entire town, and for the future to be called and known by the name Baltimore Town and by no other name. The town was again enlarged two years later by the act of 1747, c. 21, on petition of the inhabitants by the addition of 18 acres, which were not included in Jones's Town nor in Baltimore Town. In 1765 another addition to the town was made on petition of Cornelius Howard and other persons, consisting of 35 acres on the west and south sides of the town. The town was again enlarged by the act of June 1773, by the addition of 80 acres on the east and southeast.

The Revolution brought it prosperity by crippling its rivals, and it was a great seat of privateering. For a couple of months in 1776-7 Congress held session in one of its taverns, having fled from Philadelphia in fear of the English. About this period the energy and resources of a couple of immigrant Scotch-Irishmen, the brothers John and Henry Stevenson, began to push the place forward; new stage and packet lines were established, the roads improved and turnpikes laid out, and Jones's Falls diked and part of its course filled in. The European wars of the French Revolution and later threw a large part of the world's carrying-trade, till Napoleon's downfall, into American hands; the "Baltimore clippers" were famous everywhere. In 1792 a large body of French refugees from Haiti came in. On 31 Dec. 1796 the old settlement of Fells' Point was united with it, and it received a city charter, it having previously been governed from Annapolis. In the War of 1812 it again became a seat of privateers, in revenge for which the British attempted its capture in 1814, but the attack was repulsed 12 Sept. To it we owe the "Star-Spangled Banner" (see Key, Francis Scott) and the Battle Monument. The end of the Napoleonic wars in 1815, restoring to England her old carrying trade, was a heavy blow to Baltimore. In 1828 the public-school system was established. In 1860 all three anti-Republican parties held their national conventions there; and on the outbreak of the Civil War the Union troops passing through there were mobbed by the citizens, and the first blood of the war was shed in its streets, 19 April 1861. On 23 May Federal Hill was occupied by a Union force, and the city remained under martial law till the end of the war. The convention of 1864, which renominated Lincoln, was held here. In 1888 "The Annex" was annexed to the city, extending its limits two miles north and west, and nearly doubling its size. Since 1890 Roland Park and Walbrook have also been annexed.

The greatest disaster which Baltimore has experienced was the conflagration which commenced on Sunday 7 Feb. 1904, and continued to burn until the 9th. Some fire was not extinguished for a year. It commenced in the largest wholesale dry goods establishment in the city—Messrs. John E. Hurst & Co.—the building having three fronts. According to the statement of the *Baltimore Sun* "A strong wind was blowing from the southwest, and within about an hour, eight or ten buildings on Hopkins Place in the neighborhood were in flames. The fire spread to the north and east, rapidly devouring block after block of buildings. As many as ten blocks were in flames by nightfall, notwithstanding the extreme exertions of the firemen. By 8 o'clock the wind shifted and blew the fire, which had at that time acquired a volume of its own, straight down Lombard, German, Baltimore, and Fayette streets. In the effort to stay the progress of the flames, dynamite was used in ten places, or more, but the blowing up of houses had no good effect. Landmark after landmark went down. The lofty 'sky-scrapers' on Charles, Saint Paul, Calvert, and Baltimore streets and the solid brick structure, the B. & O. Central building, and the Equitable and Calvert buildings burned like great torches high up in the air. A fortunate change of the wind about midnight, helped to save the magnificent row of public buildings on the north side of Fayette street, from Saint Paul street to Holliday street—the court-house, the post-office and the city hall, but before the change occurred flying embers set fire to blocks on the south side of Baltimore street below Gay street, and to the Maryland Institute and the Marsh Market. The change carried the flames towards the water and the docks on the south, while on Baltimore street the fire stopped at Jones' Falls." The loss was estimated at about $70,000,000.

Throughout the whole period of acute distress there was no looting and no undue excitement; perfect order was maintained and the business firms and companies resumed operations in temporary quarters with comparatively little or no interruption, while the city and State governments addressed themselves, actively and intelligently, to the ways and means of speedy rehabilitation.

In addition to the local fire-fighting force, companies from other cities came to their aid as follows: Washington, D. C., 5; Baltimore Co., 4; Sparrows Point, 1; Annapolis, 1; Philadelphia, 7; York, Pa., 2; Harrisburg, Pa., 1; Chester Pa., 1; Altoona, Pa., 1; New York City 10; Wilmington, Del., 4. There was thus engaged in fighting the Baltimore fire an average of 62 well equipped modern fire organizations and they all had abundant water from the city's sources of supply.

In the banking and financial centres of the fire-swept area the greatest anxiety prevailed for several days in regard to the safety of the securities and books in the vaults of these institutions. Time locks prevented the opening of the vault doors on Sunday night and the next morning when the bank buildings were in ruins it was known that in ten of the National banks and in one other, there were values of $53,000,000 including loans and discounts, securities, clearing-house exchanges, and cash. These banks represented about $50,000,000 of deposits. In addition to this, the Savings Bank of Baltimore, at the corner of Gay and Second streets, had in its vaults in jeopardy about $25,000,000;

The Hopkins Savings Bank $6,000,000, and others equally large sums. But the vaults stood the fire test for which in part they were designed. As one by one they were opened it was found that their contents were preserved and this fortunate circumstance encouraged them all around, and enabled them to give the necessary aid in the great work of rehabilitation plans which were immediately begun. There were also a number of private banking houses and many brokers involved in the fire, but in all cases it is believed the fire did not reach their valuables. There were thousands of depositors in the savings banks, and financial anxiety extended to nearly every home in the city until the glad news was spread abroad that the bank vaults held good. This was also the case with many safes in commercial and business houses, though for weeks after the fire the streets were strewn with wrecks that failed in the fire and were valueless even as scrap-iron. Consult Love, 'Baltimore: The Old Town and the Modern City' (Baltimore 1895); Scharf, 'The Chronicles of Baltimore' (Baltimore 1874); Thomas, 'The City Government of Baltimore,' in 'Johns Hopkins University Studies, Historical and Political Science' (1896).

WILLIAM H. LOVE,
Secretary of the Board of Trade.

Baltimore Councils. See CATHOLIC CHURCH.

Baltimore and Ohio Railroad, The. *History.*—The fact that the only use of rails for locomotion in 1827 on either side of the Atlantic was for coal carrying, renders the more remarkable the action of the coterie of merchants and bankers of Baltimore, gathering at Philip Thomas' house on the evening of 18 February of that year, in deciding to proceed forthwith to build a railroad for general purposes. The Ohio, at Wheeling, was made the objective point; the intervening Blue Ridge and Alleghany mountains evidently suggesting no difficulties that could not be surmounted. But a week elapsed from the time of the initial meeting to the second, at which the committee appointed at the first reported the resolution, namely: "That immediate application be made to the Legislature of Maryland for an act incorporating a joint stock company to be styled the Baltimore and Ohio Railroad Company, and clothing such company with all powers necessary for the construction of a railroad with two or more sets of rails from the City of Baltimore to the Ohio River." The capital stock was fixed at $5,000,000.

The Baltimore and Ohio's charter, granted of date 28 Feb. 1827, was the first anywhere coming into existence defining and authorizing procedure to completion. Under it the Baltimore and Ohio Railroad Company is still acting, being the only enactment of the character of the pioneer days of the railroad in this country or Europe remaining fully operative; the B. & O. being the single railroad company of those times yet retaining, unchanged, its original name and organization.

On 23 April 1827 the Baltimore and Ohio Railroad Company was formally organized, Philip E. Thomas elected president, and George Brown treasurer. Preparations were immediately inaugurated to secure a survey of the proposed line, the measures to which end were begun on 2 July. In this the United States governmental authorities were induced to co-operate to the extent of relieving Colonel Stephen H. Long, of the Topographical Corps, from his regular duties, who, with Jonathan Knight, a Quaker civil engineer of repute, forthwith proceeded with the actual work, the date of its formal commencement being 20 November. On 5 April 1828 they submitted the result of their labor to that period; and the line west to the Patapsco and thence via its valley to Point of Rocks on the Potomac was decided upon as the first section to be undertaken.

But persistent, bitter, and vehement opposition by the canal authorities was encountered and this was even carried to legislative chambers and the courts, but despite this trouble and a few adverse decisions by the courts, the Baltimore and Ohio pushed on from Baltimore west, and three miles were completed and experimented upon early in 1829. On 22 May 1830 the first section of the Baltimore and Ohio —that from Baltimore to Ellicott City, a distance of 14 miles—was formally opened for public use. Horse-power was the standard means of locomotion pending development of the locomotive to a more assuring stage than then reached anywhere from whence reliable information could be obtained. (See LOCOMOTIVE, THE.) "Brigades of cars" were announced to run three times each way daily, the fare named at 25 cents and business commenced in earnest. This was four months in advance of the formal opening of the Liverpool and Manchester, the first railway abroad for general purposes, its date being 15 Sept. 1830.

Many difficult problems in the mechanics of railroading were decisively solved. Car wheels were first made with the flange on the inside edge, but their causing so many derailments and so frequently breaking led to the change of the flange to the outer edge. But this increased the difficulty on the curves and the conical flange was invented. The anti-friction box on the axles and the practice of placing on the outside instead of the inside of the wheels were both first introduced by Winans; as was also the eight-wheel car. When the main line of the Baltimore and Ohio was completed its roadbed embodied the highest engineering skill of the period in the traversing of mountain ranges; was the longest continuous railroad in the world, with the greatest bridges, trestles and tunnels. Its track construction throughout, and especially its manner of meeting the curvature and providing against slides from the environing mountain sides were lessons in line construction and operation the whole world availed of.

The Baltimore and Ohio was completed to Frederick, 61 miles, 1 Dec. 1831; to Point of Rocks, 69 miles, 1 April 1832; and to Harper's Ferry, 81 miles, 1 Dec. 1834. The initial move toward Washington was the letting of the contract in May 1833, for the construction of the Thomas Viaduct spanning the Patapsco at Relay. This remarkable granite structure, designed and erected under the personal supervision of Benjamin H. Latrobe, was built for the carrying of six to seven ton engines drawing from 15 to 20 ton trains, and meets with equal safety the demand of 170 ton locomotives at the head of 12 to 15 hundred ton trains. It was the marvel in the world's railway circles when con-

structed. The longest, highest, and generally most imposing railroad crossing known, it was the first on a curve and regarded, therefore, as the boldest of departures from the rule.

Two years were required to complete the Washington branch, and it was not until 25 Aug. 1835 that the echoes of the national capital resounded back the locomotive's shrill awakening. With the opening of the branch, the railway postal service came into being, its earliest form the boarded-up end of a baggage car, the two keys to which were held by the postmasters of Washington and Baltimore. The declaration of the first railroad dividend in history, a semi-annual of the Baltimore and Ohio, was made simultaneously with the opening of the Washington branch, and the securities of the latter were the first of American railway issue marketed abroad.

The greatest of eventualities, however, with which the Washington branch's history is linked was the birth of the telegraph. "What Hath God Wrought," the first four words transmitted by wire over a public line, were sent from Baltimore to Washington via the roadbed of the Baltimore and Ohio branch.

Hancock, 123 miles from Baltimore, was reached by the Baltimore and Ohio on 1 June 1842; Cumberland, 178 miles, on 5 Nov. 1842; Piedmont, 206 miles, on 21 July 1851; Fairmont, 302 miles, on 22 June 1852; and the last spike, finishing the great undertaking from Baltimore to Wheeling, 379 miles, was driven on 24 Dec. 1852. The formal opening of the road was marked by a notable demonstration 10 Jan. 1853. There being no rail connection beyond, and the prospects bright for Cincinnati and Louisville business in the one direction and Pittsburg in the other, a company was organized and a daily steamboat service established, "superior to anything floating upon western waters."

With the completion of the Parkersburg branch from Grafton — or the mouth of Three Forks, as it was then known — to Parkersburg, 1 May 1857, the Ohio was reached at another point, and a very important one, as through rail connection had been perfected thence to Cincinnati, 10 days before, 20 April. The opening of the Parkersburg bridge, 7 Jan. 1871, was the last link in the continuous rail from the Chesapeake to the Mississippi.

The old Marietta and Cincinnati, the Ohio and Mississippi and other railways, once separately conducted companies, long since became component parts of the Baltimore and Ohio System, which, with the finishing of the Chicago division, 10 Nov. 1874, has been of the foremost in the metropolis of the northwest, as, through being the pioneer into Cincinnati and Saint Louis from the east, it has ever been in those centres of the southwest.

At Pittsburg, as well, the Baltimore and Ohio's position is a commanding one. Reaching the great central point from Cumberland in July 1860, later building and acquisitions led to radiating lines to Cleveland, Chicago, Cincinnati, Wheeling, and other points of traffic concentration. Eastward from Baltimore the construction of the extension to Philadelphia and its opening, 19 Sept. 1886, together with security holdings in lines through to New York, assured important place among the railways centring in the country's leading city.

Mileage.— On 30 June 1905 the Baltimore and Ohio Railroad proper consisted of the following lines:

DIVISION	MILES
Baltimore and New York	5.34
Main Line System (excluding Valley Railroad of Virginia)	1,052.18
Wheeling System (excluding Wheeling Terminal and Valley and Branches; Cleveland, Lorain & Wheeling and Branches; Ohio & Little Kanawha; and Ravenswood, Spencer & Glenville)	752.60
Pittsburg System	947.73
Chicago Division	282.47
Baltimore & Ohio Southwestern System	985.66
	4,025.98

The lines controlled by or affiliated in interest with the Baltimore and Ohio System were as follows:

	MILES.
Valley Railroad of Virginia	62.12
Ravenswood, Spencer & Glenville Railway	32.40
Cleveland Terminal & Valley Railroad	92.72
Cleveland, Lorain & Wheeling Railway	194.28
Ohio & Little Kanawha Railroad	74.26
	455.78

Making a total of 4,481.76 miles for the entire system. By divisions this mileage is as follows:

	MILES	TOTAL
GRAND DIVISION — NEW YORK		5.34
New York Division	5.34	
MAIN LINE SYSTEM		1,114.30
Philadelphia Division	125.14	
Baltimore Division	227.98	
Cumberland Division	257.42	
Shenandoah Division	112.55	
Monogah Division	391.21	
WHEELING SYSTEM		1,146.22
Wheeling Division	143.39	
Ohio River Division	326.14	
Cleveland Division	244.68	
Newark Division	432.05	
PITTSBURG SYSTEM		947.73
Connellsville Division	308.01	
Pittsburg Division	356.93	
New Castle Division	282.79	
GRAND DIVISION — CHICAGO		282.47
Chicago Division	282.47	
B. & O. SOUTHWESTERN SYSTEM		985.66
Ohio Division	336.40	
Indiana Division	254.53	
Illinois Division	394.73	
Grand total for entire B. & O. System		4,481.76

Equipment.— The total equipment for the entire system, valued at $50,662,723.98, as of 30 June 1905 was as follows:

ROLLING STOCK	
Locomotives and Spare Tenders	1,798
Passenger Cars	1,206
Freight Cars	80,338
Service Cars	1,950
MARINE	
Steam Lighters and Tugs	12
Barges, Floats and Scows	106
Pile Drivers	3
Wharf Boat	1

Traffic Statistics.— For the year ending 30 June 1905 the total number of tons of freight carried by the B. & O. System was 56,322,085, divided as follows: B. & O. lines, 47,285,183, and affiliated lines 9,036,902. The total ton mileage was 9,637,865,455. The number of passengers carried was 16,581,666, or 728,748,125 passengers one mile, divided as follows: B. & O. lines, 15,518,372, and affiliated lines 1,063,294. The freight earnings for the B. & O. lines were $50,607,087.44 and the passenger earnings were $13,817,141.38.

Finances.— The general income account of the B. & O. Railroad Company (including the

B. & O. S. W. R.R.) for the year ending 30 June 1905, was as follows:

Gross earnings	$67,689,997.13
Operating expenses	44,710,603.58
Net earnings from operations	$22,979,393.55
Other income	2,976,998.44
	$25,956,391.99
Total payments	20,289,197.74
Surplus	$ 5,667,194.25

The operating results of the lines controlled or affiliated in interest with the B. & O. System were as follows:

Gross earnings	$4,849,449.03
Operating expenses	3,729,191.43
Net earnings	$1,120,257.60

The capital stock (preferred and common) outstanding on 30 June 1905 was $184,258,524.31; the funded debt was $234,395,430; and the capital liabilities assumed were $11,211,043.83; making the total capital liabilities $429,864,998.14. The capital assets of the company were $373,325,909.03, consisting of the following: Cost of road, $144,974,687.40; bonds and stocks held by trustees, $164,662,516.29; real estate, $12,315,832.78; gas and electric plants, $710,148.58; equipment, $50,662,723.98. The company also owned bonds and stocks of railroad and other corporations to the value of $43,548,658.87.

Baltimore Oriole. See ORIOLE.

Baltimore, Woman's College of. See WOMAN'S COLLEGE OF BALTIMORE.

Baltistan, bäl-te-stän', or **Little Tibet,** an elevated plateau through which the upper Indus flows. It lies below the Kara-Korum Mountains and the Himalayas, with a mean elevation of 11,000 feet, and contains the nameless peak marked K^2, 28,278 feet high, next to Everest, the highest on the globe. It is politically a part of Kashmir.

Baluchi, ba-loo'chē, the language of Baluchistan, one of the Iranian group of languages. There are two dialects, the North Baluchi, and the South Baluchi, or Maprani · the latter shows more ancient features.

Baluchistan, bä-loo'che-stän', a country in the south of Asia, lying between Persia and the valley of the Indus, having the former on the west, Afghanistan on the north, Scinde on the east, and the Arabian Sea on the south; area, about 134,000 square miles. It is wholly under British influence and partly under British rule, while the Khan of Kelat is ruler of a considerable portion, and certain tribes are independent. The general surface of Baluchistan is rugged and mountainous, with some extensive intervals of barren sandy deserts. In the case of the principal ranges, the general parallelism and uniformity of their formation are somewhat remarkable, one system having an inclination from north to south, another from east to west. Many of these mountains are of great height and are covered with snow. There are several broad and high table-lands, extremely cold in winter and extremely hot in summer. Mekran in the south, the ancient Gedrosia, is one of the hottest regions of the globe. Some of the mountain chains are of compact limestone, enclosing marine shells and corals identical with similar objects picked up on the sea-shores at this day. Excepting fragments of quartz found in Lus, primary formations have not been observed in any part of the Baluchistan Mountains. The mineral wealth of the country is believed to be considerable, including gold, silver, lead, iron, copper, many kinds of mineral salts, and saltpetre. Throughout Baluchistan there is a great deficiency of water, particularly in summer. In the northeast part are the rivers Bolan and Mula, the courses of which form the celebrated passes bearing their names, leading from the valley of the Indus to Baluchistan and Afghanistan. The soil is not in general fertile, but by patient industry the plains and valleys can be made productive in wheat, barley, and millet. The other chief crops are madder, cotton, particularly in Cutch Gundava, rice, indigo, and tobacco. Vegetables are abundant, and excellent fruits are produced in the gardens and orchards in the neighborhood of the towns. Fine camels are bred in large numbers.

The inhabitants are divided into two great branches, the Baluchis and the Brahuis, different in their languages, figures, and manners, and each subdivided into a number of minor tribes. The Brahuis have greater physical strength than the Baluchis, and are less addicted to predatory violence. Both races are hospitable, brave, and capable of enduring much fatigue. Many of them live in rude tents made of black felt or coarse cloth of goat's or camel's hair stretched over a frame of wickerwork. Both Baluchis and Brahuis are very ignorant but zealous Mohammedans. The Baluchi language resembles the modern Persian, the Brahui presents many points of agreement with the Hindu. The manufactures are mostly confined to coarse fabrics and a few matchlocks and other weapons, and the trade is unimportant. The khan, so far as his rule extends, has unlimited power over life, person, and property. He usually resides at Kelat, and his rule is almost confined to the country around it. Quetta is the largest town. It is occupied by a British garrison and strongly fortified.

About the middle of the 18th century Baluchistan was made tributary by Nadir Shah, who bestowed it, with the title of *beglerbeg,* or commander-in-chief, on Nasir Khan, who proved himself the ablest ruler that ever governed the country. On his death in 1795 he left the country in a comparatively prosperous condition, but it has since suffered greatly from intestine wars, and its boundaries have been curtailed. During the Afghan war in 1839 a British force was detached to assault Kelat, which was taken by storm after a siege of a few hours, 13 November the same year. The British again occupied it in 1840, but in the following year they left the country. Latterly a British protectorate over the whole of Baluchistan has been established, and the town of Quetta (which is now reached by railway from India) and a part of the country have been absolutely annexed. The khan receives an annual subsidy from India. The population is estimated at about 800,000.

Balucki, ba-loots'ke, **Michael.** Polish author, known under the pseudonym ELIPIDON: b. Cracow, 29 Sept. 1837. He is most popular as a story-teller of satirical tendency, ridiculing the shortcomings and prejudices of Polish society. Of his novels may be mentioned 'The Awakened' (1864;) 'The Old and the Young'

(1866); 'Life Among Ruins' (1870); 'The Jewess' (1871); 'For Sins Not Committed' (1879); '250,000' (1883). The best among his comedies are: 'The Chase After a Man' (1869); 'The Emancipated' (1873); 'Amateur Theatre' (1879); 'The Open House' (1883). He also wrote lyric poetry and essays on Polish literature.

Bal'uster, or **Ballister,** a kind of short column, sometimes in the form of an ancient bow, sometimes made after the model of Greek and Roman columns, employed in the construction of balustrades.

Balustrade, a series of balusters surmounted by a rail, and placed as an ornament on large buildings, above the cornice, or as a protection to enclose bridges, stairs, balconies, altars, and the like.

Baluze, bä-lüz, **Etienne,** French scholar and historian: b. Tulle, 24 Dec. 1630; d. Paris, 28 July 1718. He early acquired distinction by his varied and thorough knowledge, and was called to Paris by the celebrated Colbert, who commissioned him to make up his private library. In 1707 he was appointed to the supervisorship of the royal college, and dismissed from that office in 1709, being suspected of having in his 'Histoire Généalogique de la Maison d' Auvergne,' designedly established, by documentary evidence, that the princes of Bouillon were descended from the ancient dukes of Guienne, counts of Auvergne, and therefore owed no allegiance to the king of France. Such an offense could not be forgiven; and Baluze, deprived of nearly all his income, was compelled to reside successively at Rouen, Blois, Tours, and Orléans, and not until after the conclusion of the Peace of Utrecht was he permitted to return to Paris. He was of the most amiable temper, and his wit was equal to his cheerfulness.

Balvany, the Magyar name for idol, found in mediæval Latin documents of Hungary, and also in Hungarian geography, applied to various heights which were the last strongholds of paganism in the 11th century.

Balvas, Antonio, Spanish poet: b. Segovia in the middle of the 16th c.; died 1629. He wrote 'Elpoeta Castellano' (1627), a work highly praised by Lopez de Vega.

Baly, William, English physician: b. King's Lynn, 1814; killed in a railway accident near Wimbledon, 28 Jan. 1861. He studied at University College and Saint Bartholomew's Hospital, London, in Paris, Berlin, and at Heidelberg, where he received his M.D. degree in 1836. He commenced practice in London, and in 1841 was appointed physician to Millbank penitentiary, where he attained a reputation as an expert in the hygiene of prisons, on dysentery and cholera. He was appointed lecturer at Saint Bartholomew's Hospital; became a fellow of the Royal Society in 1847; in 1859, was chosen as one of the physicians to the royal family, and later, became censor to the College of Physicians; and crown representative in the Medical Council. He wrote: 'Diseases of Prisons'; 'Gulstonian Lectures on Dysentery' (1847); translated from the German Müller's 'Elements of Physiology,' and 'Recent Advances in the Physiology of Motion, the Senses, Generation and Development'; and with Gull, wrote 'Epidemic Cholera' (1854).

Balzac, Honore de, French novelist: **b.** Tours, 16 May 1799; d. Paris, 17 Aug. 1850. His family was of no account, and the aristocratic "de" (adopted perhaps in good faith), dates from 1830 or thereabouts. The surname itself seems to have been properly spelled Balsa, or Balsas, the first to alter it being the novelist's father, whose parents were peasants in Languedoc. Little is known of the elder Balzac's career, except that he was at one time a lawyer and later an officer in the commissariat; he married past middle age, and at the time of Honoré's birth filled certain municipal offices in the city of Tours. He is represented as a man of whimsical character, caustic but indulgent, with a wonderful memory, and full of schemes for making millions and reaching the age of 100. His wife, whose name was Sallambier, had good looks and a fortune; she is said to have been pious and imaginative, and devoted to her children's welfare, but by no means outwardly tender to them. At any rate Honoré and his favorite sister Laure (afterward Mme. Surville), if not her two younger children also, were brought up very strictly.

He was sent to school early with the Oratorians of Vendôme and was as miserable there as his Louis Lambert. All he learned was by desultory reading, and that in books too deep for his age. His masters thought him dull and lazy, and his absent-mindedness having developed into a sort of daze, he was withdrawn by his parents and became a day-scholar for a time at the Collège de Tours. Neither there nor at a boarding-school in Paris, to which city the family removed in 1814, was he by any means a brilliant pupil; and at home not only his talents but the ambition to write which had already seized upon him remained quite unsuspected. In 1816 he was put into a lawyer's office and 18 months later began to work with a notary, both his chiefs being intimate friends of the family; at the same time he attended various lectures at the Sorbonne, and was becoming familiar with the great writers of his country. His mind was made up to devote himself to literature, when in 1819, M. de Balzac, who had recently lost money in speculation and was about to retire, announced to Honoré that his friend the notary offered to take him into partnership with the prospect of succeeding to his practice. Honoré resisted, and begged for a chance to show his literary gift; after some discussion his father gave him his way and, while the family made its own home at Villeparisis, he was installed in an attic near the Arsenal Library on a two years' trial of his powers, with an allowance barely sufficient to keep him from starving. Here in cold and hunger and solitude, but supported by his unconquerable gaiety and self-confidence, he set to work first on two tales which were soon to be finished, then a comedy, lastly a tragedy in verse, 'Cromwell,' which he firmly believed to be a masterpiece. He brought it home with him in the spring of 1820: the family yawned when he read it, and a friend to whose judgment this first composition was submitted, Andrieux the academician and professor, recommended the young man to try his hand at anything in the world but literature. He had only spent 15 months of his probation, but his mother insisted

that he should now live at home; privations had already told upon his vigor, and he was obliged to recruit in Touraine before settling down at Villeparisis. There, nothing discouraged, in the next five years he wrote, with different collaborators, no less than 31 volumes of fiction, and found publishers for them. Of the entire worthlessness of this early work he was perfectly aware; it appeared under various pseudonyms ('Horace de Saint-Aubin' was the favorite), and when long afterward in great distress for money he allowed it to be republished, he would never acknowledge the paternity.

It was at this time that he became acquainted with the Berny family, then resident at Villeparisis, and formed with Madame de Berny — a woman more than 20 years older than himself — a close friendship which lasted until her death in 1836, and to which he owed, perhaps the most generous and disinterested sympathy that he ever received from man or woman.

In 1824, determined to win his independence, young Balzac returned to Paris and set up business as a publisher on borrowed capital. He had a great scheme — the first of many — for making a fortune by bringing out one-volume editions of the French classics, and began with Molière and La Fontaine; but chiefly for want of proper advertising the venture failed. He next became a printer, having induced his father to advance him the sum necessary to buy the stock and a printer's license, and seeing a type-foundry offered at a bargain he presently acquired that also. It was a most disastrous speculation; bankruptcy was only averted by the help of his mother and of Mme. de Berny, and this was the beginning of his life-long indebtedness.

Before his business was wound up Balzac was already at work, in a room in the Rue de Tournon, upon the first novel to which he signed his name. 'Les Chouans' was finished during a visit to Fourgères, in the district which is the scene of the historical events it describes, and published in 1829 with some success. The rather cynical manual called 'La Physiologie du Mariage' followed; then a number of shorter stories, and, in 1831, 'La Peau de Chagrin'—with which book his reputation became fairly established. Publishers and editors now sought for his work, and the curiosity and interest his writings already excited are attested by the anonymous correspondence which began at this time to pour in upon him. It was in this way that in 1830, he made the acquaintance of two women, the Marchioness de Castries and Mme. Hanska, whose names cannot be omitted from any account of his life. For Mme. de Castries Balzac conceived a transient, but certainly strong passion, which seems to have only gratified the vanity of a rather heartless but very intelligent great lady; she made a plaything of him; but he owed to her his most genuine insight into the manners, traditions, and ideals of the close society of the Faubourg Saint-Germain. Her portrait, it is conjectured, may be found in 'La Duchesse de Langeais.' Mme. Hanska, a Polish lady of birth, married to a Russian in the Ukraine, was the object of his deepest and most enduring affection, and eventually became his wife. His letters to this «Etrangère» have in recent years been published; they are discreet, frequent, and voluminous, for these friends or lovers were seldom together, even after the death of M. Hanska, until the last two years of Balzac's life. His biographers have little tenderness for Mme. Hanska; hers was certainly an inexpansive nature; her love for her only child, the Countess Anna (afterward Mme. Mniszech), seems to have almost excluded other affections; she cared excessively for her rank and her comfort; tortured the great man by long deferring to fulfil her secret engagement with him, and in his last illness appears to have shown herself incredibly callous. Mme. Honoré de Balzac lived until 1882.

Balzac's story, from 1830 onward, is mainly the story of his herculean industry; and the most memorable dates in his life are doubtless those of the production of such masterpieces as 'Louis Lambert' (1832), 'Le Médecin de Campagne' and 'Eugénie Grandet' (1833), 'La Recherche de l'Absolu,' and 'Le Père Goriot' (1834), 'César Birotteau' (1837), 'Illusions Perdues' (1835–1841), 'Les Paysans' (1844–1845), 'La Cousine Bette (1846), 'Le Cousin Pons' (1847). Between 1830 and 1842 he wrote no less than 79 novels, besides much other literary work. After that date his literary activity slackened somewhat as his health began to fail. But during a considerable number of years, for long intervals together, he never worked less than 12 hours each day, often worked for 15 hours, or even for 20 at a stretch, supporting himself on a lean diet in which fruit was always an important element, and drinking as much coffee as the philosopher Kant. But he was never out of harness, even during his frequent absences from Paris — whether staying with friends in the French provinces, or art collecting in the north of Italy, or mine-prospecting in Sardinia (one of his most extraordinary ventures), or visiting Mme. Hanska at Geneva, Vienna, Berlin, or Saint Petersburg. These travels, a short-lived journalistic enterprise—'La Chronique de Paris'— several excursions into drama, more than one attempt to force the doors of the French Academy, and many quarrels with the press — a lawsuit with the 'Revue de Paris' made some stir in 1836 — are the chief outward events of Balzac's maturity. Throughout his career the money question is distressingly prominent, and the history of Balzac's liabilities is long and queer and complicated. The sums he made by his pen were very considerable; but his optimism was at least as great as his acquisitive faculty. No man was more capable of penurious living; none loved luxury better; but decent comfort and regularity were beneath or beyond him. Spells of asceticism were succeeded by fits of extravagance; the story of his suburban property Les Jardies, of his famous walking-stick, of the financier Goujon's house in the Rue Fortunée (now the Rue Balzac), which he bought for his future wife and spent half a million in filling with works of art — the very works described in 'Le Cousin Pons'— balances the story of his sacrifices, privations, and his games of hide-and-seek with creditors. He was a born speculator; he was also the most generous of men, and sometimes unfortunate in the objects of his generosity.

The strain entailed by Balzac's way of living and by his constant mental agitation was such as no constitution — and his was extraordinarily robust — could resist very long. From 1842, or

HONORÉ DE BALZAC.

thereabouts, he began to suffer from time to time with heart and lung troubles, and from 1845 onward he was rarely well. It was during his second stay at Vierzschovnian, Mme. Hanska's property in the Ukraine, that his health began to give serious anxiety. For a time he improved; but the climate, the uncertainty in which he was kept as to the reward of his long devotion, certain material obstacles to his marriage, the necessity of conducting his literary and other transactions by proxy, the anxieties of the political situation in France, misunderstandings with members of his own family, and the effort to force himself to work when work was beyond his failing physical powers, all hastened his end His marriage was solemnized at last in March 1850, at Berditchef, in Poland; rather more than two months later, Balzac arrived in Paris with his bride. He was a dying man, though he clung almost to the last to the hope of living to finish 'The Human Comedy,' and extinguish what was left of his debts. Victor Hugo was among those who visited his deathbed, and the same great poet it was who paid a splendid tribute to his friend and peer at the graveside in Père Lachaise. Occurring in the midst of a grave political crisis, his death was less noticed than might have been expected; but though widely read and fervently admired among his contemporaries — more especially perhaps in foreign countries — it wanted at least another generation to assure his fame; nor (thanks to a combative spirit and an ingenuous vanity) did he lack enemies; though the mere dedications of his novels are enough to show that his friends were among the elect of his age, and it is impossible to read his correspondence without a feeling of respect, and even of affection, for a personality so rich, so valiant, so tenacious, and so kindly.

It is best, in so slight an estimate of Balzac's colossal achievement as can be attempted here, to leave out of account not only the worthless fiction of his nonage but also his plays, of which only one, 'Mercadet,' first called 'Le Faiseur,' and produced with considerable changes after its author's death, can be said to have won or deserved success. An exceptional place belongs to the 'Merry Tales,' not so much in virtue of their notorious, guileless, and jovial salacity as because, while the form is more essential there than in anything else he wrote, they are among the very few skilful *pastiches* in literature — for the lapses they contain from either the language or the atmosphere of the early French Renaissance are astonishingly few — in which the mere erudition does not replace or overshadow other merits. They are memorable for their genuine zest, inventive vigor, and shrewd humanity.

Balzac's glory, of course, is that unfinished series of masterpieces called 'The Human Comedy,' which it is necessary to consider as one work in order to appreciate the audacity and breadth and steadiness of aim which are essential titles to his rank, not merely as the father of the modern novel and the supreme master of the craft, but as a genius of the universal order. In its most obvious bearing, it is an imaginative reconstruction of French society in every part and aspect, with all the vicissitudes and variations that affected it between the Revolution and the middle of Louis Philippe's reign: an heroical design, less comprehensive in regard to time and space than that of the Waverley novels, but more consistently and coherently executed out of more copious material. The picturesque, however, was subordinate to the philosophical interest, as he conceived it, of Balzac's undertaking. He intended his work for nothing less than a natural history of civilized man, which should illustrate the war between the passions of the individual and the social instinct or the common interest, the differentiation of types by the action of gregarious life, the reflection of personality in matter, and the stamp of habits and calling upon character. The theory outlined by Buffon and bequeathed by Geoffroy Saint Hilaie to the first evolutionists, which supposes a single original pattern of organic creation varied by the mere effects of environment, fascinated Balzac by a partly chimerical but, at any rate, suggestive analogy with human existence. «Does not society,» he asked in his general preface of 1842, «make of man, according to the sphere in which his activity develops, as many different men as there are species in zoology?» This conception is enough to explain one great characteristic of his novels — the importance attributed in them to atmosphere, to local influences, to material conditions, to all that the elder novelists had regarded as accidental and accessory. It is Balzac who set the example of bestowing as much care upon *things* as upon *men* in works of fiction. The description of streets, houses, furniture and works of art, of implements and equipages, of dress and pastimes, of customs and offices, business and procedure and, in particular, of all that pertains to money, is, throughout 'The Human Comedy,' not only exact and elaborate (sometimes to the point of tediousness and disproportion), but above all significant. Séchard's printing-press and Gaudissart's advertisements, the laboratory of Balthazar Claës, the aroma of Maman Vauquer's dining-room, are part and parcel of those famous personages.

The French imagination had tended for some time to desert that psychology *in abstracto* which had been at once the glory and the limitation of the great classical authors, and to pay more attention to the setting and the background of fictitious characters. Diderot particularly, who on several grounds might be called a herald of Balzac (and resembled him in vitality, variety of knowledge, fertility, hasty and unequal execution), had done much to carry into pure literature a spirit of curiosity about the common things of life, a new multiplicity of interests and concern for reality, and some of the results of natural science. But the romantic contemporaries of Balzac, most of whom were irresistibly allured by the prestige of the old and the distant, used the extension of imaginative matter to enhance the picturesque value of descriptions, rather than to enrich the definition of human types; for their interest in characters is generally insufficient, being dependent upon an introspection distorted as often as not by a morbid vanity. Balzac is unique in this, that with a searching modernity of outlook which omits none of the sensible elements of life from his imaginary world, he is yet essentially the restorer of the old, patient, constructive psychology and of the drama of internal action. It is remarkable how much of the spirit of the

grand siècle survives in his work; how much of La Bruyère in the brilliant pages of moral analysis, of Corneille in some of his heroes of the will of Molière in the smiling sanity of his attitude toward a necessarily imperfect society, of Racine in the sympathetic presentment of absolute passions and their victims! Balzac's personages — even the secondary figures — are at once individuals and types. They live with the intense life of living men and women; and we accept them as great moral symbols. They are highly differentiated, particularized with an unsurpassable sureness of detail; but they are also, one and all, informed by an *idea* — so that, though there is only one Goriot, he sums up all the tragedy of a primal affection run to seed and despitefully entreated; and there is only one Baron Hulot, but he contains all the shame of elderly profligacy, bringing disaster on whole families; and César Birotteau is inimitable, but he stands for all that is sterling as well as all that is ridiculous in the middle class.

In the vitality of his creatures Balzac is not inferior to Shakespeare himself. But we believe not only in the people he made, but in the whole world of 'The Human Comedy,' and accept it as a rival of reality. This mastery of illusion, the very highest virtue in a writer of fiction, does not depend upon veracity or exactitude of detail (a test which upon the whole he sustains triumphantly), but is simply the power to imagine strongly. It is true that in this case a system of composition which discarded chapters, or rather made of each novel (by the continual reappearance of old friends among the characters) a chapter in the whole work, is a powerful help to illusion; so of course are the accumulation of circumstances, and especially perhaps the variety and distribution of interests, in which Balzac's astonishing invention seems to play the part of chance.

The work of Balzac displays at one view the whole capacity of the form of literature called fiction, its scope and possibility of content. The ordinary tone of the French novel had once been heroic and pastoral; then it had tended to caricature and to the parodying of court memoirs; and later the ideal had been to amuse one class by showing the manners of another. The picturesque romance had been succeeded by «realistic» satires upon society and, with the advent of the *philosophes,* the novel became a pamphlet, a vehicle of moral or political doctrines. Perhaps all these phases are represented in 'La Comédie Humaine': the novel according to Balzac is simply a universal instrument like Homer's epic or Shakespeare's drama. The ineffaceable mark of his achievement upon his successors is that, since Balzac, the novel in France is not a toy but a serious art. Balzac indeed would not have been content with the qualification; half the preface already referred to is an apology for the novel considered as a work of science and a means of propaganda, and to him — to his precept rather than to his practice — must be traced the arrogant pretensions of some modern writers of fiction, their sermons and sociology and what Flaubert so disdainfully called their *manie de conclure.* A work of imagination does not need the protection of a political creed or a scientific hypothesis; it is Balzac's weakest side that, while he sinks what we call his personality almost always, he frequently obtrudes fallible opinions — matter for argument — into the domain of the imagination. His royalism is an interesting fact, but in his novels it is irrelevant; the same is true of many of his political prophecies. It should be added that he seldom intervenes directly in the discussion of scientific theories (which hold a somewhat important place in his novels), though with characteristic credulity he identifies himself expressly with the speculations of the phrenologists! There was a mystic in Balzac, and that section of his work, 'Philosophical Studies,' which deals with the solitary adventures of the mind in regions beyond the world of sense, is strangely original and fascinating.

He was, in some degree reluctantly, an artist — a prodigious though an imperfect artist. His defects of form have been exaggerated. His style, like Saint-Simon's, is vigorous and vivid in default of correctness, and full of fortunate phrases; but he was wanting in the sense of idiom, and the effort to condense his thought often produced a clumsy syntax and obscurity. Haste no doubt accounts for some base coinage, repetition, and inadequate expressions. As of other writers of his stature it may be said of him that his fecundity was necessarily wasteful, so that a part of his work is greater than the whole. This exuberance, a certain worship of the excessive, a stupendous confidence for which no design is too large, and a preference for the expressive over the symmetrical, for colour over draughtsmanship, are characteristics which he shares with several great Frenchmen of his generation — the generation conceived in camps and lulled by the guns of Austerlitz, which grew up haunted by a vision of heroical accomplishment. Honoré de Balzac stands beside Victor Hugo and Jules Michelet and Hector Berlioz and Eugène Delacroix — a giant among giants, a perennial force among the intellectual forces of the world.

Bibliography.—The best edition of the complete works of H. de Balzac is the 'Edition Définitivé' in 24 volumes (Paris, 1869–76). Uniform with it are the letters to Mme. Hanska, 'Lettres à l'Etrangère,' posthumously published in 1899. There exist numerous English translations of insulated novels. Prof. G. Saintsbury in the general edition of a complete English translation of a 'Human Comedy,' by various hands, in 40 volumes (London, 1895–98). The letters to Mme. Hanska have been translated by D. F. Hannigan—'Love Letters of Balzac' (London, 1901). Among biographical and critical studies of Balzac the more valuable are the following: L. Gozlau, 'Balzac chez lui' (1862); E. Biré, 'Balzac' (1897); Le Breton, 'Balzac, l'homme et l'œuvre' (1905); F. Brunetierè, 'H. de Balzac'; Vicomte Spoelberch de Lovenjoul, 'Histoire des œuvres de Balzac' (1880); 'La Genèse d'un roman de Balzac'—'Les Paysans' (1901); 'Un pays perdu d'H. de Balzac' (1903). The short life of her brother by Mme. Surville (Laure de Balzac), first published in 1858, is included in the volume of the 'Edition définitive' containing Balzac's general correspondence. In English Mr. Frederick Wadmore has written a 'Life of Balzac'; and a better-informed study by Miss M. F. Sandars appeared in 1904.

F. Y. Eccles.

Balzac, Jean Louis Guez de, French essayist and letter writer: b. Angoulême, 1597; d. 18 Feb. 1654. In his youth he was secretary to Cardinal La Valette at Rome. He returned to Paris, devoted himself to literature, and under Richelieu became councilor, and historiographer of France, and was one of the most influential members of the Academy from its foundation, likewise a sort of oracle of the Hôtel Rambouillet. His influence on French prose is ranked with that of Malherbe on poetry. Besides his 'Letters' (1624), which are elaborate epistles with a definite attempt at style, he wrote 'The Prince' (1631), a glorification of absolute monarchy; 'The Dotard' (1648); 'The Christian Socrates' (1652); and 'Aristippus' (1658), the latter intended to portray the ideal statesman. His 'Letters' were edited by Larroque (1874).

Balzico, bäl-tsē'kō, **Alfonso,** Italian sculptor: b. 1825. He was educated at the Academy of Naples, and in Rome. Among his works are: 'John the Baptist'; 'Cleopatra'; 'The Free'; 'Vincenzo Bellini'; 'Duke Ferdinand of Genoa'; and 'Victor Emmanuel.'

Bambarra, bäm-bär'ra, a negro kingdom of western Africa, lying at the point where 5° W. lon. and 12° N. lat. cross. It was first visited by Mungo Park. In the east the country is flat and swampy; but in the west there are low chains of granite hills. The climate in some parts is intensely hot, but is generally healthy. The land is well watered and fertile. The rainy season is from June to November. Cotton, maize, and yams are raised. The inhabitants, a branch of the Mandigoes, number about 2,000,000 and are superior to their neighbors in intelligence. The principal towns are Sego, Sansandin, Yamina, and Bammako. Many local merchants are very wealthy, and a quite extensive trade is carried on, the natives working articles in gold, ivory, and iron. In 1881 a treaty with the sultan of Sego opened up the country to French traders.

Bamberg, bäm'bĕrg, a town of Bavaria, in Upper Franconia, on the navigable Regnitz (which here divides into two), three miles above its junction with the Main, partly on a plain, partly on hills, amid vineyards and gardens. Its chief edifice is the Roman Catholic Cathedral, built in the 12th century, and forming one of the finest examples of the transition from the Romanesque to the Gothic style, with four towers, a noteworthy portal, and interesting sculptures and monuments. Other buildings include the old palace or residence; another palace, formerly occupied by King Otto of Greece; the former castle of the prince-bishops of Bamberg, etc. The educational institutions include a college or lyceum, an old and a new gymnasium, a Roman Catholic seminary, an observatory, etc. There is a library containing 300,000 volumes, with valuable MMS. and early printed books. There are manufactures of cotton and woolens, besides other industries, such as market-gardening and seed-growing, brewing, etc. The United States is represented by a resident consul. Pop. (1902) 42,300.

Bamberger, Heinrich von, Austrian pathologist: b. Prague, 1822; d. 1888. He was graduated in medicine in 1847, and became professor of special pathology and therapeutics, first in the University of Würzburg, and in 1872 in the University of Vienna. Of his numerous publications, two have been held in particularly high esteem, 'On the Diseases of the Chylopoietic System' (1855), and 'Treatise on Diseases of the Heart' (1857).

Bamberger, Ludwig, German statesman: b. Mainz, 1823; d. 1899. He was educated at Giessen, Heidelberg, and Göttingen; took part in the revolution of 1849; and was a member of the German Reichstag 1873–80. He was an advocate of free trade, and on account of his opposition to Bismarck's economic policy, he left the National Liberal party and joined the "Secessionists," a group which later became part of the German Liberal party. His publications include 'Monsieur de Bismarck' (of which there is an English translation; 'The Five Milliards'; 'Germany and Socialism'; etc.

Bambino, bäm-bē'nō, the figure of our Saviour represented as an infant in swaddling clothes. The 'Santissimo Bambino' in the Church of Ara Cœli at Rome, a richly decorated figure carved in wood, is specially venerated, and is often the object of impressive religious demonstrations.

Bambocciades, bäm-bŏch-ĭ-ädz', paintings generally grotesque, of common, rustic, or low life. The name is derived from the nickname of Peter Van Laer, a Dutch painter of the 17th century, who, on account of his deformity, was called *bamboccio* (cripple). Teniers is the great master of this style.

Bamboo, the common name of more than 200 species of about 20 genera of perennial, mostly tree-like, tropical and sub-tropical grasses unevenly distributed throughout the world, but most abundant in southern Asia, where 160 or more species are found from sea-level to altitudes of 10,000 feet or slightly more in the Himalayas; and next most plentiful in America, where there are about 70 species, some of which reach elevations of 15,000 feet in the Andes. Occasional specimens of the larger species attain a height of 120 feet and a girth of 3 feet. From the jointed root-stock the numerous jointed, usually straight and erect, but sometimes crooked or creeping stems grow without branches until the full height is reached, when a more or less dense thicket of horizontal limbs is developed, and the great panicles of flowers appear.

The number of uses to which these plants are put rivals that of the palms. In fact the various species can be utilized for man's every purpose. The light, elastic hard stems, hollow or slightly pithy, except at the joints, which are strong partitions, are used for bridges, masts, poles, joists, fishing-rods, etc.; when the partitions are removed, for waterpipes; when sawed in sections, for pails (the natural partitions serving as bottoms), cooking-utensils, life-preservers, bows, arrows, quivers, walking-canes, flutes, and smoking-pipes; when split, for nets, hats, fishing-rods, wicker-work, and umbrellas. Parts of the leaves of some species are used for paper-making, thatch, and hats; the young shoots of some are used as food, either boiled or pickled; the seeds, for food and for making a kind of beer; some of the spiny species are planted as hedges for defense against foes, animal and human.

Some species yield "Indian honey" (so called by the Greeks), the air-dried saccharine exudations from the nodes. Sometimes this sub-

stance is called *tabaris* or *tabasheer* (q.v.), which is properly a phosphorescent substance obtained from other species and from related grasses. Many of the species are of exceedingly rapid growth; even in greenhouses specimens have been known to attain a height of 20 feet in two months or even less time. In arid climates the bamboos are often of great value, since they are among the few plants that will grow in such places. Many species are cultivated for ornament, not only in warm countries, but in greenhouses. Some species are hardy in climates where the thermometer does not fall much below the freezing-point. In general the hardy species do best in deep, rich soil, and warm situations protected from severe winter winds. The roots should be given a protective mulch of litter in autumn, and this should be allowed to remain during the summer as a moisture conserver. For an account of ornamental bamboo culture in greenhouse and out of doors, and of the ornamental species grown in America, consult Bailey & Miller, 'Cyclopedia of American Horticulture.'

Bamboo Rat, a name given to several species of mole-rats, of the genus *Rhizomys,* found in the bamboo jungles of India.

Bamborough (băm'bŭr-ō) **Castle,** an ancient English castle on the coast of Northumberland, formerly with its connected estate the property of the Forsters, and forfeited to the Crown in 1715, both being purchased by Lord Crewe, Bishop of Durham, and bequeathed by him for charitable purposes.

Bam'bouk, or **Bambuk,** a region in west Africa, in the French colony of Senegal, between the Falémé and Senegal rivers, between lat. 12° 30′ and 14° 30′ N.; lon. 10° 30′ to 12° 15′ W., and estimated to be about 140 miles in length by 80 to 100 in breadth. Besides the Senegal, its tributaries, the Falémé and the Bafing (or Upper Senegal), form its natural boundaries. A considerable part is somewhat rugged, though not very elevated, the highest points seldom exceeding 600 feet. The valleys and plains are remarkably fertile. The baobab, calabash, tamarind, with a variety of acacias and palms, reach the utmost limit of their fruitfulness; maize, millet, cotton, and a multitude of leguminous plants grow almost without culture, and rice is produced in the lowlands, which are subject to inundation. Its unhealthiness, however, makes it almost uninhabitable by Europeans. The animals comprise lions and elephants, wild cattle, crocodiles, etc. Gold is found in abundance. It is carelessly worked, and is given to traders in exchange for salt, an article in great demand, and various other goods. Bambouk is more sparsely inhabited than formerly. The natives are Mandingoes and form a considerable number of communities or confederations more or less hostile to each other. The country has latterly been fully explored by the French, who are developing its resources and have constructed a railway along the Senegal from Kayes to Bafulabé. In the 15th century the Portuguese, allured by the fame of its gold, invaded Bambouk, but ultimately perished almost to a man, partly through intestine dissensions and debauchery, and partly by the weapons of the natives.

Bamian, bä-me-än′, a valley and pass of Afghanistan, the latter at an elevation of 8,496 feet, the only known pass over the Hindu Kush for artillery and heavy transport. The valley is one of the chief centres of Buddhist worship and contains two remarkable colossal statues and other ancient monuments.

Bammako, bä-mä'kō. See BAMBARRA.

Bampton Lectures, a course of lectures established by John Bampton, canon of Salisbury, who bequeathed certain property to the University of Oxford for the endowment of eight annual divinity lectures to be annually delivered. The subjects prescribed are, the Confirmation of the Christian faith and the confutation of all heretics and schismatics; The divine authority of the Scriptures; The authority of the primitive Fathers in matters of Christian faith and practice; The divinity of Christ; The divinity of the Holy Ghost; The Apostles' and Nicene creeds. The lecturer must have taken the degree of M.A. at Oxford or Cambridge, and the same person may not lecture twice. The first course of lectures was delivered in 1780, and they have been delivered every year since, with the exceptions of 1834, 1835, and 1841. A list of the lectures will be found in the yearly 'Historical Register of the University of Oxford.'

Ban, the title of the governors of certain military districts in the eastern part of Hungary, corresponding to the German title of margrave. The ban is nominated by the king, renders an oath to the Diet, and formerly had very extensive powers, exercising an almost absolute authority in the political, judicial, and military affairs of his district. The progress of Turkish conquest after the unfortunate battle of Mohacs in the 16th century extinguished the most of the banats, and there remains now only the banat of Temesvar, the ban of which is the third great dignitary of the Hungarian kingdom and has the title of ban of Croatia.

In Teutonic history the ban was an edict of interdiction or proscription: thus, to put a prince under the ban of the empire was to divest him of his dignities and to interdict all intercourse and all offices of humanity with the offender. Sometimes whole cities have been put under the ban; that is, deprived of their rights and privileges.

Bana, bä'na, in Hindu mythology, a thousand-armed demon or giant who was the enemy of Vishnu, but the friend of Siva.

Ban'ak, or **Ban'nock,** an Indian tribe of Idaho. Its territory formerly extended over southern Idaho and eastern Oregon; but the tribe is now concentrated on the Fort Hall and Lemhi reservations, Idaho. Those of the latter reservation are confederated with the Shoshoni.

Banana, ba-nä'na, an island in west Africa, north of the mouth of the Kongo; also a seaport of the Kongo Free State, situated on the island. A few years ago the town was an important commercial station, but after the building of the railroad from Matadi, and the establishment of an ocean steamship line direct to that place, Banana began to decline, and, at last lost all its trading importance when the extensive Dutch firms formerly established there removed their headquarters to Kabinda and Kisanga, in Portuguese territory.

Banana (*Musa sapientium*), a tropical herb of the natural order *Scitaminaceæ,* apparently native of India, but unknown in a wild state;

BAMBOO GROVE IN JAVA.

valued somewhat for its fibre and decorative appearance, but mostly on account of its fruit, for which it is widely cultivated in warm climates. For a large part of the human race it ranks as high as cereal grains among northern peoples. Though considered less nutritious than an equal weight of potatoes, the banana is said to produce more food upon a given area and to be capable of sustaining a larger number of persons than wheat. From its perennial rootstocks suckers are thrown up to a height of from 8 to 40 feet or more. They bear a whorl of paddle-like leaves, from among the bases of which, in about two years, a large heart-shaped scaly bud appears. As the bud grows it becomes pendant, the scales separate and disclose groups of upward-pointing flowers sometimes to the number of 150. The fruit is gathered while still green, the stem being cut at the same time. Of the suckers that quickly appear, one, two, or three are allowed to remain for the succeeding crop. When once established the plants should bear a bunch every year. Since the plants rarely or never bear seeds, suckers are usually relied upon for propagation. Propagation by means of root-cuttings is a more rapid means of multiplying the number of plants, but is used only when large numbers are desired. The plants are set in the field 8 to 12 feet apart when two or three feet high; when full grown they completely shade the ground. Since 1870, when only a few hundred bunches were imported into the United States, the banana has become increasingly popular: in 1899 $5,600,000 worth was imported, mainly from the West Indies and Central America. California, Florida, and Louisiana produce a small quantity, but these States cannot be expected to compete with warmer climates. Banana flour, produced in the tropics from ripe bananas, is growing in popularity wherever introduced, and dried bananas seem to promise an outlet for excessively heavy crops. The botanical name, *Musa sapientium*, which means "of the wise muse," alludes to Theophrastus' statement that the wise men of India used a certain fruit for food, which seems to have been the banana or the plantain.

Banana-birds, any of several small West Indian insect, and honey-eating birds that frequent the banana groves, especially the banana-quit (*Certhiola flaveola*) of Jamaica, whose pretty ways are described at length by Gosse in his books on the natural history of that island. One species (*C. bahamensis*) occasionally visits Florida. All these birds are brilliantly plumaged, usually rich blue with yellow markings, and represent the sun-birds (q.v.) of the Eastern tropics.

Banana-fish. See LADY-FISH.

Bananal, bä-na-näl′, also called SANTA ANNA, an island in Brazil, formed by the River Araguaya, in the province of Goyaz. Its length is 200 miles; breadth 35 miles. It is covered with dense forests, and has in its middle an extensive lake. Soil, fertile. Also the name of several small villages in Brazil.

Banas, ba-näs′, a common name for rivers in India. The most important are: (1) a river of Shutia Nagpur, Bengal, having a northwest course of about 70 miles, and falling into the Sone, near Rampur; (2) a river which rises in the Aravulli Mountains, and, after a southwest course of 180 miles, is lost in the Runn of Cutch; (3) a river of Rajputana, also rising in the Aravulli Mountains, flowing northeast through Mewar for 120 miles, then southeast, and falling into the Chambal, after a total course of 300 miles.

Ban′at, a term applied to any district ruled by a ban (q.v.). Specifically a large and fertile region in Hungary, consisting of the counties of Temesvar, Torontal, and Krisso; principal town, Temesvar. The region originally belonged to Hungary; was occupied by the Turks in 1652–1716; and was reunited to Hungary in 1779. The population exceeds 1,500,000.

Ban′bridge, Ireland, a market town in County Down, 22 miles southwest of Belfast, situated on the Bann. It has an Episcopal church in the Gothic style, and several other churches. The principal manufacture is that of linen, which is carried on to a great extent. Pop. (1901) 5,376.

Ban′bury, England, a municipal borough and market town of Oxfordshire, on the Oxford Canal, 23 miles north of Oxford, and 78 northwest of London by rail. Its strong castle, built about 1125, was demolished during the Great Rebellion, when Banbury was noted for Puritanical zeal. In 1469 the Yorkists were defeated in the vicinity. The town is still famous for its cakes and ale, as in Ben Jonson's day; and it manufactures webbing and agricultural implements. Among the buildings are the parish church (1797) and the town hall (1854). Pop. (1901) 12,967.

Banc (Lat. *Bancus,* Ger. Bank, a bench), legally a seat or bench of justice, and in this sense has given rise to the expression in courts of common law, "sitting in banc," or *in banco* — that is, sitting together on the bench of the respective courts.

Banca, bän′ka, **Banka,** or **Bangka,** an island of the Malay Archipelago, belonging to the Netherlands, between Sumatra and Borneo; area, 5,000 square miles. It possesses several considerable bays and is hilly. It is celebrated for its excellent tin, obtained in black alluvium in the north end of the island, about 25 feet below the surface, and of which the annual yield is about 4,000 tons. Banca likewise yields iron, copper, lead, timber, sago, nutmegs, benzoin, etc. The population is about 100,000, of which a large proportion are Chinese.

Banca, a boat used in the Philippines, made from a single log and furnished with an out-rigger.

Ban′co, a term designating the money in which the banks of some countries keep or kept their accounts in contradistinction to the current money of the place, which might vary in value or consist of light and foreign coins. The term was applied to the Hamburg bank accounts before the adoption (in 1873) of the new German coinage. The mark banco had a value of 35.43 cents; but there was no corresponding coin.

Ban′croft, Aaron, Unitarian clergyman: b. Reading, Mass., 10 Nov. 1755; d. 19 Aug. 1839. He was graduated at Harvard in 1778; became pastor in Worcester in 1785, where he remained nearly 50 years. Besides a great number of sermons, his works include a 'Life of George Washington' (1807). He was the father of the historian, George Bancroft.

Bancroft, Cecil Franklin Patch, educator: b. New Ipswich, N. H., 25 Nov. 1839. He graduated from Dartmouth in 1860; at Andover Theological Seminary in 1867; and at the University of Halle, Germany. He was ordained to the Congregational ministry in 1867, but has never held a pastorate. In 1873 he was made principal of Phillips Academy, Andover, Mass., and since then has sent more boys to colleges and scientific schools than any other American secondary school teacher. He has frequently contributed religious and educational articles to periodicals.

Bancroft, Edward, American physician: b. Westfield, Mass., 9 Jan. 1744; d. 8 Sept. 1820. Early in life he ran away from home; became a practising physician in Guiana; and passed the latter part of his life in England. During the Revolutionary war he is believed to have been a spy for the British. His publications include a 'Natural History of Guiana' (1769) and 'Researches Concerning the Philosophy of Permanent Colors' (2 vols. 1794–1813).

Bancroft, George, American historian: b. Worcester, Mass., 3 Oct. 1800; d. Washington, D. C., 17 Jan. 1891. He was the son of Rev. Aaron Bancroft (q.v.), a Unitarian clergyman, and Lucretia Chandler Bancroft. He fitted for college at Phillips Academy, Exeter, N. H., entered Harvard College at the age of 13, and was graduated before reaching his 17th birthday. Edward Everett, then professor of Greek, having proposed that some young graduate of promise be sent to Germany for purposes of study in order that he might afterward become one of the corps of instructors, Bancroft was chosen, and in the summer of 1818 went to Göttingen, where two years later he received his degree of Ph.D. At Göttingen he studied German literature under Benecke; Italian and French literature under Artaud and Bunsen; Oriental languages and New Testament Greek under Eichhorn; natural history under Blumenbach; and the antiquities and literature of Greece and Rome under Dissen, an enthusiastic admirer of Plato, with whom he went through a thorough course of Greek philosophy. But his chief attention was given to history, which he studied under Heeren, the greatest historical critic of that day, and one of the most scientific of all historians. In choosing this special branch, Bancroft gave as a reason his desire to see if facts would not clear up theories and assist in getting out the true one. For a time he also studied at Berlin, where he was warmly received by the leaders in the academic world, notably, Wolf, the editor of Homer; Schleiermacher, and Hegel, to whom he brought tidings of their fame in the New World. In an extended tour through Germany and other countries he met Goethe at Jena, studied for a time with Schlosser at Heidelberg, formed an acquaintance with Manzoni at Milan and a life friendship with Chevalier Bunsen at Rome, where he also met Niebuhr. At Paris he was kindly received by Cousin, Benjamin Constant, and Alexander von Humboldt. Returning to America in 1822 he served for a year as tutor in Greek at Harvard. In 1823, in conjunction with J. G. Cogswell, he established the famous Round Hill School at Northampton, Mass., a preparatory school far in advance of its time as to systems of study and class-books. The teachers were good, the instruction inspiring, and the students led a happy, healthy life, but the undertaking proved a failure financially. Bancroft withdrew in 1830, and Cogswell two years later. Many of their students afterward became men of national reputation or prominence, among them being J. L. Motley, Ellery Channing, G. E. Ellis, and Theodore Sedgwick. Henceforward his career is best separated into political and literary. During the Round Hill years he had cut loose from the political traditions of the Harvard circle. In a public speech in 1826 he had avowed his principles to be for universal suffrage and uncompromising democracy, and at once became foremost in the councils of the Democratic party, though twice declining nomination or election to the State legislature. Van Buren appointed him collector of the port of Boston (1838–41), and his administration of the office won the praise of his political opponents. While collector he appointed Nathaniel Hawthorne and Orestes Brownson to offices within his jurisdiction. In 1844 he was defeated as the Democratic candidate for governor of Massachusetts, although he received more votes than any previous candidate of his party. In 1845 he became secretary of the navy under Polk. It was he who planned and established the Naval Academy at Annapolis, Md.; he gave the first order to take possession of California; and while acting secretary of war ordered Gen. Taylor to march into Texas, thus ultimately leading to the annexation of that State. During 1846–9 he was minister-plenipotentiary to Great Britain, and there successfully urged upon the British ministry the necessity of adopting more liberal navigation laws. His reputation as a man of letters put the manuscript treasures of the great English families at his disposal, and he combined his public duties with ardent historical researches. From 1849 to 1867 he lived in New York city, absorbed in literary work. During the Civil War he was a patriotic War Democrat, and delivered a powerful speech effectually demolishing the Constitutional plea for slavery. Before both Houses of Congress he delivered a masterly eulogy on Lincoln. Appointed minister to Prussia in 1867 he achieved a diplomatic triumph in bringing about the adoption of treaties in which England and Germany finally recognized the right of expatriation and abandoned their doctrine of «once a citizen, always a citizen.» In the northwest boundary treaty, negotiated by Polk, there was an ambiguity concerning a portion of the line. It was decided to submit the point to the German emperor for arbitration. Bancroft prepared the whole American argument and the reply to the case of the British. The decision was unreservedly in favor of the United States.

His first publication was a volume of 'Poems' (1823), all European in theme. This was followed by books for the use of his students, translations of Heeren's 'Politics of Ancient Greece' (1824), and Jacobs' 'Latin Reader' (1825). His first article in the 'North American Review' appeared in October 1823, and was a notice of Schiller's 'Minor Poems' with numerous translations. Thenceforward he wrote in almost every volume, but always on classical or German themes, until in January 1831, he took up 'The Bank of the United States', and in October 1835 'The Documentary History of the American Revolution.' The two

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latter indicate the direction his historical studies had taken. Then came the beginnings of his great 'History of the United States,' the work which gave him his greatest fame. The first volume appeared in 1834, the second in 1837, the third in 1840, the fourth in 1852, the fifth in 1853 and so onward to the tenth in 1874. The earlier volumes were received with enthusiasm in America, pirated in England, translated into Danish, Italian, German, and French, both with and without the author's permission. The 15th editions of Vols. I–III was issued in 1853. The design of the work was as deliberate as Gibbon's, and almost as vast, and, like Gibbon, Bancroft lived to see his work accomplished. The history of the United States from 1492 to 1789 is treated in three parts. The first deals with 'Colonial History, 1492–1748.' The second part, 'The American Revolution, 1748–82,' is divided into four epochs called respectively: 'Overthrow of the European Colonial System, 1748–63'; 'How Great Britain Estranged America, 1763–74'; 'America Declares Itself Independent, 1774–5'; and 'The Independence of America Acknowledged, 1776–82.' The last part, though published as a separate work, entitled 'History of the Formation of the Constitution, 1782–9,' is really a continuation of the 'History.' The work is still the most popular and widely read of the larger American histories. Bancroft's materials and facilities for writing it were better and more extensive than any other writer on our Anglo-American history has enjoyed. His private collection of manuscripts and documents, original and copies (now in the Lenox Library, New York), was by far the finest of his day in private hands, and superior to most institutional collections. His merits as a historian are positive and incontestable. For his subject he had a boundless and untiring enthusiasm, and he was permeated with that democratic spirit without which the history of the United States cannot be adequately written. Though his early style is justly open to the charge of being pompous, inflated, and over-ornamented, it is essentially picturesque, and the earlier defects were greatly remedied by his successive revisions of the work. His command of his resources was masterly, and a far from favorable critic candidly admits that «one must follow him minutely through the history of the war for independence to appreciate in full the consummate grasp of a mind which can deploy military events in a narrative as a general deploys brigades in a field. Add to this the capacity for occasional maxims in the highest degree profound and lucid, and you certainly combine in one man some of the greatest qualities of the historian.» It has been said that he made no effort to avail himself of the materials and results of other investigators, but nowhere does he claim finality for his work, and his later years were chiefly occupied in weaving into his narrative what he and no one else had. In 1876 he issued a Centenary edition in six volumes, upon which he had spent a solid year in revision. Again in 1883–5 he published what he termed the «author's last revision» in six volumes large octavo. In this he made considerable changes in arrangement and the subdivisions, all tending to a better ordering of the narrative. There were frequent omissions and condensations, and many repetitions and redundancies were cast out. These final changes have, in the judgment of good scholars, better fitted the work for permanent favor. It will remain necessary to the student until another historian, with equal or better facilities, shall rewrite the story in a way to gain wider sympathy. Present tendencies and methods in historical study and writing give little evidence that such another will soon arise. His lesser works include 'Poems' (1823); 'Literary and Historical Miscellanies' (1855); 'Memorial Address on the Life of Lincoln' (1866); 'Joseph Reed: a Historical Essay' (1867); 'A Plea for the Constitution of the United States Wounded in the House of Its Guardians' (1886); 'Necessity, Reality, and Promise of the Progress of the Human Race' (1854); 'Oration, 4 July 1826, Northampton, Mass.'; 'Oration Before the Democracy of Springfield, Mass., 4 July 1836'; 'Address at Hartford, Conn., 18 Feb. 1840'; 'History of the Formation of the Constitution of the United States' (1882); 'Oration Delivered at the Commemoration, in Washington, of the Death of Andrew Jackson, 27 June 1845.' To the American Encyclopædia he contributed the article on Jonathan Edwards. See Green, 'George Bancroft' (1891); Wallis, 'Mr. Bancroft as a Historian' (1896); West, 'George Bancroft' (1900).

Bancroft, Hubert Howe, American historian: b. Granville, Ohio, 5 May 1832. In 1852 he went to California to establish a book business, and began to collect documents, maps, books and MSS. for a complete 'History of the Pacific States' from Mexico to Alaska. In 1893 this library numbered 60,000 volumes, to which many additions have been made. His histories are still in preparation. 'Literary Industries' (Vol. XL., San Francisco, 1890) describes his work.

Bancroft, Marie Effie Wilton, English actress, wife of Sir Squire Bancroft (q.v.). She appeared on the stage when a child, and acted in several places before making her London début. In London she won great popularity in several plays, particularly in 'The Maid and the Magpie' at the Strand. In 1865 she became a partner in the management of the Prince of Wales' Theatre, and obtained Squire Bancroft (afterward her husband) as leading man. Since then she has been associated with him as manager and actress.

Bancroft, Richard, English archbishop: b. Farnworth, Lancashire, 1544; d. 1610. He studied at Cambridge, entered the Church, and rose rapidly during the reign of Elizabeth till he obtained the see of London in 1597. After her death James I. made him archbishop of Canterbury on the death of Whitgift. He possessed good talents, and was distinguished as a controversialist, a preacher, and a politician. The greatest blot on his memory is the rigor with which he treated the Puritans.

Bancroft, Sir Squire, English actor: b. 1841. He began his career in Birmingham in 1861, and played at Dublin and Liverpool. In 1865 he made his first appearance at the Prince of Wales' Theatre, and continued there several years as leading man in a series of comedies depicting modern life, among which are: 'Society'; 'Caste'; 'Play'; 'School'; and 'M. P.' In 1880 he moved with his wife to the Haymarket Theatre, where he continued presenting the same line of plays. Since 1885 he has ap-

peared but little, though he took part in 'Diplomacy' at the Garrick Theatre in 1893.

Bancroft, Wilder Dwight, American chemist: b. 1867. He was educated at Harvard and abroad, and obtained the degree of Ph.D. at Leipsic. He was instructor of chemistry at Harvard 1894–5; was appointed assistant professor of chemistry at Cornell in 1895. In the same year he founded the 'Journal of Physical Chemistry' and became its editor.

Bancroft, William Amos, American railway president: b. Groton, Mass., 26 April 1865. He was graduated from Harvard University 1878, Harvard Law School 1881, and was admitted to the Suffolk bar 1881. He was elected mayor of Cambridge in 1893 and has occupied many positions of political importance. He is also director in many educational and financial institutions.

Band, in music, a number of trained musicians in a regiment, intended to march in front of the soldiers and play instruments, so as to enable them to keep step as they move forward; also any similarly organized company of musicians, though unconnected with the army; an orchestra. The word is also applied to the subdivisions of an orchestra, as string-band, wind-band, etc.

In architecture, any flat fascia or ornament which is continued horizontally along a wall, or by which a building is encircled. Bands often consist of foliage, quatrefoils, or of simple bricks. Band of a shaft is the molding or suits of moldings by which the pillars and shafts are encircled in Gothic architecture. Several bands are often placed at equal distances on the body of the shaft, when it is long, in which case they are known as shaft-rings.

As vestment, bands are linen pendants from the neck, forming part of clerical, legal, and academic costume. It is a moot question whether they are a survival of the amice, or immediate descendants of the wide falling collar which was a part of the ordinary civilian dress in the reign of James I. In the Anglican Church they are seldom worn, except by ultra-low Churchmen; but they are in common use with Presbyterian ministers (ordained ministers as distinguished from licentiates). Foreign Catholic ecclesiastics wear black bands with a narrow white border.

Band-fish, a genus in the family *Cepolidæ,* having the body much elongated and compressed, and is covered by very small scales. The dorsal fin is very long, and consists like the anal of soft rays. The tail vertebræ are very numerous, and the whole structure of the body exhibits unusual delicacy, so that specimens are seldom obtained in an uninjured state. All the species inhabit quiet depths, and are unable to contend with waves and currents. The snake-like form and the beauty of their colors make them objects of great interest. One species, the red band-fish (*C. rubescens*), not uncommon in the Mediterranean, is occasionally cast ashore by storms on the British coasts. It is about 15 inches long. Its brilliant appearance, when seen moving in the water, has suggested the names of fire-flame and red ribbon, by which it is known at Nice. The home of the genus is in Japanese waters. See Oar-fish.

Band of Hope Union, an association of the children's temperance societies of Great Britain, having upward of 15,000 allied associations, with a membership of 2,000,000.

Band Saw Blades. Owing to the increased value of timber in America more and more attention has been paid to the economical conversion thereof into the sawn product ready for market. The methods in use a few years ago were found to be wasteful and usually crude, and the product turned out of but an indifferent quality so far as sawing was concerned.

The attention of the operator being directed to band saw blades, these have come into quite general use for various purposes. A test of the band saw blade has proven its advantages to be so great that it has displaced not only the small scroll or "jig" saws for bracket sawing and ornamental scroll and curved work, but has also displaced reciprocating saws and circular saws for heavier work.

A band saw consists of a thin band or ribbon of steel with teeth cut in one edge, and when in use it is mounted on two wheels like a belt and made to travel at a rapid rate of speed by revolving the wheels. For scroll work its advantage over the reciprocating and jig saw lies mainly in the increased and uniform speed at which the saw blade travels which enables the operator to better control the work in hand and to feed the material toward the saw constantly, and thus to turn out more and better work than would be possible with a reciprocating saw cutting on the downward stroke only.

In sawing logs the advantage of a band saw as compared with a reciprocating saw may be judged when we state that the band saw blade travels at a rate of from 8,000 to 10,000 feet per minute, whereas, a reciprocating saw making 200 strokes of 18 inches to the minute, would only have a cutting speed of 300 feet per minute. The band saw traveling more than 20 times as fast as the reciprocating saw, will naturally perform nearly or quite as much work as 20 reciprocating saws. The single reciprocating saw, which evidently was the primitive saw mill, because of its limited capacity was succeeded by what is termed in the United States a gang, in Europe, a log frame, and in Canada a gate. The gang saw mill for log sawing consists of a sufficient number of reciprocating saws placed side by side in a frame to saw completely at the one operation an entire log. The advantage of the band log mill over the gang lies in its adaptability to the sawing of each log to the best advantage; as but one cut is made at a time, and as the face of the log is exposed to the view of the sawyer, he can judge through what portion of the log the next cut should be made to yield the best results.

Another form of saw mill is that known as the rotary mill or circular saw mill. Both the circular and band log mills are provided with traveling carriages on which the log is placed, secured and fed past the saw. The circular saw has possibly as great a capacity as the band, but it is very wasteful, because a circular saw large enough to saw plank from the side of a log of medium size needs be of such large diameter that in order to support it in the cut the saw is made very thick, and thus removes an immense saw kerf. Not only this, but it has been found impossible to saw with this kind of mill with sufficient accuracy to meet the pres-

ent market requirements. The circular saw while popular in the past is known to have wasted nearly or quite 25 per cent of the product of the log in saw kerf and poorly sawn timber. The band saw, on the other hand, combines the accuracy of the reciprocating saw with the capacity of the circular saw. The success of the band saw is due: first, to the acquired skill of the saw maker in turning out saw blades of suitable temper to retain a good cutting edge and at the same time flexible enough to pass over the wheels without cracking; second, to the skill of the saw filer in fitting his saws. Band saws require to be "tensioned" from time to time when in use. By the word tension is meant the expanding of the central portion of the saw blade either by the use of a hammer and anvil or by the use of what is termed stretching rolls.

The use of the band saw has also brought forth an extensive line of saw fitting tools such as saw "swages" which are designed to expand the points of the teeth, "pressure side dressers" or "tooth formers" or "shapers" which are intended to give form to the swaged points of the teeth, automatic saw sharpeners, etc. With the use of these improved appliances it was found that thinner and thinner band saw blades could be used, and hence the band saw has come into general use for "resawing purposes," that is, the sawing of planks and boards into two or more thinner pieces. For this purpose it is well adapted. The plank or boards to be resawn are fed to the saw by means of rollers. Saws as thin as .02 of an inch in thickness are successfully used. Such saws remove a saw kerf of practically one thirty-secondth of an inch. The advantage of the band resaw lies in the fact that it is practical to use the thinnest and most delicate saw of this type and still have it of practical use and service as a tool.

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Ban'da, a town of India, in the northwest provinces, capital of a district of the same name, on an undulating plain near the Ken River, 95 miles southwest of Allahabad. It is a straggling, ill-built place, but with clean streets, and contains a large number of mosques and temples. It was formerly an important cotton market. There are cantonments about a mile distant from the town. Pop. (1900) 29,000.

Banda Islands, a group belonging to Holland, in the Indian Archipelago, south of Ceram; the largest, Great Banda, being 12 miles long by 2 broad, while Goenong Api is an active volcano nearly 8,000 feet high. They have a rich soil admirably adapted for the cultivation of the nutmeg, which is their chief product, others being cocoanuts and sago. The total area of the group is about 19 square miles and the capital of the group is Banda, the seat of the assistant resident. Tatti wood is grown on the island of Rosingen. Pop. about 8,000, of whom less than 600 are Europeans.

Banda Oriental, a state of South America, originally settled by Spaniards from Buenos Ayres, claimed by Brazil, but, after a war, made in 1825 into the independent State of Banda Oriental del Uruguay — that is Eastern Bank of the Uruguay, now usually called simply Uruguay (q.v.).

Bandage, a surgical wrapper applied to some part of the body. Bandages are employed for a variety of purposes. One of their chief uses is to secure dressings or splints. Another is to give support to a limb or to restrain its movements, or to exert pressure upon it so as to aid in restraining bleeding at some point; or a bandage may be used to promote healing, as in the case of ulcers, or to aid in the removal of swelling. In these latter cases the bandage must be applied with a considerable degree of tightness, and great care must be exercised that it be evenly put on, and that the tightness with which it is drawn does not give rise to disturbances of the circulation by undue and irregular pressure. Suppose, for instance, the arm is being bandaged from the hand well up over the upper arm. The arteries which carry the blood down the limb are for the most part deeply seated and well protected by muscles, so that they are practically unaffected by any ordinary degree of pressure on the surface. But many of the veins which carry the blood back to the heart up the limb run immediately under the skin, and will be pressed upon considerably by a bandage applied round the arm. If the bandage is made too tight at the elbow, say, the veins will be compressed and the blood will flow less easily along them at that point than it does lower down where the pressure is less. The consequence will be that the blood will be hindered in passing up from the hand; and as blood is all the time being carried down to the hand in the arteries, which are unaffected, the veins in the forearm and hand will become swollen and gorged with blood. The pressure of blood in the veins will become so great that fluid will be pressed out of the finer vessels into the surrounding tissues, and the hand will become swollen, puffy, and dropsical, while much pain will be experienced. If the tight turns of the bandage are now loosened, the veins will again offer a free passage to the blood, and the swelling and pain will gradually subside. The proper method in such a case is not necessarily to bandage loosely, but to bandage uniformly, beginning with the requisite degree of tightness at the very extremity of the limb, and continuing evenly and regularly upward. A general rule in bandaging a limb, then, is: never let the bandage be tighter up the limb than it is at the extremity; apply it firmly and evenly at the extremity and carry it up uniformly. To this may be added, as a second rule, that if a bandage requires to be tightly applied in the course of a limb it must be begun at the extremity. It is specially necessary to follow these rules when the bandage is applied to secure a splint, since it must be tight enough to keep the splint in accurate position, or to keep a pad firmly applied over a wound for the arrest of bleeding. Bandages usually consist of strips of unbleached or bleached calico, linen, flannel, muslin, etc. Elastic bandages and india-rubber bandages are also in use for particular cases. The material should be torn into strips of the requisite breadth, and the bandages should have no hem or edging, as this would prevent them stretching equally in all directions. The strips should be rolled up for use into firm rollers, a roller bandage being usually 6 yards long, though often more. They are of different breadth, most commonly 2½ or 3½ inches. For the chest and abdomen the breadth should be 4½ inches; for

the fingers three-quarters of an inch. The triangular bandage is of all others the one made use of for rendering temporary aid in cases of accident, and, through the training afforded by "first aid to the injured" associations, is now familiar to almost everyone. The bandage is made of a square yard of linen or calico halved diagonally, each half having of course two sides 36 inches each in length, with a base of fully 50 inches. When it is desired to exert very considerable pressure upon a part for a length of time, or when it is desired to keep a limb or a joint motionless for some time, this may be done without the use of splints by stiffening the bandage with starch or plaster of Paris.

Bandai-San, bän'dī-sän', Japan, a volcano on the island of Nippon, 140 miles north of Tokio. Its summit consists of several peaks, the highest of which is 6,035 feet above the ocean and 4,000 feet above the surrounding plain. On 15 July 1888 there was a terrible explosion of steam which blew out a side of the mountain, making a crater more than a mile in width, and having precipitous walls on three sides. The débris of broken rock and dust poured down the slope and over an area of 27 square miles, killing 461 persons and covering a number of villages.

Bandajan', a pass over a range of the Himalayas, in Cashmere, 14,854 feet above sea-level.

Bandan'a, a cotton handkerchief, having a dark ground of Turkey-red, blue, or purple, variegated with simple patterns of white or bright yellow, their bright colors making them a favorite head-covering for southern negro women. These handkerchiefs were originally manufactured in the East Indies; but the beauty and durability of their colors caused such a demand that the manufacture of them was established elsewhere. The process is first to dye the cloth of a dark color, commonly Turkey-red, which serves as a ground. The white spots constituting the pattern are afterward produced by discharging the color with a solution of chlorine. In order to confine the discharging fluid to the exact points to be operated upon, the pattern is cut out in leaden plates, upon which the fluid will not act, and as many handkerchiefs or pieces of cloth as are to be operated upon are enclosed between pairs of these patterns, and subjected to enormous pressure, the discharging fluid being run in at the top and prevented by the pressure from spreading, so that the pattern is brought out clean on the spots subjected to the action of the fluid.

Bande Noire, bänd nwär, an appellation given during the French Revolution to companies of capitalists and speculators who bought up the forfeited estates of the Church and nobility. They were considered by many as hordes of Vandals bound to destroy the monuments which kings, nobles, and religious orders had erected all over France; and thence the scornful denomination, which was continued nearly up to 1830. But while the Bande Noire removed some castles and monasteries which ought to have been preserved as relics of art and religion, they did much toward the prosperity of the country by improving unproductive lands and disseminating among the people landed property which previously was concentrated in the hands of privileged classes. The term was originally applied to a body of German soldiers who were employed in the Italian wars by Louis XII. of France, and who received the name from carrying black colors after the death of a favorite commander. The appellation was also assumed for the same cause by different Italian and French troops in the 16th century.

Ban'ded Peak, or **Mt. Hesperus,** a summit of the San Juan Mountains, in southern Colorado; altitude, 12,860 feet.

Bandel, bän'dĕl, **Ernst von,** Bavarian sculptor: b. Ansbach, 1800; d. near Donawörth, 25 Sept. 1876. He studied art at Munich, Nuremberg, and Rome; and from 1834 lived chiefly at Hanover, engaged off and on, for 40 years, on his great monument of Arminius, near Detmold, 90 feet high, which was unveiled by the Emperor Wilhelm 16 Aug. 1875.

Bandelier, bän-dĕ-lēr, **Adolph Francis Alphonse,** Swiss-American archæologist: b. Berne, 6 Aug. 1840; settled early in the United States, where he has done important work under the direction of the Archæological Institute of America. His studies have been chiefly among the Indians of New Mexico and Arizona, Central America, and Mexico. He has published many papers on the subject. He is also the author of 'Art of War and Mode of Warfare' (1877); 'Social Organization and Government of Ancient Mexicans' (1878); 'Tenure of Lands and Inheritances of Ancient Mexicans' (1878); 'An Archæological Tour into Mexico' (1885); a novel of Pueblo Indian life, 'The Delight Makers'; etc.

Bandello, bän-dĕl'ō, **Matteo,** Italian novelist: b. about 1480; d. 1561. He studied at Rome and Naples and applied himself almost exclusively to polite literature. In his youth, he was a Dominican monk, and was entrusted with the education of the celebrated Lucrezia Gonzaga. After the battle of Pavia he was banished from Italy as a partisan of the French, and Henry II. of France gave him in 1550 the bishopric of Agen. He left the administration of his diocese to the Bishop of Grasse, and employed himself, at the advanced age of 70, in the completion of his novels, of which he published three volumes in 1554; a fourth was published in 1573, after his death, which took place in 1561. He also published some poems. His novels are in the style of Boccaccio and are characterized by even greater license.

Ban'deras, Rio de, a river of Mexico, on the east coast; so called (river of flags) because, when discovered in 1518 by Juan de Grijalva, the natives waved white flags at the end of their spears in token of friendship.

Bandettini, bän-dĕt-tē'nē, **Teresa,** Italian poet: b. Lucca, 12 Aug. 1763; d. 1837. Beginning life as a danseuse, she discovered her poetic talent as if by accident, and came to be known and honored in most parts of her country. She was especially gifted in improvising verse. She was called the Amarilla Etrusca. Of her finished poems there remain 'La Morte de Adanoide'; 'Il Polidoro'; 'La Rosmunda'; and some shorter pieces.

Ban'dicoot. 1. A large dark-colored rat (*Nesokia bandicota*) of southern India and Ceylon, where it is known as the "pig-rat" on account of the taste of its flesh, which is a favorite article of food among the natives of the

dry, hilly districts it frequents. As its food is chiefly grain and roots it does much harm to gardens; and it is also destructive to poultry. It has the habit of storing rice in its underground nests against the famine of the dry season.

2. In Australia, a small marsupial with a long, narrow head and muzzle belonging to the family *Peramelidæ*. Many species are scattered throughout Australasia. They live in warm nests underground, and feed upon insects, worms, and vegetable food. The hare-like marsupials of the closely allied genus *Perogale* are known as rabbit-bandicoots, and, like the other, frequently injure vegetable gardens. Consult Gould, 'Mammals of Australia' (London 1863).

Bandiera, băn-dĭ-ā'ra, **Attilio** and **Emilio,** two brothers of a Venetian family, lieutenants in the Austrian navy, who attempted a rising in favor of Italian independence in 1843. The attempt was a failure, and they fled to Corfu; but, misled by false information, they ventured to land in Calabria with 20 companions, believing that their appearance would be the signal for a general insurrection. One of their accomplices had betrayed them, and the party was captured at once by the Neapolitan police. Attilio and Emilio were shot, along with seven of their comrades, in the public square of Cosenza, 25 July 1844.

Bandinelli, băn-dē-nĕl'-lē, **Baccio,** Italian sculptor: b. Florence, 1493, the **son of a goldsmith**; d. 1560. He learned his art under the sculptor Rustici, but modeled his style after that of Michael Angelo, whom he vainly attempted to rival and whom he hated with lifelong hatred. He was patronized by the Medici, and in honor of the presence of Leo X. in Florence he executed the model of a colossal statue of Hercules which was intended to surpass the David of Michael Angelo. Another work of his was an inferior copy of the Laocoon group for Francis I. He produced also Hercules and Cacus (at Florence), a somewhat heavy work, 88 figures of apostles, prophets, and saints in the choir of the cathedral at Florence, a Bacchus, an Adam and Eve, etc.

Ban'dit (It. *bandito*), originally an exile, banished man, or outlaw; and hence, as persons outlawed frequently adopted the profession of brigand or highwayman, the word came to be synonymous with brigand. Of all European countries Italy has perhaps been most infested with banditti. They used to form a kind of society of themselves, subjected to strict laws, and living in open or secret war with the civil authorities. Peter the Calabrian, the most terrible among these robbers, in 1812 named himself, in imitation of the titles of Napoleon, "emperor of the mountains," "king of the woods," "protector of the conscribed," and "mediator of the highways from Florence to Naples." The government of Ferdinand I. was compelled to make a compact with this bandit. One of the robbers entered the royal service as a captain in 1818 and engaged to take captive his former comrades. Subsequently adventurers of all kinds united with them. The Austrian troops which occupied Naples were obliged to send large detachments to repress them. The bandits used to exact from strangers and natives a sum of money for protection, and give them in return a letter of security. In Sicily the Prince of Villa Franca declared himself, from political and other views, the protector of bandits; he gave them a livery and treated them with much confidence, which they never abused. Banditti are still active in Italy, Sicily, Turkey, and elsewhere.

Bandolier', a large leathern belt or baldrick, to which were attached a bag for balls and a number of pipes or cases of wood or metal covered with leather, each containing a charge of gunpowder. It was worn by ancient musketeers, and hung from the left shoulder under the right arm with the ball bag at the lower extremity, and the pipes suspended on either side. The name is now given to a similar belt by which a number of cartridges are conveniently carried.

Bandon, a river of Ireland which rises in the Carberry Mountains, and at its mouth forms the harbor of Kinsale. Spenser describes it as "the pleasant Bandon, crowned by many a wood." It has a course of 40 miles, for 15 of which it is navigable to Innishannon, four miles below Bandon.

Bandtke, bänt-kĕ, or **Bandtkie, Jerzy Samuel,** Polish historian: b. Lublin, 24 Nov. 1768; d. Cracow 11 June 1835. He was author of 'History of the Polish Nation' (1820), and professor in the University of Cracow, 1811–35.

Bane'berry. See ACTÆA.

Banèr, bā-nār', **Johan Gustafsson,** Swedish general in the Thirty Years' war: b. 1596; d. 1641. He made his first campaigns in Poland and Russia, and accompanied Gustavus Adolphus, who held him in high esteem, to Germany. After the death of Gustavus in 1632 he had the chief command of the Swedish army, and in 1634 invaded Bohemia, defeated the Saxons at Wittstock, 24 Sept. 1636, and took Torgau. He ravaged Saxony again in 1639, gained another victory at Chemnitz, and in 1640 defeated Piccolomini. In January 1641 he very nearly took Ratisbon by surprise.

Banez, Dominic, theologian: b. 1528 in the Spanish province of Biscaya; d. 1604 at Medina del Campo. He made rapid progress in philosophy and theology at the University of Salamanca, where he had as teachers the famous Melchior Cano and Peter and Dominic Soto. In 1581 he was appointed professor in this university, which was then dividing the honors and prestige of the Sorbonne. He was recognized as one of the clearest and most acute interpreters of the 'Summa' of Saint Thomas, and his chief works were commentaries on the same. He took a prominent part in the controversy on Divine Grace, predestination, etc., in which he opposed the theories of Molina. For several years he acted as confessor to Saint Theresa, and at his command she wrote her spiritual treatise, 'Camino de Perfeccion.'

Banffshire, Scotland, a county in the north, bounded on the north by the Moray Firth, on the west by the county of Moray and part of Inverness, on the south and east by the county of Aberdeen. The soil is for the most part a rich loam or deep clay. The principal rivers are the Spey and Deveron, with the Isla, a tributary of the former, and the Avon and Fiddich of the latter; besides which there are many other main and tributary streams. The

mountains rise in altitude as they recede from the sea, the most celebrated being Cairngorm, which is 4,095 feet high. The principal crops are barley, oats, turnips, and potatoes, little wheat being raised. Special attention is paid to the cultivation of turnips, the chief object of the farmer being the rearing and feeding of cattle. The total area of Banffshire is 410,000 acres. Nearly two fifths of the total surface is under cultivation, and about one fifth is occupied by woods and plantations. Since about the middle of the 19th century large tracts of formerly waste land have been reclaimed. Fishing is a staple industry. The salmon caught in the Spey and Deveron constitute an important article of traffic, the valued rental of the Duke of Richmond's salmon fishings in the former being over $60,000 a year. Banffshire possesses several woolen factories, tanneries, rope and sail works, ship-building yards, breweries, lime-works, and many distilleries, the whiskey being generally known under the name of Glenlivet, after a glen in the county. Among the natural productions limestone is the most prevalent. Serpentine also abounds in several places, especially at Portsoy, where it is known as «Portsoy marble»; it is wrought into vases and other ornaments. Ironstone and manganese also occur, and Scotch topazes or cairngorm stones are found on the mountains in the south of the county. Pop. (1901) 61,439.

Bang, bäng, **Hermann Joachim,** Danish novelist: b. 1857. He came into notice about 1879, since which time he has published a number of novels and some poems. 'Hopeless Generations' (Haablose Slœgter); 'Eccentric Tales' (Excentriske Noveller); 'Under the Yoke' (Under Aaget); 'Ten Years' (Ti Aar); and 'By the Roadside' (Ved Veien), are the titles of some of them. The last named is considered the masterpiece.

Bang, a drink. See BANGUE.

Bangalore, bän-gą-lōr', a town of Hindustan, capital of Mysoer, 70 miles northeast of Seringapatam. It stands on a plateau 3,000 feet above sea-level, and is divided into two parts, the old native town and the cantonments. The chief buildings are the government house (where the British resident lives), the new public offices, the palace of the maharajah, the central jail, etc. There is a fine public pleasure-garden. In the old town stands the fort, reconstructed by Hyder Ali in 1761, and captured by Lord Cornwallis in 1791. Latterly the town has greatly prospered. There are manufactures of silks, cotton cloth, carpets, etc. Bangalore is noted for its salubrity. Pop. (1901) about 160,000.

Bange, bäñzh, **Valerand de,** French artillery colonel: b. Balignicourt, 1833. In 1873 he reconstructed both the light and heavy field pieces of the day, and his models were adopted by the French army in 1879. In 1884 he was the successful competitor with Krupp for the contract to supply field pieces to the Servian government. His gun has been preferred also by England, Sweden, and Italy. He was the first to employ effectively the screw principle in the mechanism of the breech block. See Hennébert, 'L'Artillerie Krupp et l'Artillerie de Bange' (1886).

Bangkok', or **Bankok,** the capital of the kingdom of Siam, extending for 3 or 4 miles on both sides of the Menam, which falls into the Gulf of Siam about 15 miles below. It consists of three parts — the town proper, the floating town, and the royal palace. The town proper occupies an island 7 or 8 miles in circuit, and is surrounded with walls and bastions; situated in the midst of gardens and luxuriant foliage it presents a very picturesque appearance. The floating town consists of wooden houses erected on bamboo rafts moored to the bank in rows eight or more deep. The palace, occupying an island in the river, is surrounded by high walls. Though the general character of the buildings is not imposing, numerous temples, glittering with gilding and terminating in lofty spires, are seen in many quarters. The trade, both inland and foreign, is very extensive. The population is about 800,000, nearly half of whom are Chinese, the others including Burmese, Annamese, Cambodians, Malays, Eurasians, and Europeans. The foreign trade of Siam centres in Bangkok and is mainly in the hands of the Europeans and Chinese. The approach to Bangkok by the Menam, which can be navigated by ships of 350 tons' burden (large sea-going ships anchor at Paknam, below the bar at the mouth of the river), is exceedingly beautiful. As the town is neared, numerous temples present themselves, and floating houses become common; and finally the whole city, with its rich gardens and shining temples and palaces, bursts full upon the view. Stone buildings are used only for the royal palaces, some noblemen's houses, monasteries, and the dwellings of Europeans. A large number of the houses float on rafts fastened by ropes to poles; most of the trade of the city is carried on upon the river. The internal traffic of Bangkok is chiefly carried on by means of canals, there being only a few passable streets in the whole city. Horses and carriages are rarely seen, except in the neighborhood of the palaces. The native houses on land,— of bamboo or other wood, like the floating houses,— are raised upon piles, six or eight feet from the ground, and are reached by ladders. The circumference of the walls of Bangkok, which are 15 to 30 feet high and 12 broad, is about 6 miles. Bangkok is the constant residence of the king. The palace is surrounded by high walls and is nearly a mile in circumference. It includes temples, public offices, accommodation for officials and for some thousand soldiers, with their necessary equipments, a theatre, apartments for a crowd of female attendants, and several Buddhist temples or chapels. Several of the famous white elephants are kept in the courtyard of the palace. Throughout the interior are distributed the most costly articles in gold, silver, and precious stones. The temples of Bangkok are innumerable, and decorated in the most gorgeous style, the Siamese taking a pride in lavishing their wealth on them. In the neighborhood of Bangkok are iron mines and forests of teakwood. The chief exports are rice, sugar, pepper, cardamoms, sesame, hides, fine woods, ivory, feathers, and edible birds' nests. The imports are tea, manufactured silks, and piece goods, opium, hardware, machinery, and glasswares. The United States has a resident consular agent. Among recent evidences of progress may be mentioned the erection of steam mills, the introduction of gas into the royal palaces and many noblemen's houses, and the estab-

lishment of a regular mail to Bangkok in 1884. Siam joined the International Postal Union in 1885, and in 1890 a parcel post service (with Singapore and Europe) was established. Bangkok is now connected with Burma and Cambodia by telegraph, and is the centre of a local system of (in 1893) 1,780 miles. A short railway at Paknam (on the coast) was opened in 1893; another line of 165 miles is being made; and others to the northern provinces have been surveyed and sanctioned. In 1893 a treaty was concluded at Bangkok, by which Siam made large cessions to France, two French gunboats having forced their way to the capital after an ineffective defense.

Ban'gor, Ireland, a seaport town, county Down, situated on an acclivity on the south side of Belfast Lough, four miles northwest of Donaghadee. It consists of three principal and several smaller streets, and has an Episcopal church, a Methodist and a Roman Catholic chapel, and two Presbyterian churches; an endowed school, six national schools, a Protestant hall, and a branch of the Belfast Bank. The male population is chiefly employed in seafaring pursuits, the females in hand-sewing in all its branches. Bangor is a favorite bathing resort. Bangor Abbey was founded by Saint Congall in 555 A.D., and was destroyed by the Danes in the 9th century. The parish church now occupies the site. Pop. in 1891, 3,834.

Bangor, Maine, the chief city of eastern Maine, is a port of entry and the seat of Penobscot County. The city is on the west bank of the Penobscot River, across its affluent the Kenduskeag, and at the head of navigation, about 28 miles from Penobscot Bay. It is on the Maine Central, Bangor & Aroostook and several other railroads, with steam and electric lines radiating in all directions; is on the main line from Boston to Saint John and Halifax, and also has direct steamship connection with Boston, being the terminus of the Bangor Division of the Eastern Steamship Company. Bangor is 76 miles northeast of Augusta, 137 miles northeast of Portland and 246 miles from Boston.

Trade and Commerce.— Situated near the geographical centre of Maine and at the head of navigation on the largest river of the State, Bangor occupies a highly favored position and one destined to be even more commanding with the growth and development of the expansive territory north and east and tributary to her. As the shire town of a county embracing some 75,000 inhabitants, as the trade centre and shipping point of a large and rich agricultural section and for many thriving industrial communities; as a point of convergence for numerous important railway and steamship lines, and a consequent tarrying place for great numbers of tourists, sportsmen and commercial travelers; these together with the busy commerce of its port, the metropolitan character of its hotels and the compactness of its business section, give to the city a much more populous appearance than the above figures would indicate. Bangor has a fine harbor, easily accessible for vessels of large size; and the scene in the open season along the docks, where crafts of varying rig are loaded with lumber, ice and the diversified products of this region, is an animated one. Although nearly 30 miles from the bay and 60 miles from the ocean, the tide rises about 17 feet, and there is a sufficient depth of water to float the largest of ocean steamships. The Penobscot River, whose waters unite with those of the bay of the same name, is a noble water highway, rising 300 miles away amid the mountains and forests of northwestern Maine. In the 8,200 square miles drained by the Penobscot there are 1,604 tributary streams indicated on the State map, and 467 lakes and ponds. Bangor is one of the greatest lumber markets in the north, there being tributary to the city the great forests of spruce traversed by the Penobscot and down which the logs are floated; and has every sort of manufactory of wood and allied products,— saw, planing, woodpulp, and molding mills; factories of furniture, carriages, trunks, valises, agricultural implements, boots, shoes and moccasins, clothing, dairy products, etc., with iron foundries, machine shops, shipyards, flour mills and pork-packing establishments. Ice-cutting is also an important industry, Penobscot ice being exceptionally pure.

Manufactures and Industries.—Bangor's manufacturing establishments number in the vicinity of three hundred, embracing about one hundred different kinds of industries and employing several thousand hands. These figures are, however, inadequate to correctly portray the city's manufacturing interests, as many of the most important establishments, including all the large saw mills but one, are outside the city's limits. Therefore, while the manufactures of these mills are purely Bangor products, the plants themselves and most of the employees belong properly to other towns. Among Maine's many industries the lumber trade still holds a foremost place. From 1816, in which year about a million feet were cut, down to the present time, there have been cut on the Penobscot waters in the vicinity of 11,000,000,000 feet. The lumber cut on the Penobscot and its tributaries during the winter of 1903–4 aggregated about 210,000,000 feet. Lumber shipments from the port of Bangor during 1903 were 156,509,108 feet against 124,767,646 feet in 1902, and 120,954,897 feet in 1901. In recent years pulp and paper manufacturing has made great advance and numerous pulp and paper mills are now in operation along the Penobscot, from those of the Eastern Manufacturing Company at South Brewer to the immense plant of the Great Northern Paper Company at Millinocket.

In recent years diversified manufactures have been multiplying and many and varied are the products of these establishments. Bangor has one of the largest and most prosperous shoe factories in the State. Here is located a trunk manufacturing establishment which shipped recently a whole trainload of trunks, the largest shipment of trunks ever made by one manufacturer in this country or the world. There are located here great wood-working plants from whence go all over the country the finest designs in interior decorations and architectural wood-working.

Bangor is a trade centre for eight counties, and is connected with their principal places by steam or electric roads, or by water communication. As indicative of the volume of the city's commerce the Bangor Customs District reports the exports for the fiscal year ending 30 June 1903 as $5,372,939, against $4,248,430 in 1902, and $4,170,982 in 1901. The imports for the fiscal

year ending 30 June 1903 were $1,341,880. In 1903 for the first time in its history the United States Bureau of Statistics reports a shipment to the Midway Islands, located in the distant Pacific, midway between Honolulu and Guam, and it is interesting to note that these goods were shipped from the Bangor Customs District. Exports by vessel from the port of Bangor consist chiefly of fruit box shooks to the Mediterranean, spool bars to Scotland and deals to South America and the United Kingdom. The coal receipts in the port of Bangor aggregated 365,720 tons in 1903 and there were 273 cargoes.

Banks, etc.— Bangor has five national banks, two savings banks, two trust and banking companies, two loan and building associations and two marine insurance companies. There are two daily papers and several weekly and monthly publications. There is a board of trade with attractive rooms at the city hall. The Kenduskeag, flowing through the centre of the city, is spanned by several bridges, and the city is connected with Brewer across the Penobscot by a bridge 1,300 feet long. A dam across the Penobscot just above the city furnishes water supply and power, the city owning both its waterworks and municipal lighting plant. The assessed property valuation of Bangor is $16,345,000, with a total debt of less than $1,000,000.

Buildings, etc.—The city has a fine granite custom house and post-office and the recently completed county court-house is a handsome and commodious edifice, a credit to the great county of Penobscot, of which Bangor is the shire town. Bangor's city hall — the Hersey memorial building — is an imposing edifice which reflects credit upon the city. The Bangor public library is one of the foremost institutions of its kind and contains on its shelves upwards of 50,000 volumes. The Bangor opera house is unsurpassed for its beauty and appointments by any outside the largest cities. The Bangor Auditorium Association has erected the largest building of its kind in the State, and here each fall are held the eastern Maine musical festivals. The Eastern Maine General Hospital is one of the important institutions here and Bangor is also the home of the Eastern Maine Insane Hospital. The Bangor Theological Seminary is a time-honored institution of learning, and only nine miles away, in the town of Orono, is the flourishing University of Maine.

Government.— Bangor received a city charter 12 Feb. 1834. The city seal is typical, the rising sun in the background illustrating the Sunrise State, and the spruce tree in the centre portraying the great lumber interests, while in the immediate foreground are gear wheel, anchor and plow, emblematic of manufactures, commerce and agriculture. The government is vested in a mayor, who is elected annually, and a council divided into two chambers. The city has seven wards, and one alderman and three councilmen are chosen annually from each ward, the city government comprising the mayor, seven aldermen and twenty-one councilmen. Most of the appointments and administration offices are subject to the control of the mayor and city council.

History.— Bangor's present site was in the early days the camping-ground of the Tarratines, a famous tribe of Indians. It was in 1769 that Jacob Buswell, Bangor's first white settler, came here from Massachusetts. He was a hunter and boatbuilder, and established his home near the site of Saint John's Roman Catholic Church. The place was for a time known as Kadesquit, afterwards as Condeskeag, and later as Kenduskeag. The locality had been visited by the French as early as 1605, and was one of the many places identified with the mythical Norumbega. Kenduskeag plantation was only a small hamlet at the time of the Revolution and during the time when the British had control of the river the hardships were severe. At the instigation of Rev. Seth Noble, Bangor's first clergyman, the name of Kenduskeag was finally abandoned and Sunbury adopted. With the growth of the place the people became impatient of the plantation organization and delegated Parson Noble to proceed to the General Court at Boston and secure an act of incorporation. Minister Noble was a great lover of music, and the hymn tune of Bangor was such a favorite with him that that name was substituted for Sunbury and the act incorporating the town of Bangor was passed 25 Feb. 1791.

Bangor early gave attention to the matter of improving her transportation facilities, and she had her railroad when most of the proud cities of to-day knew nothing of such things. As early as 1836 her enterprising citizens built a railroad to Old Town, a dozen miles up the river, with a view of aiding the development of her natural resources; and this, one of the earliest railroads in America, prospered for nearly a third of a century. Not only did the city have one of the first railroads in the country, but the pioneer iron steamship constructed in America was built to run to this port and bore the name Bangor. She was built in 1845 on the Delaware, her owners being the Bangor Steam Navigation Company of Maine, and she was designed for passenger and freight service between Boston and Bangor. Within recent years, through the enterprise of some of Bangor's public spirited men, Aroostook County has been brought into direct railroad communication with Bangor through the construction of the Bangor & Aroostook railroad, this system having numerous branches to important points in northern Maine, it having also absorbed the Bangor & Piscataquis railroad. In recent years there has been no more important railroad enterprise inaugurated in New England than that of the Bangor & Aroostook, and under its enterprising and progressive management it has become a potential factor in the development of Bangor and the immense territory stretching to the northward. Bangor business men, ever alert to adopt the newest methods, inaugurated in this city the first electric railroad in Maine and more recently electric roads have been constructed reaching Hampden and South Brewer on the south and Old Town and Charleston on the north. These electric lines bring Bangor and the territory immediately contiguous into close touch, and the benefits accruing therefrom are far-reaching.

Located as the city is, on the west bank of the imperial Penobscot, at its junction with the less pretentious Kenduskeag, the business is largely in the valley, while the surrounding heights afford picturesque sites for residences. The diversified aspect is heightened by the

wealth of trees along the residential streets, and few localities are to be found with greater scenic attractions. From the highlands overlooking the city the view is particularly fine, the mountains which fill the eastern horizon making a fitting background to the picture. The Kenduskeag has, through much of its course, very precipitous banks, a notable illustration being the historic Lover's Leap, a mile above the city; and along this picturesque stream are innumerable gems of scenic beauty.

Bangor enjoys the unique distinction of being the only place of its size on the globe where salmon fly-fishing can be successfully practised within the city's limits, and in one season a Bangor lumber manufacturer brought to the gaff and successfully landed twenty-seven salmon, aggregating 500 pounds in weight. The Bangor salmon pool, whence are taken all the salmon caught with a fly on the Penobscot, is situated about a mile above the city and just below the falls that span the river at the Bangor waterworks dam.

Bangor is the home of many sportsmen and is the headquarters in this section for sportsmen's supplies of all descriptions. Nearly all the parties of sportsmen who in the season visit the great wilderness of northern and eastern Maine make this their rendezvous and procure their outfits here. Moose and deer are multiplying rapidly as the result of wise game laws, and Maine is truly the sportsmen's paradise. The records kept by the wardens at Bangor show that during the fall months of 1903 there were shipped to and through the city from the Maine game regions 4,679 deer, 217 moose and 26 bears, the biggest shipment in a single day having been 202 deer and 14 moose.

Population.— In the year 1800 the population of Bangor was 277. From 1830 to 1834 Bangor expanded rapidly and when in the latter year a city charter was adopted the population was about 8,000. The census for 1900 gave Bangor a population of 21,850; the population in 1904 is about 25,000, and with the towns immediately environing, including the city of Brewer across the river, about 40,000.

EDWARD M. BLANDING,
Secretary Bangor Board of Trade.

Bangor, North Wales, an episcopal city and parliamentary borough, in Carnarvonshire, near the northern entrance of the Menai Strait. It consists chiefly of one principal street about a mile in length, nestling i na narrow valley, but there is also a higher and more modern quarter called Upper Bangor, overlooking the strait. The principal public buildings are the cathedral, the bishop's palace, deanery house, University College of North Wales, training college for teachers, etc. Bangor is the oldest bishopric of Wales, having been founded by Saint Deiniol in 550 A.D. He built a cathedral, which the Saxons demolished in 1071, and the new edifice, completed in 1102, was destroyed by fire in 1402. The present structure was in building in 1496–1532; it is of cruciform design, 214 by 60 feet, and has a tower 60 feet in height. Modern improvements have been freely introduced. There are plants for gas and electric lighting, and a free public library. The municipality was incorporated in 1883. The chief local trade is through the Penrhyn slate quarries, in which 3,000 wage-earners are employed. The annual fairs are thronged with buyers and sellers. The fact that the harbor is not suited to large vessels makes the trade by sea of small proportions. Pop. (1901) 11,500.

Bangor, Pa., a borough of Northampton County, 15 miles north of Easton; on the Bangor and Portland and New Jersey Central railways. There are numerous slate-quarries, and the products of the slate-mills, etc., find an extensive market. Pop. (1890) 2,509; (1900) 4,106.

Bangor Theological Seminary (Congregational). It sprang from the Society for Promoting Theological Education, organized in 1810, and chartered in 1812 (for the need at this time see ANDOVER THEOLOGICAL SEMINARY). The seminary was chartered by the legislature of Massachusetts (of which Maine was then a part) February 1814; was opened at Hampden, Me., October 1816; but in 1819 was removed to Bangor and graduated its first class 2 Aug. 1820. In that year the province of Maine was separated from Massachusetts; and the Seminary was conducted as a means for supplying the need in Maine for pastors and teachers. It was at first conducted on the English plan, but a few years later remodeled its courses to suit American needs. Organized to supply the churches of Maine with educated pastors, it has furnished over half their number ever since and does so still. Up to 1903 it had graduated 808 students and given partial course to 255 others. It has endowments which furnish aid to all needy students, and a library of 23,500 volumes; and in 1903 had six professors and 23 students. The course is one of three years, and the Seminary is open to Christians of every denomination. There is an endowment of $10,000 for the Bond lectureship, which is not limited to the subjects common to such lectureships, but includes also instruction in scientific directions. In recognition of the close connection between the Seminary and the Maine churches, the Seminary trustees, in 1827, invited the general conference of the Congregational Churches to send yearly a committee to the institution, and a board of visitors has since been annually appointed by the State conference.

Bango'rian Controversy, a controversy stirred up by a sermon preached before George I. in 1717, by Dr. Hoadly, bishop of Bangor, from the text "My kingdom is not of this world,"— in which the bishop contended in the most pronounced manner for the spiritual nature of Christ's kingdom. The controversy was carried on with great heat for many years, and resulted in an enormous collection of pamphlets. See HOADLY, BENJAMIN.

Bangs, Heman, Methodist Episcopal clergyman: b. Fairfield, Conn., April 1790; d. New Haven, Conn., 2 Nov. 1869. He became a member of the New York Annual Conference in 1815; preached in pulpits in New York and Connecticut; was one of the founders of Wesleyan University, Middletown, Conn., and one of the most effective preachers in his Church.

Bangs, Isaac Sparrow, American soldier: b. Canaan, Me., 17 March 1831; d. 1903. He entered the Union service 9 Aug. 1862; became

captain in the 20th Maine infantry, August 1862; lieutenant-colonel of colored troops, February 1863; colonel of the 10th U. S. colored heavy artillery, November 1863, until honorably discharged 19 July 1864. He took part in the Maryland campaign of September and October 1862, and was present at the battles of Antietam, Shepardstown Ford, and Fredericksburg; was with the expedition to Ellis and Richard's fords, and served through Burnside's second campaign. Later he was at the siege of Port Hudson, La., and commanded the defense of New Orleans. For his meritorious services he was brevetted brigadier-general of volunteers, 13 March 1865.

Bangs, John Kendrick, American humorist and editor: b. Yonkers, N. Y., 27 May 1862. He was one of the founders of 'Life,' and has long been famed for his light verse and humorous stories, among which may be mentioned 'Coffee and Repartee' (1886); 'New Waggings of Old Tales,' with F. D. Sherman (1887); 'The Idiot' (1895); 'Mr. Bonaparte of Corsica' (1895); 'Water Ghost, and Other Stories,' 'The Mantel-Piece Minstrels,' 'The Bicyclers and Other Farces,' 'A Houseboat on the Styx,' and 'A Rebellious Heroine' (1896); 'The Pursuit of the Houseboat' (1897); 'Enchanted Typewriter' (1899); and 'Uncle Sam, Trustee' (1902). He became editor of 'Harper's Weekly' in 1900, of the 'Metropolitan Magazine' in 1903, and of 'Puck' in 1904.

Bangs, Lemuel Bolton, American physician: b. New York, 9 Aug. 1842. He was graduated at the College of Physicians and Surgeons in 1872; was professor of genito-urinary diseases in the Post-Graduate Medical School and Hospital of New York, and later at Bellevue Hospital Medical College; and was consulting surgeon to a number of hospitals in New York. He was president of the American Association of Genito-Urinary Surgeons (1895), and the editor of the 'American Text-Book of Genito-Urinary Diseases,' etc.

Bangs, Nathan, clergyman and author: b. Stratford, Conn., 2 May 1778; d. New York, 3 May 1862. He entered the Methodist ministry in 1801. In 1820 he became head of the Methodist Book Concern, which he reorganized thoroughly, paying off its debts, extending its business, and putting it on a paying basis. He was also charged with the censorship of all its publications. He edited the 'Christian Advocate' and the 'Methodist Magazine'; was a founder and secretary of the Methodist Missionary Society; president of Wesleyan University, Middletown, Conn., in 1841; and in pastoral work from 1842 until his retirement in 1852. His chief work was 'A History of the Methodist Episcopal Church, 1776–1840' (4 vols. 1839–42); others are: 'Errors of Hopkinsianism' (1815); 'Predestination Examined' (1817); 'Original Church of Christ' (1836); 'State and Responsibilities of the Methodist Episcopal Church' (1850). Compare his life by A. Stevens (1863).

Bangue, or **Bang,** a drink much used throughout the East as a means of intoxication, prepared from the dried leaves of the Indian hemp, which are also called by this name. See HASHISH.

Bangued, băn-gād', Philippines, the capital of the province of Abra, Luzon, 236 miles north of Manila. Pop. (1898) 13,417.

Bangweolo, băng'wē-ō'lō (also called BEMBA), a great Central African lake, discovered by Livingstone in 1868, which is 150 miles long by 75 wide, and 3,700 feet above the sea. The Chambeze, which flows into it, and the Luapula, which issues from it, constitute the head-stream of the Kongo. The shores are flat, and parts of the lake are mere marsh. In the northwestern part are four large islands inhabited by the Mboghwa, a race of fishermen and herdsmen. On its southern shore Livingstone died.

Ban'ian, or **Ban'yan** (from Sanskrit *banij*, a merchant), the name commonly given by Europeans to Hindu merchants, brokers, etc., in Bengal and western Hindustan. They are often men of great wealth, and carry on most extensive dealings, their operations extending as far as the borders of the Russian and Chinese territories, the Persian Gulf, and Eastern Africa. They are great travelers, and have countinghouses in almost every trading town of importance in Asia. English sailors call *banian days* those days on which they have no flesh meat. Probably the name has a reference to the habits of this class; because, before people were acquainted with the abstinence of all the Hindus, it was thought to be confined to the Banians.

Banian Tree. See BANYAN.

Banim, bā'nĭm, John, Irish writer: b. 1800; d. 1842. He early exhibited a taste for literature, and before his 20th year wrote a play called 'Damon and Pythias,' which was afterward performed at Drury Lane. His fame rests on his novels, particularly the 'O'Hara Tales,' in which Irish life in all its features is admirably portrayed.

Banim, Michael, Irish novelist: b. Kilkenny, 5 Aug. 1796; d. Booterstown, 30 Aug. 1874. He claimed to have written 13 out of the 24 books of fiction confusedly associated with the names of John and Michael Banim, and called himself the author of 'Crohoore of the Bill Hook,' one of the most popular of the 'O'Hara Tales'; 'The Ghost Hunter' (1833); 'Father Connell' (1842), and 'The Town of the Cascades' (2 vols., 1864).

Ban'ishment (the act of putting under ban, proclamation, as an outlaw), a technical term in Scotch criminal law for the punishment of sending out of the country under penalties against return. This punishment was formerly much used in various forms,— for example, banishment to the plantations or colonies; to England (even after the Union); from a particular county in Scotland, etc. Sometimes capital punishment was commuted to banishment for service in a foreign war. The old Scotch doom of deportation was gradually merged in transportation under various British statutes. At present, banishment is still the statutory sentence in cases of celebrating clandestine marriages.

«Banishment is sometimes used in the sense of expulsion or deportation by the political authority on the ground of expediency, as well as in the sense of transportation or exile by way of punishment for crime.» 3 Am. & Eng. Enc. Law (2d Ed.) 770. The United States

supreme court decided in the case of Fong Yue Ting *v.* United States, 149 U. S. 698, that the right to exclude or to compel aliens, or any class of aliens, absolutely or upon certain conditions, in war or in peace, is an inherent and inalienable right of every sovereign and independent nation. The idea of banishment occurs in the ostracism and petalism of Greece, and the relegation, exile, and deportation of Rome. It was generally accompanied by forfeiture of civil rights. In England, voluntary banishment was called abjuration.

Ban'ister, John, Anglo-American scientist: b. England; d. 1692. He settled in the West Indies, and later in Virginia, in the vicinity of Jamesburg, where he devoted himself to the study of botany. He was a contributor of a catalogue of Virginia plants to Ray's 'History of Plants,' in 1660. The genus *Banisteria* was named in his honor. His publications include 'Observations on the Natural Productions of Jamaica'; 'The Insects of Virginia'; 'Curiosities in Virginia,' etc.

Banister, John, son of the preceding: b. Virginia; d. 1787. He was educated in England and studied law there; became colonel in the Virginia militia; was a member of the Virginia Assembly, and prominent in the patriotic conventions of the Revolutionary period; was a representative from Virginia in the Continental Congress in 1778–9, and one of the signers of the Articles of Confederation.

Banjarmassin, bän-yärmäs'-sẹn, Borneo, a town near the southeastern angle of the island, under the government of the Dutch, on an arm of the Banjar, about 14 miles above its mouth. Owing to the marshy ground and frequent inundations of the river the houses are built on piles, and many of them on rafts, the front next the river being used as a shop or stall on which wares are exposed for sale. On market days the water is covered with skiffs, having a single individual in each, moving about selling vegetables, etc. The people are continually on the river, all necessaries being purchased at these floating markets, and all business being done on the water. In every respect it is a floating town, possessing neither carriages nor horses; the only animals kept being pigs, goats, ducks, geese, and fowls. The houses of the European functionaries, the government buildings, and the fort, are built partly of stone and partly of wood. The fort Tatas is surrounded with palisades, and contains the resident's house, the magazines, and barracks. Exports are pepper, benzoin, bezoar, ratans, dragon's blood, birds' nests, iron, and straw mats very artistically made; and imports rice, salt, sugar, opium, coral, Chinese poreclain, silk, cutlery, gunpowder, etc. Pop. about 35,000.

Ban'jo (a negro corruption of *bandore,* Italian, *pandora,* from Greek *pandoura,* a three-stringed instrument), the favorite musical instrument of the negroes of the southern States, and now widely popular elsewhere. It is five-stringed, has a body like a tambourine, and a neck like a guitar, and is played by stopping the strings with the fingers of the left hand and twitching or striking them with the fingers of the right. The upper or octave string, however, is never stopped.

Bank, primarily an establishment for the deposit, custody and repayment on demand, of money; and obtaining the bulk of its profits from the investment of sums thus derived and not in immediate demand. The term is a derivative of the banco or bench of the early Italian money dealers, being analogous in origin to the terms *trapezitai* (*trapeza,* a bench or table) applied to the ancient Greek money-changers, and *mensarii* (*mensa,* a table) applied to the public bankers of Rome. See BANKS AND BANKING.

Bank Bills, or **Notes,** promissory notes issued by a bank or banker and representing their face value in specie. In the production of bank notes the principal purpose is to render their forgery impossible, or at least easy of detection. This is sought to be effected by peculiarity of paper, design, and printing. Bank of England notes are printed in one of the blackest and most indelible of inks, on paper expressly made for the purpose by one firm only. It is a hand-made paper, remarkable for strength, lightness, and difficulty of imitation, and its peculiar watermark constitutes one of the chief safeguards against forgery. No Bank of England notes are issued twice, so that this mark is rarely indistinct and the paper does not lose its peculiar crispness. Some years ago a self-registering machine was invented for impressing on each note a distinctive mark known only to the bank authorities. Owing to some of the notes of the Scotch banks, printed simply in black ink, having been successfully forged by photography, those issued by them have since 1858 been printed in colored inks, at least two colors being used for each note.

Since 1855 the notes of the Bank of England have been all produced by surface printing from an electrotype. The number of notes produced and issued by this bank sometimes amounts to 300,000 per week. There are 70 or 80 kinds of Bank of England notes, differing in their denominations or values, but similar in the mode of printing.

In the United States the bank notes at present in circulation are manufactured by the Government Bureau of Engraving and Printing, the paper being made by a private concern under a patented process, the chief ingredients being a mixture of linen and cotton fibre, into which are introduced threads of silk so arranged as to be perceptible after the notes are printed. This style of paper is furnished only to the government. The highest skill is exercised in engraving the plates, nearly all parts of them being executed by the geometrical lathe and the ruling-machine the work of which it is impossible to imitate successfully by hand. The printing of the notes is done in colored inks of the best quality, sometimes as many as four shades being used. The great expense of the machines used in the engraving, and the superior quality of the work generally, renders successful counterfeiting almost impossible. The notes, when badly worn, are returned to the United States Treasury, and other notes are issued in their stead. See MONEY, PAPER.

Bank Holidays, days during which banks are legally closed. In the United States they are: 1 January, or New Year's Day, a legal or bank holiday in all the States except Arkansas, Delaware, Georgia, Kentucky, Maine, Massa-

chusetts, New Hampshire, Rhode Island, and North and South Carolina. 4 July, Independence Day, and 25 December, Christmas Day, are bank holidays in all the States and Territories of the Union. Thanksgiving Day and public fast days appointed by the President of the United States are also legal, or bank, holidays. 12 February, the anniversary of the birth of Abraham Lincoln, is a legal holiday in nine States. 22 February, the anniversary of the birth of Washington, is a legal holiday in all the States save Arkansas, Iowa, and Mississippi. The first Monday in September, Labor Day, is a holiday in nearly all the States. 8 January, anniversary of the battle of New Orleans, and Firemen's Day, 4 March, are legal holidays in Louisiana. Good Friday is a legal holiday in Florida, Louisiana, Minnesota, and Pennsylvania; and Shrove Tuesday in Louisiana and Alabama. Decoration Day (North) and Memorial Day (South) is observed in the several States.

In England and Ireland the bank holidays are: (1) Easter Monday; (2) the Monday in Whitsun week, generally called Whit Monday; (3) the first Monday in August; (4) 26 December, popularly called Boxing Day. In Scotland: (1) New Year's Day; (2) the first Monday in May; (3) the first Monday in August; (4) Christmas Day.

When one of these holidays falls on Sunday it is observed on the following day, and a note or check becoming due on a holiday or a Sunday is payable on the first business day following.

Bank-swallow, a small swallow, familiar not only in all parts of America, but in most other countries, for its habit of breeding in colonies in holes in sand-banks. It is sooty black above, and white on the under surface of the body, with a dusky band across the breast. This swallow comes from its winter home in the tropics, among the earliest birds of spring, and spreads northward even to the borders of the Arctic Ocean. Many, however, remain within the United States, where companies of them seek the banks of streams or exposed cliffs of sand, and bore in close proximity a great number of tunnels, which may be seven or eight feet deep. The bill and feet are both exceedingly weak, yet with these feeble tools each pair, working alternately and with great diligence, complete their excavation in a surprisingly short time. The same bank will be occupied year after year. The inner extremity of the tunnel is furnished with a nest of dry grass and feathers, and there are laid in June four or five pure white eggs. The tunnels are used as roosting places at night by both sexes, and when the young are hatched they will scramble to the mouth of the burrow and may be seen sitting there some days before they obtain strength and courage to launch forth upon their wings. These swallows, like others, feed entirely upon small insects caught in the air, and the sight of a crowd of them darting about the neighborhood of their homes, with a constant twittering, is one of the most familiar and pleasing sights of our country districts. The English sparrows trouble them greatly by seizing upon their burrows and dragging out the furniture; and snakes and mice sometimes enter the holes, but against most enemies these swallows are well protected. Our common species (*Clivicola riparia*) is also numerous throughout Europe and Asia. Very similar species inhabit the Oriental region and Africa. These birds are well described in all standard works of ornithology, and some special information may be obtained in the 'Monograph of the Hirundinidæ' by Sharpe and Wyatt (1885–94); and in 'Bird Watching,' by Edmund Selous (1901). See SWALLOW.

Bank of England. See BANKS AND BANKING.

Bank of France. See BANKS AND BANKING.

Bank of North Amer'ica. See BANKS AND BANKING.

Banking Institutions, the Examination of. Since the beginning of the Civil War, corporations have materially multiplied in number in the United States. As their scope has broadened and their responsibilities have grown with their increase, it has been found necessary to the inspiring of public confidence, to the protection of vested interests, and the prevention of abuse, to prescribe certain limitations beyond which they may not go. On the other hand, extraordinary powers have been shown to be absolutely necessary to the successful prosecution of enterprises which must otherwise be undertaken by the State or municipality or else remain unaccomplished, not only to the detriment of the public interests but to the impoverishment of a whole country. The wisdom of such legislation, permissive yet restrictive, which has brought the great corporations of the day into being has been fully justified by experience. This is especially true of the great financial institutions which supply the funds for gigantic undertakings. In fact, in this connection we find that of all the large corporations those pertaining to banking are the most important, the most necessary of all. These it is that make great nations and render possible the living in comfort of millions within a prescribed area; for it is the financial institutions that supply the means for building railways, installing the prominent manufacturing industries, rebuilding cities — as the city of New York is now being rebuilt — and even furnishing the means, at a time of national peril, of successfully maintaining a war of defense against aggression and aggrandizement. Let us glance at a few of the benefits which our national and State banks and trust companies and banks for savings confer.

Benefits of Banking Institutions.— These institutions afford a permanently safe place where the individual may deposit his moneys. And this is much more of a privilege than may appear on the surface. For not only is the secure place of deposit supplied, which otherwise would be wanting, but the bank practically insures the safety of the funds committed to it: if in any way loss is sustained by robbery or fire or by some other cause, the bank is bound to make good the loss, and this regardless of the fact that the depositor may not be a profitable customer, as many dealers are not. In fact, the number of depositors who simply use a bank as a convenience, whose deposits are not large and whose multiplicity of small checks

are a trouble, as they are the despair of the individual bookkeeper, is legion. Nevertheless the bank takes such accounts, holds the money subject to innumerable little drafts which are made good by new deposits equally numerous and small; and thus the active little account is maintained from year to year, often only a source of trouble and expense to the bank, which actually receives no adequate return for its services as warden and agent. It is to be noted, too, that in this country the services rendered the individual by the banks differ greatly from those afforded by like corporations in some other countries, notably in France. To cite one instance: In that country every note when due must be paid to the bank officer in hard cash; a check on that or some other bank, duly certified, would not be received. In fact, the bank's messenger visits the payer of the note and demands the payments of the exact amount in cash, or protest and legal proceedings follow.

Relation of Banks to the Community.— But leaving this phase of the subject, a glance will show how vital is the relation of a bank to the community doing business with it. In a word, it may be said to receive all the money that comes to that community and to disburse it as desired by the customer. Not only so, but when he cannot command the money required to transact his business, the bank may supply the desired amount. Thus it is, estates are cared for, income in the shape of interest is paid, vast sums are committed to its keeping, while by its loans made at times of emergency the bank enables the business of the community to be transacted; and this principle extended stands for the business of the world. It is easy to see that a misfortune to such an institution means a calamity to a community, and a series of them means panic, with its consequences of impoverishment and distress, and sometimes ruin to countless thousands. How disaster in this direction has been wrought in the past those familiar with the history of banking in the earlier days, when banks were not subject to the restrictions of the present time, and when the failure of a bank often meant irreparable loss to innocent holders of their circulating notes, are fully aware. But when we go farther and take the most superficial glance at the great industries of the country, we obtain some conception of what banks and banking mean. Is it too much to say that without credit and banking facilities the unparalelled facilities of our gigantic railway systems, stretching from ocean to ocean and conveying the enormous crops of the country by which we are enabled to feed the world, would be in vain? In the last analysis we shall find that it is not car wheels, but it is money, that moves the great harvests of a continent — as for that matter, of the world. And the money would be lacking but for the banks; these, and not steam or electricity, stand between the nations and starvation.

Safeguarding Depositors.— It would seem that under the circumstances no argument was required to establish not only the necessity for adequate safeguards in the shape of stringent statutes, but that measures should be provided to insure strict conformity on the part of the bank officers and directors to the requirements of the banking laws, thus safeguarding the depositor against abuse of privilege or criminal carelessness. The attainment of this object is sought by the provision in national and State legislation, as the case may be, requiring official examination and the publishing of a statement of a bank's condition from time to time as the authorities may deem expedient. There is but one proper bank supervision, and this includes mental alertness to discover the very best methods for despatching business with celerity, for insuring correctness, for guarding most effectually against errors, and to render tampering with the books most difficult and detection most easy. It means, too, economy in the use of time — the article which so many squander lavishly as if, like the waters that pass out from between the mute lion lips of the Nile fountains, it was to flow on forever. Supervision means, also, such oversight as makes the manager thoroughly familiar with the business of the bank, so that he can upon occasion command the fullest information regarding a new department of the business at a moment's notice. The years of a banker's work in the discharge of his heavy responsibilities are not many at the most. From the time he assumes the direction of the affairs of a bank to the time when his own ledger must be closed, a very few decades intervene. When that time has come and he either passes from all work or puts down his pen and vacates his chair for a younger man, it becomes evident that the supervising banker — be he president, or cashier — whoever he may be and whatever his official designation — should be able to hand over to his successor not only the assets of the bank unimpaired, but an intelligible working system such as will enable the new manager to familiarize himself with the details of the business and discover the exact situation with the least delay. But this can only be accomplished by the inauguration of a system as nearly perfect as may be, which, with its comprehensive method of safeguarding checks, will require of him less devotion to such details as it is the province of his subordinates to supervise. That is to say, the more perfect the system in practice the more time will the manager have for the exercise of his judgment upon the most important questions coming before him. It is here that the test of the most efficient bank official lies. Take, for an illustration, the work of supervising the loans made on real estate.

Expert Examinations.— It has been held, and is indeed held by many knowing no other method, that to ascertain the value of properties submitted as collateral for loans recourse must be had to some qualified expert, generally some one engaged in buying and selling real estate. The judgment of such an authority has been, and is, accepted as conclusive on the security offered, and determinative as to whether the report shall be favorable or adverse to the loan. But here the question arises, Who shall guarantee the expert? — for experience has too often shown that his judgment may fail, or it may be discovered that the expert was consciously or unconsciously interested in advising the loan: the applicant may have been a friend of his, or — and such cases have been — it may be his own device for getting a loan by applying through

the concealed interest of another party. But suppose a more excellent way is to be found by which the bank can be rendered reasonably certain as to the value of the property, that a clear title can be given, that it has real existence as described, both as to environment and prospective value; if he be a wise banker, will he not take advantage of that safer and saner method? And let us suppose, further, that in this way our banker is kept informed regarding specific localities, as to whether they are advancing or retrograding in value, whether the interest is kept up — is it not clear that a banker who has such expert advice is not only freed from duties that would otherwise needlessly weigh upon him, but that his services are to just this extent made more valuable in that with less time expended in searching for details and technicalities he has more time to devote to other important duties? Needless to say, I am not pleading for a title guarantee company or other corporation; I only say this — that where the services of these or kindred institutions are warranted by the business of the bank — and it must be small institutions where the volume of business does not warrant them — such facilities carrying guarantee of perfect safety should be utilized by the prudent banker. Illustrations of the principle that the more responsible officer should not be troubled with detail that can be as well looked after by capable subordinates are supplied at every turn. They obtain recognition in the management of our great industrial corporations where reports of details are placed before responsible heads and action based on them is taken accordingly. In fact the principle finds expression in every phase of activity, being adopted by the captains of industry as well as by the captains of great armies. Assuredly, great as Napoleon was, and past master in the art of war, had he attempted to perform the duties of subsistence commissary, quartermaster, adjutant, and inspector, the story of Wagram would in all probability still be unwritten, and the history of Austerlitz would only be that of an inconsequential village in the outskirts of Vienna.

Systematic Examinations Essential.— But be supervision ever so thorough, it cannot serve its proper purpose without a system of right examination — rather of examinations. Unceasing watchfulness can only be maintained through proper investigations, not only to detect fraud but errors of judgment. The usual examinations of books are of but two kinds, those of the directors, and those of the official examiners of the general or State government, as the case may be. Of these two methods, that of the directors, when rightly conducted, is most important, and for the obvious reason that the directors are better informed as to the value of paper and local securities than the official bank examiner, as a rule, can be. That the examinations made by directors are too often superficial and perfunctory, goes without saying. Were it otherwise we should hardly have the record of the year last past, which showed 26 national banks placed in charge of receivers. Six, however, have resumed business. Eight of these failures were due to fraudulent management, or to dishonesty of cashiers. Besides this, during the year ending June 1904, 50 private banks, 37 state banks, 8 trust companies, and 7 savings institutions became insolvent. Of course, in the examinations by the directors the revision of loans is most important, enabling the board, as it does, when conducted in a business spirit, to detect improper advances on an insufficient collateral or inadequate endorsement. It is here the examination should be most thorough, so that the presence of "weak" paper, which often becomes such after the loan has been made, may be discovered and remedied. Obviously in such an examination every piece of paper must be gone over as to time of maturity and collateral, which latter should invariably be produced. Collaterals should all be carefully examined with reference to their proper assignments to the bank, so that there may be no question about its ability to exercise a legal ownership, if necessary. The ticklers, the discount book, and all books pertaining to this most important branch of bank, should be carefully investigated, and the precise facts ascertained. The liabilities of the bank, its deposits and cash on hand, the character of the depositors and borrowers, the condition of the individual and general ledgers, the bad debts of the bank, including especially notes past due, over-drafts when permitted — all these and more should be investigated by the board, and this without bias to any officer or employe of the bank; all of them who discharge their duties faithfully will be glad of an examination which will result in enhancing the appreciation and increasing the confidence of the board as to the value of their services.

To insure the correctness of balances on the individual ledgers it would be well to render a monthly statement to depositors having active accounts, and to others at short intervals. A reconcilement blank, stating that the balance is correct, should accompany the same, to be signed by the depositor, and an envelope addressed to the cashier. If there are errors, the depositor may note them, to the end that they may receive official attention immediately; these reconcilements to be filed by the auditor and checked back by the examining committee.

Surplus Nominal and Real.— In some instances it would be advisable for the directors, when making an examination, to employ a trustworthy expert accountant to aid them in their investigations, because such an expert may be able to make a more complete analysis of the condition of the bank than can the directors. Here I venture, in the interests of justice to all, to express the conviction that while banks may continue to fail, shortly after they have secured a certificate of soundness from the national or State bank examiner — as they have failed in the past — no such failure should take place following a like verdict of a board of directors of a bank, though there have been such cases. The official examiner of the national or State government may not be presumed to know the standing of many of the promisors or endorsers of notes. It may be impossible for him to detect worthless paper, though it is supposed to represent thousands upon thousands in value. But no such plea can be accepted for the directors of a bank, some, if not all, of whom should have knowledge of the value of the paper upon which they lend their depositors' money. And what are the directors but trustees of the moneys

of others, committed to them in perfect confidence, and to whom no language can too severely be applied, who fail to direct? Here it seems proper to emphasize a practice which is becoming far too common in the management of banking institutions, namely, the practice of carrying on the general ledger a large surplus fund, or undivided profits, through the failure to charge off bad paper which is known to be such. This is a matter to which, in their examination, directors should give their attention, that their bank statement may represent the exact condition of the institution; just such a statement, in fact, as every right-minded director would furnish were the bank his own property. But let me be just to the directors, many of whom are prominent business men, some of them directors in several other institutions and otherwise engaged in business occupations which take all their time, and which make it impossible always for the director to direct and examine, as he would be glad to do. This fact has obtained recognition among leading bankers, who have inaugurated another system of examination, namely, the practice of having the books of the bank examined as often as may be deemed expedient by a committee appointed by the president from the competent clerks, including a chairman of considerable experience. The committee being notified assemble immediately. Without a moment's warning all the affairs of the bank are put in their hands. They count the cash on hand, examine balances, count all securities, examine and compare the sum total of all discounted bills and their collaterals, verify all accounts in the ledgers — in short, they rigidly scrutinize the condition of the bank. No one — no officer even — is allowed to make any transaction without the knowledge of the committee, who take due account of it. Where, as in the large cities, branch banks exist, the affairs of each branch are also examined in the same manner and at the same moment, that there may be no collusion by shifting of balances, borrowing money or securities to make good a deficiency.

How Some Banks Examine Themselves.— The following from a circular letter, convening a committee of examination, will give some idea of the character of the work performed. The first line of the instructions to the committee may read as follows:

On presentation of this order you will at once take charge of the bank, and will not allow any officer or clerk to do anything without your knowledge.

Then follow specific instructions to the committee: First, count the cash in detail. Examine the cash items, and all items composing exchanges, and see if any are irregular, and make full returns to the president. Test all discounted bills, their endorsements and collaterals, and prove the amounts and accompanying securities. Check up all the loans. Verify all extensions and balances of ledgers. Prove all certificates of deposit and certified checks as well as all outstanding vouchers. Prove the cashier's account; make a record of all outstanding vouchers and see that all checks drawn by the bank have two signatures. Verify the expense account. Ascertain whether all charges are initialed by an officer. Prove the tellers' difference and submit all items to the president. List all amounts due from banks and verify them, noting any irregularity. Report on amount due from each concern. Scrutinize and report upon clearing house accounts and margin accounts of the Consolidated, Produce, and Cotton exchanges. List all dividend checks unpaid. Check off all stocks, bonds, and mortgages. Describe all overdrafts, and see whether the books are properly kept. Report all suspended debts and balances due. Check off, a month back, the discount book and see if all amounts are duly entered. Examine exchange account: see if the entries appear suspiciously low and if there are any debits. Investigate interest account; see if all charges are initialed by an officer. All insurance policies and bonds should be scrutinized and a complete record made of the same. Report on all differences called for on general ledger, and whether they are all known to the officers. State at length your views as to the condition of the bank; report any departure from the method of our system as you understand it. Report any suggestions that may occur in connection with the method of bookkeeping looking towards their improvement. Finally state errors made in the methods pursued in the handling of bills discounted, loans, or any other detail of the business.

In view of the facts which have been given concerning these examinations made by bank clerks themselves as to the condition of their own institution, is it not true that while a great deal of importance is attached, and rightly so, to the report of the official bank examiner, it must be obvious that the examination by the committee as stated is exceedingly desirable. The fact that the bank's investigating committee enter into possession and assume entire control of the bank's affairs, which they retain without interference or interruption until they have thoroughly satisfied themselves that the books of the bank are correct and its affairs precisely as represented, affords the best possible guarantee against fraud and clerical errors. It would seem wise that all banks should cause such examinations to be held; where this is not expedient the same methods should be pursued by the directors. If any illustration were desired showing the necessity for rigid supervision and thorough examination it may be found in the astonishing story which appeared in the public journals in December 1904. The fact is disclosed that a woman not engaged in business, and not known to possess tangible assets, was able to obtain from at least one bank, with a reputation for conservatism, loans of four times the capital stock of the institution.

It is a good plan, when an investigation is being made by national or State bank examiners, to appoint a committee of the clerks to co-operate with such officials for the purpose of verifying the investigation.

A theft which had wide newspaper publicity, both because of the very large sum stolen and the prominence of the bank in the city of New York, was where a receiving teller was found to be a thief, although the directors had absolute confidence in his integrity. He used part of the receipts of one day to cover the shortage of the day preceding.

In one bank two individual bookkeepers were

in conspiracy with a dealer. They allowed the depositors to draw out more money than they had deposited by covering up the defalcations by false entries.

The officer in charge of the exchange department in one case entered drafts issued by him for a less amount than the face. To illustrate: A $5,000 draft was entered by him as $1,000, and, as he had charge of the "reconcilement," the difference was transferred from one account to another. If a ledger is manipulated, or a certificate of deposit register falsified, it is difficult to discover the fraud.

It is true that in the larger cities the national bank examiners receive pay whereby, perhaps, they may receive sufficient to enable them to make a proper examination, but the law is such that it is alleged a premium is placed upon incomplete work by the provision contained in the statute for the pay of examiners outside of the central reserve cities. There are, at the present time, only 78 examiners to investigate 5,536 national banks, and but a short time can be given by the examiner to his work.

It is a wise proceeding to compel all employes to take a vacation without notice each year, so that others may become acquainted with their duties. In this way, sometimes, defalcations have been discovered.

In my experience, there has been found no more satisfactory preventive against fraud than the changing of employes, without previous notice, for a short time, from one department to another, at least once a year. A constant inquiry should be made as to the conduct and habits of all persons employed by the bank. Such inquiry may not make a weak man strong, but good resolutions may be strengthened by the knowledge that the penalty for wrongdoing will be surely and promptly inflicted.

It is only a truism to say that good bank management and thorough examination are wholly impossible in the absence of a definite system, which enters into every phase of industry. We find it everywhere. The manufacturer who does not know in detail his stock on hand at any time is in as dangerous a position as an engineer without a steam gauge. His steam may be low — the machinery of his business will suddenly stop. His pressure perhaps is high — all his capital tied up in stocks means an explosion — and the receiver gets the pieces.

Necessity of Method.— To a right and safe banking system method is a necessary protection. Unsystematic banking is not only a paradox, it is a contradiction in terms. System economizes time, excites invention, expands energy, concentrates power and accelerates results. Without system, determination weakens, purpose crumbles, failure is sure. Subtract system from banking and chaos is left. In banking there is no middle ground between order and confusion, between cosmos and chaos. System, applied to banking, should make it easy for the manager to have its condition constantly before him. Emphasis has been placed upon the value of examinations conducted by bank clerks. But in view of the close relationship of these institutions to the public welfare, and the further fact that they are virtually the creation of the Federal and State laws, it is evident, not only that banks should be examined by officials of the respective governments, but that the examinations should be of the most searching character. A good bank will court investigation. Whether it is true or not, as a recent writer has said, that "bank examiners are not called upon to play the detectives," it is assuredly true that they should discharge their duties with thoroughness, and with a realizing sense of their duty to the public. So far as practicable they must see to it that collusion at the time of examination, between teller and discount clerk or other officers is made impossible, and that neither cash nor vouchers are made to do double duty in the hands of the dishonest, as has been done. It may not be assumed that either national or State or directors' examinations will form an infallible guarantee against dishonest practices. But what may justly be expected of these examinations, together with such as the bank officials may themselves institute, is that they will reduce losses through error or fraud to a minimum. No known system affords any guarantee of faultless management; but the best system rigidly applied will produce the best results possible; and for this the public have a right to look.

The Pre-eminence of New York.— Some years ago I made the statement that the banking law of the State of New York not only furnished the model for the National Bank Act but that it had affected the management of the Bank of England, so that New York may be said to have furnished banking law for two worlds. Gradually but surely the larger financial institutions of this country, following the law of concentration, are developing in capital and other resources until at a time not distant, unless all signs fail, the Bank of England will yield to this country the possession of the world's greatest financial institutions. And it may not be wholly irrelevant to remark here that the lessons America has taught Great Britain, as certified to by Daniel O'Connell, John Bright, and other British statesmen, are neither few nor unimportant — only to mention the lesson of local self-government as seen in the several States and counties of the Union, the lesson of religious liberty as seen in a nation without a Church, witnessed, too, in free commercial intercourse as exemplified in the freedom of intercourse between the several States and Territories. Can it be doubted that in the management of the great financial institutions this country will exert a more powerful influence upon the other nations of the world than she does even now? When it is stated that enough money lies to-day in the savings banks of the State of New York alone to pay off our entire national debt on demand, and leave a substantial balance, is it not made clear that if we are a spending nation we are also a saving people? And let it be said that should the worst ever come to this country through the horrors of war, it may not for a moment be doubted that the financial resources of America will serve her even more effectively than the Bank of England served Great Britain through the Napoleonic wars, when she was obliged to send large sums of gold and silver out of the country.

When we regard our financial resources in the plentitude of their full significance it scarcely

seems possible to exaggerate the significance or importance of anything and everything that bears upon our financial institutions. And what can be of greater importance than the thorough, systematic, exhaustive and regular examination of our great financial institutions — our national and State banks, trust companies and institutions for savings whose capital and deposits are expressed by billions? What can be more essential to the welfare of a community of breadwinners and dependents upon them than the assurance that those institutions, with which are lodged the means for conducting the vast enterprises of the country and the earnings which have been won by hard labor, are conducted in an honest, businesslike way, prepared to meet the demands that may at any time be made upon them? And the key to such a situation — what is it but such thorough supervision, with rigid examinations, as shall inspire confidence and dissipate alarm in hours of financial stringency and tendency to distrust? A mercantile house may fall, and the adverse results may be partial and remediable; but when a great banking institution goes down, credit goes, fortunes disappear, the poor are left helpless, and the tale of suffering is long and grievous.

No banking institution to-day is of the right kind which is conducted as such institutions were 50 years ago. In like manner we may believe that in future years new methods, new safeguards, enforced by an impartial, effective system of promotion of the personnel, will give increased efficiency in bank management, resulting in a greater volume of business, fewer bank failures, and heavier balances on the right side of the ledger.

No institution can run itself — except to ruin — least of all a bank. Eternal vigilance is no less the price of liberty than of safe banking; and only those institutions can gain and deserve the public confidence and justify the powers conferred upon them which are managed under a supervision that is searching and thorough, including examinations which are rigid and relentless.

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Bank'rupt, a term derived generally from Italian, *banca,* a bench, and Latin, *ruptus,* broken, in allusion to the benches formerly used by the money-lenders in Italy, which were broken in case of their failure. The word in its most general sense signifies an insolvent person, but more strictly an insolvent merchant.

There is perhaps no branch of legislation more difficult, and at the same time more important, than that which defines the relations of debtors and creditors. One of the first objects of all laws, after the protection of the person, is the enforcement of the obligation of contracts, and among all the contracts made in a community those imposing the obligation to pay money constitute the most numerous class. Some of the first questions in legislation are: By what measures shall this obligation be enforced? and by what penalties shall the breach of it be punished? In many communities, especially in the earlier stages of civilization, the breach of such a contract or obligation is regarded as a crime, and the insolvent debtor is treated as a criminal. The ancient laws upon this subject in England so regard the insolvent trader. The early laws of the Romans and Athenians authorized the most rigorous measures for procuring satisfaction of a debt, even permitting the sale of the debtor into slavery for this purpose. The Battas of Sumatra still, it is reported, sell not only the debtor, but also his family for the benefit of the creditor. But as civilization advances the laws put a more mild construction upon the debtor's failure to fulfil his contract, and, with certain qualifications, and under certain restrictions, attribute it to misfortune, and, on giving up his property to be divided among his creditors, discharge him from all further liability.

The power of making bankrupt laws in the United States was, by the Constitution, conferred on Congress, which alone had the power to make a bankrupt law applicable to, and binding upon, all creditors in the United States, and for all descriptions of debts. This power was first exercised by Congress in 1800, by the enactment of a bankrupt law limited to five years, and which expired by its own limitation. This act was modeled upon the English statutes of bankruptcy existing at the time, and, like them, was applicable to no debtors except merchants. Both by the English statutes and the French code, persons capable of becoming bankrupts are such as fall under the general description of merchants, which the French describe as commercants.

A statute of the reign of George III., relating to bankrupts in Scotland, describes a person capable of becoming such to be one who "either for himself, or as an agent for others, seeks his living by buying and selling, or by the workmanship of goods or commodities"; an English statute of the reign of George IV., embodying the previous acts and judicial decisions on this subject, enumerates particularly the descriptions of persons who are to be considered merchants, and capable of becoming bankrupts. See BANKRUPTCY LAWS.

Bank'ruptcy Laws. When a person is unable to pay his debts in full, the law of civilized countries adopts some means of satisfying the creditors, as far as they can be satisfied, out of the debtor's estate, and relieving the debtor himself from pressure which, by his own efforts, he would not be likely to overcome. The debtor having been declared a bankrupt, his property vests in his creditors for the purpose of being divided ratably among them, and consequently he starts anew, entirely relieved from the obligations thus partially satisfied. In general terms this is the process of bankruptcy as observed in modern societies. The law of bankruptcy is, in fact, a modern creation slowly evolved out of the criminal code in answer to the necessities of a widely spread industrial life.

The early law of Rome, while prohibiting contracts of usury, gave the legal creditors the savage remedy of dividing the carcass of their debtor or selling him and his family into slavery. The *Lex Poetelia* (about 326 B.C.) enabled a debtor who could swear to being worth as much as he owed to save his freedom by re-

signing his property; and many years afterward the legislation of Julius Cæsar established the *cessio bonorum* as an available remedy for all honest insolvents. The bankrupt law was slowly developed in England. The first English statute on bankruptcy (34 and 35 Henry VIII., c. 4.) was directed against fraudulent debtors, and gave power to the lord chancellor and other high officers to seize their estates and divide them among their creditors. In England, before 1841, only a tradesman could be a bankrupt. This distinction was then abolished. It was abolished in the United States in 1869. In the United States, Congress alone has power to pass a bankrupt law which shall have authority throughout the country. The several States may enact such statutes when there is no law of Congress in operation. The first general bankrupt act in the United States was passed in 1800 and was repealed in 1803. In 1841 another law was put in operation, with a special view of meeting the urgent needs of debtors who had been ruined by the commercial revulsion of 1837–8, and who could receive no effectual relief from local laws. This act was repealed in 13 months, but in the meantime a large number of cases had been disposed of, amounting to 3,250 in Massachusetts alone. Another bankrupt law was passed which took effect 1 June 1867. It was framed with great care by a committee of the House of Representatives, of which Mr. Jenckes was the chairman and chief working member. Its authors hoped that it would form a permanent addition to the jurisprudence of the country, but it was repealed within a few years.

An act "to establish a uniform system of bankruptcy throughout the United States," was passed by both Houses of the 55th Congress. and by the approval of President McKinley became a law on 1 July 1898. The question had been brought before Congress for several years, the issue not being between the political parties, but on the method of legislation, one side favoring the creditor and the other the debtor class. The Nelson bankruptcy bill, which at the first, or special, session of the 55th Congress, passed the Senate, failed to receive the consent of the House. The new law was a compromise between the Nelson bill, calculated chiefly to benefit debtors, and the Torrey bill, designed to guard the interests of both creditors and debtors. The adoption of the bill which became a law was mainly through the long-continued efforts of Senator Hoar (Rep., Mass.), aided especially by Senator Nelson (Rep., Minn.), and Representative George W. Ray (Rep., N. Y.). A conference between the two Houses was held, which reached an agreement on 15 June, the report being adopted by the House, 28 June, by a vote of 133 to 53; present and not voting, 24. All the votes against the bill came from the South and the far West.

The provisions under which a man can be thrown into bankruptcy against his will are as follows: (1) where a man has disposed of his property with intent to defraud; (2) where he has disposed of his property to one or more creditors to give a preference to them; (3) where he has given a preference through legal proceedings; (4) where a man has made a voluntary assignment for the benefit of his creditors generally; (5) where a man admits in writing that he is a bankrupt. The last two provisions are practically voluntary proceedings. Under the common law a man is considered insolvent when he cannot pay his debts when they are due; under the new law he is deemed insolvent only when his property, fairly valued, is insufficient to pay his debts. Only two offenses are cited under the new law; one when property is hidden away after proceedings in bankruptcy have been begun, and the other when perjury is discovered. Discharges are to be denied in only two cases; one, in which either of the offenses detailed has been committed, and the other, when it is shown that fraudulent books have been kept. The term of imprisonment for either of these offenses is not to exceed two years.

The law provides a complete system throughout the United States, and for its administration by the United States courts in place of the different systems formerly in existence in the various States administered by State courts. In bankruptcy proceedings a bankrupt debtor may turn over all his property to the court, to be administered for the benefit of his creditors, and then get a complete discharge from his debts. A bankrupt may of his own motion offer to surrender his property to the administration of the United States court and ask for his discharge in voluntary bankruptcy, or creditors may apply to the court to compel a bankrupt to turn over his property to be administered under the act for the benefit of the creditors in involuntary bankruptcy. The bankrupt who has turned over all his property and conformed to the provisions of the acts is entitled to a judgment of court discharging him from any future liability to his creditors.

Extended powers are given by the law for the taking possession and the administration of the assets, among others, to allow and disallow all claims against bankrupt estates; appoint receivers and take the necessary measures for the preservation and charge of the property of a bankrupt; to arraign, try, and punish bankrupts, officers, and other persons, and the agents, officers, and members of the board of directors or trustee, or other similar bodies or corporations for violation of the act; to authorize the business of the bankrupt to be conducted for limited periods; to cause the assets to be collected and reduced to money and distributed, and substantially determine all controversies in relation thereto; to enforce obedience to lawful orders by fine or imprisonment; and to extradite bankrupts from one district to another. As all questions, both of law and fact, in relation to the property of the rights of the various parties, must be decided in the bankruptcy proceeding, it is provided that referees be appointed, who are charged with the duty of hearing the allegations and testimony of all parties, and deciding all such questions as may arise. Each case, as it comes up, is assigned to some referee, whose duty it is to adjudicate and pass upon all such questions arising therein in the first instance, the right being reserved to any parties to appeal from the decision of the referee to the United States district court. The duties of the referee are substantially of a judicial character, and he occupies much the position of a judge of primary resort, subject to an appeal to the court, and is required to take the same oath of office as that prescribed for judges of the United States courts.

Provision is made in the act for allowing bankrupts to compromise or settle with their creditors by a proceeding known as composition proceedings, whereby, if a bankrupt and a majority of his creditors agree upon some basis of settlement, the same, if approved by the court, shall become binding upon all creditors. The decision of the question as to the approval of compositions and granting discharges to a bankrupt from his debts is specifically reserved by the act to the judges of the United States courts; but the court, by virtue of its general powers, may refer such matters to the referee to take testimony and report to the court his opinion thereon. The aim of the act has been to make the expense of the proceedings depend largely upon the amount of the property involved, and the compensation of the referee is fixed substantially at one per cent on the amount distributed to the creditors in ordinary cases, where the assets are distributed by the court, and one half of one per cent in composition cases, and the trustees who have charge of the actual management of the bankrupt's property receive as compensation such commissions on accounts paid out by them as dividends as the court may allow, not to exceed, however, three per cent on the first $5,000, two per cent on the second $5,000, and one per cent on all sums in excess of $10,000.

Banks, Mrs. Isabella (VARLEY), English poet and novelist: b. Manchester, England, 25 March 1821; d. London, 5 May 1897. After teaching school for some years in Manchester, she married the journalist, George Linnæus Banks in 1846 and with him published a volume of verse, 'Daisies in the Grass' (1865). Her first novel, 'God's Providence House' (1865), made her widely known, and among other popular novels by her are: 'Stung to the Quick' (1867); 'The Manchester Man' (1872); 'Wooers and Winners' (1880); 'Forbidden to Wed' (1883); 'In His Own Hand' (1885); 'Geoffrey Oliphant's Folly' (1886). She published several volumes of poems also and she and her husband were the authors of many popular songs.

Banks, Sir Joseph, English naturalist: b. London, 4 Jan. 1743; d. Islesworth, 19 June 1820. While in Oxford he began to manifest a strong love of botany and other branches of natural history, to which his attention had already been turned from about the age of 14. He formed a volunteer class in the university and brought Mr. Lyons from Cambridge to teach it. In May 1766 he was chosen a member of the Royal Society, and in the following summer he went to Newfoundland and proceeded to Hudson Bay to collect plants. In 1768 he, with Dr. Solander, a pupil of Linnæus and assistant librarian at the British Museum, accompanied Cook on his voyage of discovery, Banks being appointed naturalist to the expedition. In an expedition into the interior of the desolate Tierra del Fuego, for the purpose of examining the country, the two naturalists narrowly escaped perishing with cold. Banks procured the introduction of the bread-fruit tree into the West Indies, and he wrote the botanical observations in the account of Cook's voyages. In 1772 he visited Iceland with Dr. Solander, in order to make himself acquainted with its natural productions. During this voyage the Hebrides were examined, and the columnar stratification of the rocks surrounding the caves of Staffa was made known to naturalists for the first time. After the resignation of Sir John Pringle in 1777 Banks was chosen president of the Royal Society. In 1781 he was made a baronet. The French chose him a member of the National Institute in 1802, because to his intercession they owed the recovery of the papers of La Peyrouse relating to his voyage, which had fallen into the hands of the British. His library and his collections in natural history are celebrated. Besides some essays, periodical publications, and some contributions to the transactions of learned societies, he wrote nothing but 'A Short Account of the Causes of the Blight, the Mildew, and the Rust in Corn' (1805). In accordance with a contingent bequest his collections were added to the British Museum. The genus *Banksia,* of the natural order *Proteaceæ,* was named in honor of him by the younger Linnæus.

Banks, Nathaniel Prentiss, American soldier and statesman: b. Waltham, Mass., 30 Jan. 1816; d. there 1 Sept. 1894. Entirely self-taught, he worked himself up from the position of bobbin-boy in a cotton factory to the editorship of a weekly newspaper. He read law, was admitted to the bar, and began to practise, but soon became active in politics. Elected to the Massachusetts legislature in 1849, he became speaker in 1851–2. In 1853 he was president of the Massachusetts Constitutional Convention, and the same year was elected to Congress as a Coalition Democrat. The session which began 3 Dec. 1855, was memorable for its bitter speakership contest, the candidates being Banks and William Aiken, a large slaveholder of South Carolina. The contest lasted two months, the President's message being withheld, and all legislative business blocked. The sergeant-at-arms borrowed $20,000 from a Philadelphia bank in order to make advances to needy members of both parties. On the 133d ballot, 2 Feb. 1856, Mr. Banks was elected. None of his decisions while speaker were ever reversed by the House. He was governor of Massachusetts, 1857–9. In 1861 President Lincoln appointed him major-general of volunteers. He conducted active operations in the Shenandoah valley and fought with credit at Winchester and Cedar Mountain. In co-operation with Admirals Farragut and Porter he invested Port Hudson and unsuccessfully attempted to carry it by assault. In 1864, much against his judgment, he was placed in command of the Red River Expedition, which resulted most disastrously for the Federal forces. Banks was widely censured and soon relieved of his command. Gen. Grant, years later, in his 'Memoirs' furnished a full vindication of Banks by giving the name of the superior officer responsible for the expedition. From 1866 to 1876 Gen. Banks represented his old district in Congress, and was prominent as chairman of the Committee on Foreign Relations. He was United States marshal for Massachusetts, 1879–88. In 1891 Congress bestowed on him an annual pension of $1,200, a severe mental disorder having come upon him.

Banks, Thomas, English sculptor: b. Lambeth, 29 Dec. 1735; d. 2 Feb. 1805. He studied sculpture in the Royal Academy, and was sent,

as one of its students, to Italy. Here he executed several excellent pieces, particularly a bas-relief representing Caractacus and his family before Claudius, and a Cupid catching a butterfly. Among other works executed by him was a colossal statue showing Achilles enraged for the loss of Briseis, now in the entrance hall of the Royal Academy. He was also the sculptor of the admired monument of Sir Eyre Coote in Westminster Abbey, and of those of Dr. Watts and Woollett. He was elected a member of the Royal Academy in 1785.

Banks, a nautical term applied to shelving elevations in the sea or the bed of a river, rising to or near the surface, composed of sand, mud, or gravel. When tolerably smooth at the top they constitute shallows, shoals, and flats; but when rocky become reefs, ridges, keys, etc. A good chart always defines them, indicating whether they are sands or rocky.

Banks Land, an island in the Arctic Ocean, discovered by Parry in 1819, explored by McClure in 1850, and named by him Baring Island. It is separated by Banks Strait from Melville Island, lying to the northwest, and by Prince of Wales Strait from Prince Albert Land, lying eastward.

Banks and Banking. In specific relation to his customer the banker occupies the position of debtor to creditor, holding money which the customer may demand at any time in whole or in part by means of a check payable at sight on presentation during banking hours. For the refusal to cash a check from the erroneous supposition that he has no funds of his customer's in his hands, or for misleading statements respecting the position in which the bank stands, the banker is legally responsible. Moreover, the law regards him as bound to know his customer's signature, and the loss falls upon him in event of his cashing a forged check. In their relations to the community, the chief services rendered by banks are the following: By receiving deposits of money, and massing in sums efficient for extensive enterprises the smaller savings of individuals, they are the means of keeping fully and constantly employed a large portion of the capital of the community which, but for their agency, would be unproductive; they are the means by which the surplus capital of one part of a country is transferred to another; where it may be advantageously employed in stimulating industry; they enable vast and numerous money transactions to be carried on without the intervention of coin or notes at all, thus obviating trouble, risk and expense. The mechanism by which the last of these benefits is secured is to be found in perfection in the clearing-house system.

History.—Although banking operations on a considerable scale appear to have been conducted by the ancients, modern banking must be regarded as having had an independent origin in the reviving civilization of the Middle Ages. In the 12th century almost the whole trade of Europe was in the hands of the Italian cities, and in these the need of bankers was first felt. The earliest public bank, that of Venice, established in 1171, and existing down to the dissolution of the republic in 1797, was for some time a bank of deposit only, the government being responsible for the deposits, and the whole capital being in effect a public loan. In the early periods of the operations of this bank deposits could not be withdrawn, but the depositor had a credit at the bank to the amount deposited, this credit being transferable to another person in place of money payment. Subsequently deposits were allowed to be withdrawn, the original system proving inconvenient outside the Venetian boundaries. It was, however, less from the Bank of Venice than from the Florentine bankers of the 13th and 14th centuries that modern banking especially dates, the magnitude of their operations being indicated by the fact that between 1430 and 1433, 76 bankers of Florence issued on loan nearly 5,000,000 gold florins. The Bank of St. George at Genoa also furnished a striking chapter in financial history. The important Bank of Amsterdam, taken by Adam Smith as a type of the older banks, was established in 1609, and owed its origin to the fluctuation and uncertainty induced by the clipped and worn currency. The object of the institution (established under guarantee of the city) was to give a certain and unquestionable value to a bill on Amsterdam; and for this purpose the various coins were received in deposit at the bank at their real value in standard coin, less a small charge for recoinage and expense of management. For the amount deposited a credit was opened on the books of the bank, by the transfer of which payments could be made, this so-called bank money being of uniform value as representing money at the mint standard. It bore, therefore, an *agio* or premium above the worn coin currency, and it was legally compulsory to make all payments of 600 guilders and upward in bank money. The deposits were supposed to remain in the coffers of the bank, but were secretly traded with in the 18th century till the collapse of the bank in 1790. Banks of similar character were established at Nuremberg and other towns, the most important being the Bank of Hamburg, founded in 1619. In England there was no corresponding institution, the London merchants being in the habit of lodging their money at the Mint in the Tower, until Charles I. appropriated the whole of it (£200,000) in 1640. Thenceforth they lodged it with the goldsmiths, who began to do banking business in a small way, encouraging deposits by allowing interest (4d. a day) for their use, lending money for short periods, discounting bills, etc. The bank-note was first invented and issued in 1690 by the Bank of Sweden, founded by Palmstruck in 1688, and one of the most successful of banking establishments. About the same time the banks of England and Scotland began to take shape, opening up a new era in the financing of commerce and industry.

Bank of England.—The Bank of England, the most important banking establishment in the world, was projected by William Paterson, afterward the promoter of the disastrous Darien scheme. It was the first public bank in the United Kingdom, and was chartered in 1694 by an act which, among other things, secured certain recompenses to such persons as should advance the sum of £1,500,000 toward carrying

on the war against France. Subscribers to the loan became, under the act, stockholders, to the amount of their respective subscriptions, in the capital stock of a corporation denominated the Governor and Company of the Bank of England. The company thus formed advanced to the government £1,200,000 at an interest of 8 per cent — the government making an additional bonus or allowance to the bank of £4,000 annually for the management of this loan (which, in fact, constituted the capital of the bank), and for settling the interest and making transfers, etc., among the various stockholders. This bank, like that of Venice, was thus originally an engine of the government, and not a mere commercial establishment. Its capital has been added to from time to time, the original capital of £1,200,000 having increased to £14,553,000, in 1816, since which no further augmentation has taken place. There exists besides, however, a variable "rest" of over £3,000,000. The charter of the bank was originally granted for 11 years certain, or till a year's notice after 1 Aug. 1705. It was subsequently renewed for various periods in 1697, 1708, 1713, 1742, 1764, 1781, 1800, 1833, and 1844, certain conditions which the bank had to fulfill being specified at each renewal. On this last occasion it was continued till 12 months' notice from 1855. At the same time the issue department of the bank was established as distinct from the general banking department, the sole business entrusted to the former being the issue of notes. By this arrangement the bank was authorized to issue notes to the value of £14,000,000 upon securities especially set apart, the most important of the securities being the sum of £11,015,100 due to the bank by the government, together with so much of the coin and bullion then held by the bank as was not required by the banking department. The bank has since been permitted to increase its issue on securities to £15,750,000, but for every note that the issue department may issue beyond the total sum of £15,750,000 an equivalent amount of coin or bullion must be paid into the coffers of the bank. The Bank of England notes are, therefore, really equivalent to, and at any time convertible into, gold, as it is in the utmost degree improbable that any drain on the treasure in the bank will reduce the outstanding notes below £15,750,000. They are (like all English bank-notes) of the value of £5 and upward, and are legal tender throughout England. Notes once issued by the bank and returned to it are not reissued but destroyed — a system adopted in order to facilitate the keeping of an account of the numbers of the notes in circulation, and so prevent forgery.

In compliance also with the act of 1844 the bank is compelled to publish a weekly account. The following shows the condition of the bank on 21 Jan. 1903: Issue department: notes issued, £49,666,245; securities, £18,175,000; gold, coin, and bullion, £31,491,245. Banking department: capital and "rest," £18,103,048; deposits and post bills, £50,670,747; securities, £45,438,969; notes in the reserve, £21,314,325; and gold and silver coin, £2,020,501.

The total of the notes given out by the issue department is called the issue circulation, the portion of it in the hands of the public being the active circulation, and that still in the banking department being the note reserve. This note reserve represents really the amount of bullion in the issue department available for the use of the banking department. Of the other items in the account it may be noted that the proprietors' "rest" is a varying surplus increased always by accumulated profits up to 5 April and 10 October, when the bank dividends are paid to the shareholders; and that the public deposits, which include sums lodged on account of the customs, inland revenue, etc., increase through revenue receipts until the dividend terms in January, April, July, and October. The other or private deposits comprise those of bankers, merchants, and other persons. An increase in these private deposits indicates an increase of monetary ease, while a decrease informs us that bankers, merchants, and traders have calls upon them for money. A better indication of the demand for money is furnished, however, by the advances on commercial securities, and it is by this and the condition of the reserve that the bank rate of discount is regulated. When the reserve is high and the advances moderate the discount rate is low, and it is raised according as the reserve falls and advances are more in request, especially during an adverse foreign exchange and drain of gold. Gold is thus restrained from going abroad, and its influx into the country is encouraged. In addition to the profits which the bank may make by ordinary banking business, it receives an allowance for the management of the national debt, etc., at the rate of £300 per million on £6,000,000, and £150 per million on all debt above that sum. It also derives a profit from the foreign coin and bullion brought to it, for which it pays £3 17s. 9d., or 1½d. per ounce less than the real value.

The management of the bank is in the hands of a governor, deputy-governor and 24 directors, elected by stockholders who have held £500 of stock for six months previous to the election. A director is required to hold £2,000, a deputy-governor £3,000, and a governor £4,000 of the stock. The court or board of directors meets every Thursday, when the weekly account is presented.

Bank of France.—The Bank of France is second in importance only to the Bank of England. It was established in 1800, at first with a capital of 45,000,000 francs, and with the exclusive privilege in Paris of issuing notes payable to bearer, a privilege which was extended in 1848 to cover the whole of France. It has numerous branches in the larger towns, a number of these having been acquired in 1848, when certain joint-stock banks of issue were by government decree incorporated with the Bank of France, the capital of which was then increased to 91,250,000 francs, in 91,250 shares of 1,000 francs each. In 1857 the capital was doubled, and, besides this, it has a large surplus capital or "rest." Like the Bank of England, it is a bank of deposit, discount, and circulation, and is a large creditor of the state. The government appoints the governor and two deputy governors, who are all required to be stockholders. There is also a body of 15 directors and 3 censors, nominated by the shareholders.

The capital stock of the Bank of France is 182,500,000 francs. As shown by statement of resources and liabilities dated 22 Jan. 1903 the surplus and other profits of the bank amounted to 42,515,000 francs, and its outstanding circula-

tion to 4,431,801,910. The total assets of the bank were 5,262,099,592, of which 3,601,126,067 consisted of specie divided as follows: Gold, 2,508,805,839; silver, 1,092,320,228.

National Banks of the United States.—The table below, compiled from the report of the comptroller of the currency (30 Jan. 1905), gives a comprehensive view of the development of the national banking system in recent years.

On 11 Jan. 1905, 5,528 national banking associations filed reports of condition with the comptroller of the currency. The paid-in capital stock of the reporting banks was $776,916,147; surplus funds and other undivided profits, $466,177,675 and $183,994,737, respectively. The outstanding circulating notes of the reporting banks amounted to $424,345,433 and their individual deposits to $3,612,499,599. The aggregate resources of the associations were $7,117,800,553, an increase since 22 Jan. 1904 of $540,922,390. Against deposit liabilities of $4,416,877,711, a reserve was held aggregating $1,008,064,321.

The volume of the exchanges of the 98 clearing houses of the United States for the year ended 30 Sept. 1904 amounted to $102,150,313,982, against $113,963,298,913 for the year ended 30 Sept. 1903, the net decrease being $11,812,984,931. See BANKS AND BANKING, AMERICAN, and BANKS, UNITED STATES NATIONAL.

Recent Rapid Growth.—From 14 March 1900 to 31 March 1903—3 years and 17 days—1,442 new banks were organized. They were capitalized and distributed as follows:

STATE	No.	Capital	Bonds Deposited
Alabama	16	$ 777,500	$ 205,000
Arizona	6	205,000	51,500
Arkansas	5	200,000	50,250
California	19	4,205,000	549,000
Colorado	20	1,065,000	280,750
Connecticut	3	100,000	35,500
Delaware	2	50,000	25,000
Florida	6	410,000	117,500
Georgia	22	1,365,000	319,250
Hawaii	2	525,000	56,500
Idaho	9	250,000	62,550
Illinois	80	5,710,000	1,544,050
Indiana	49	3,030,000	839,300
Indian Territory	64	1,970,000	524,400
Iowa	73	2,445,000	807,250
Kansas	38	1,490,000	479,750
Kentucky	24	2,620,000	498,300
Louisiana	12	875,000	194,000
Maine	5	250,000	69,500
Maryland	20	1,107,000	286,450
Massachusetts	5	2,150,000	175,000
Michigan	12	2,565,000	242 300
Minnesota	95	3,406,000	988,900
Mississippi	8	725,000	235,000
Missouri	18	1,855,000	385,250
Montana	3	305,000	64,000
Nebraska	35	960,000	295,800
New Hampshire	3	225,000	60,000
New Jersey	23	1,67[illegible],000	299,800
New Mexico	8	225,000	67,550
New York	55	6,570,000	1,205,300
North Carolina	12	330,000	106,250
North Dakota	43		367,500
Ohio	85	5,945,000	1,573,450
Oklahoma	69	2,065,000	644,300
Oregon	7	175,000	51,750
Pennsylvania	169	14,497,000	2,830,350
Porto Rico	1	100,000	50,000
Rhode Island	1	500,000	50,000
South Carolina	5	260,000	70,750
South Dakota	30	800,000	242,300
Tennessee	13	480,000	139,500
Texas	166	6,318,000	1,778,450
Utah	3	105,000	30,000
Vermont	1	25,000	25,000
Virginia	26	1,130,000	343,000
Washington	7	380,000	101,250
West Virginia	31	1,335,000	420,000
Wisconsin	28	1,795,000	462,200
Wyoming	5	175,000	68,750
Number of new banks			1,442
Capital			$86,135,500
Bonds deposited			20,375,500

Nine hundred and fifty-seven of these took advantage of the law of 14 March 1900, permitting the establishment of $25,000 banks. The remaining 485 were banks of $50,000 and over capital. These figures include 622 converted State and private banks. During March 1903, 56 banks were organized, distributed as follows:

Middle States	22	banks	$700,000 capital
Western States	13	banks,	405,000 capital
Southern States	12	banks,	630,000 capital
Eastern States	8	banks,	400,000 capital
Pacific Territories	1	bank,	25,000 capital
Number of new banks in one month			56
Capital			$2,170,000

THE NATIONAL BANKS OF THE UNITED STATES.

Year Ending Sept. 1	No. of Banks	Capital	Surplus	Total Dividends	Total Net Earnings	Ratio of Dividends to Capital	Ratio of Dividends to Capital and Surplus	Ratio of Earnings to Capital and Surplus
1882	2,197	473,947,715	133,570,931.00	40,701,028.00	53,321,234.00	8.73	6.81	8.88
1883	2,350	494,640,140	131,232,187.00	40,078,078.00	54,007,148.00	8.30	6.50	8.00
1884	2,582	518,605,725	147,721,475.00	41,254,473.00	52,362,783.00	8.00	6.20	8.00
1885	2,665	524,599,002	140,903,495.00	40,656,121.00	43,625,497.00	7.80	6.00	6.50
1886	2,784	532,459,921	155,030,884.00	42,412,803.00	55,165,385.00	7.96	6.17	8.02
1887	3,049	578,462,765	173,913,440.97	44,152,407.92	64,506,869.66	7.98	6.12	8.95
1888	3,093	583,539,145	184,416,990.92	46,531,657.80	65,360,486.73	8.02	6.10	8.57
1889	3,170	590,302,518	194,818,192.19	46,618,060.27	69,618,265.07	7.82	5.89	8.80
1890	3,353	625,089,645	208,707,786.00	51,158,883.33	72,055,563.52	8.19	6.14	8.65
1891	3,577	660,108,261	222,766,668.00	50,795,011.00	75,763,614.00	7.70	5.89	8.80
1892	3,701	670,076,650	237,761,865.23	50,400,713.93	66,658,015.27	7.42	5.50	7.27
1893	3,759	684,342,024	246,018,073.11	49,633,105.00	68,750,952.09	7.25	5.33	7.38
1894	3,755	672,051,450	246,001,328.00	45,333,270.00	41,055,248.00	6.07	4.09	4.05
1895	3,716	660,287,065	247,460,002.00	43,900,663.00	46,866,557.00	6.96	5.06	5.15
1896	3,682	652,725,750	248,235,323.00	45,525,947.00	49,742,318.00	6.97	5.05	5.52
1897	3,620	638,173,895	240,044,948.00	42,394,241.00	44,273,314.00	6.64	4.78	4.99
1898	3,581	615,818,725	244,281,870.00	44,201,071.00	50,032,072.00	7.17	5.15	5.82
1899	3,561	608,674,895	247,930,970.00	46,601,502.00	54,346,692.00	7.67	5.45	6.34
1900	3,632	613,053,695	250,914,856.00	47,995,024.00	87,293,485.00	7.89	5.57	10.14
1901	4,030	630,043,080	271,432,504.00	52,616,778.00	81,853,795.00	8.28	5.82	9.06
1902	4,306	667,354,275	305,211,716.00	68,199,494.00	106,581,477.00	10.10	6.98	10.92
1903	4,805	735,314,217	362,497,812.00	63,565,847.00	109,881,530.00	8.80	5.91	10.21
1904	5,244	765,948,330	398,299,071.00	75,588,890.00	112,936,427.00	9.93	6.57	9.81

The number of new banks in the manufacturing States is very marked. Ohio, 85; Indiana, 49; Illinois, 80; Pennsylvania, 169; New York, 55. The agricultural States also show up well, with 166 for Texas, 95 for Minnesota, 69 for Oklahoma, and 64 for Indian Territory.

By groups of States the showing is:

	No.	Capital	Bonds Deposited
New England States	18	$ 3,250,000	$ 415,500
Eastern States	269	23,204,000	4,646,900
Southern States	346	16,825,500	4,477,250
Middle States	440	26,751,000	6,842,700
Western States	315	10,160,000	3,041,100
Pacific States	51	5,320,000	846,050
Islands	3	625,000	106,500

The $20,375,500 of bonds deposited against circulation is a fraction less than 24 per cent of the capital, the latter being the measure of the maximum amount of circulation issuable. Our total national bank figures for 31 March 1903 were:

		Increase since 14 March, 1900
Number of banks	4,869	1,252
Capital	$739,178,695	$122,870,600
Bonds on deposit	342,160,770	97,549,200
Circulation secured by bonds	338,349,814	
Circulation secured by lawful money	44,169,444	128,116,528

UNITED STATES CURRENCY CIRCULATION.

Fiscal Year	Amount in circulation	Circulation per capita
1870	675,212,704	17.50
1872	738,309,549	18.19
1873	751,881,809	18.04
1874	776,083,031	18.13
1875	754,101,947	18.16
1876	727,609,338	16.12
1877	722,314,883	15.58
1878	729,132,634	15.32
1879	818,631,793	16.75
1880	973,382,228	19.41
1881	1,114,238,419	21.70
1882	1,174,290,419	22.37
1883	1,230,305,696	22.90
1884	1,243,925,969	22.65
1885	1,292,568,615	23.02
1886	1,252,700,525	21.82
1887	1,317,539,143	22.45
1888	1,372,170,870	22.88
1889	1,380,361,649	22.52
1890	1,429,251,270	22.82
1891	1,497,440,707	23.41
1892	1,601,347,187	24.44
1893	1,596,701,245	23.85
1894	1,660,808,708	24.28
1895	1,601,968,473	22.93
1896	1,506,631,026	21.10
1897	1,640,808,946	22.49
1898	1,837,859,895	24.66
1899	1,904,071,881	25.45
1900	2,055,150,998	26.94
1901	2,175,387,277	27.98
1902	2,249,390,551	28.43
1903	2,367,692,169	29.42
1904	2,519,142,860	30.77

Currency Act of 1900.—On 14 March 1900 President McKinley approved a new currency act, which, among other things, established the gold dollar as the standard unit of value, and placed at a parity with that standard all forms of money issued or coined by the United States. The bill also made a number of important changes in the regulations governing national banks. The new law permits national banks with $25,000 capital to be organized in places of 3,000 inhabitants or less, whereas the minimum capital previously was $50,000. It also permits banks to issue circulation on all classes of bonds deposited up to the par value of the bonds, instead of 90 per cent of their face, as before. This act also reduces the semi-annual duty on national bank circulation secured by 2 per cent consols of 1930 to one fourth of 1 per cent. As a result of this legislation the outstanding circulation of national banks increased over $100,000,000 between the date of passage of the act and 31 Oct. 1901.

From 14 March 1900 to 31 Oct. 1904 there were organized 2,196 national banking associations, with an authorized capital aggregating $125,512,300, and with bonds as security for circulation of $31,331,250. Of this total number, there were 1,437 banks with an aggregate capital of $37,459,500, whose individual capital was less than $50,000, the average but slightly in excess of the minimum, namely, $25,000. The number of banking institutions in the country, by reason of these organizations, was only increased to the number of 1,230, as 250 of the associations were conversions of State banks, and 716 reorganizations of State or private banks liquidated for the purpose.

During the existence of the national banking system, up to 31 Oct. 1904, there were organized 7,460 national banking associations, of which number 1,548 were placed in liquidation either by vote of stockholders or by expiration of charters, and 417 in charge of receivers, leaving in active operation on the date mentioned 5,495 banks, with capital stock of $781,126,335. These associations had on deposit with the treasurer of the United States, in trust, as security for circulation, bonds to the amount of $426,544,790, on which circulation had been issued (on that date) to the amount of $424,530,581. In addition to circulation secured by bonds there were outstanding notes to the amount of $32,750,919, secured by the deposits of lawful money. The increase of national bank circulation from 14 March 1900 to 31 Oct. 1904 was, in round numbers, 202.9 million dollars.

On 12 April 1902 the act was approved, authorizing the extension, for a period of 20 years, of the charter of national banking associations which had been extended under the act of 12 July 1882. From the date of the passage of the extension act of 1902 to 31 Oct. 1904 the corporate existence of 315 banks, with a capital of $88,310,300, was extended for a second time.

O. P. Austin,
United States Treasury Department.

Banks and Banking, American. The history of banking in America opens in those trying days of the Revolutionary War, when the new republic, trembling on the verge of disaster, groped out so blindly in search of some adequate means of financial relief. At that moment, however, there were some master minds that were found capable of meeting such an emergency, and it requires no stretch of the imagination to discover that the aid given by their advice was of incalculable importance at this critical period in the nation's history.

Of course, it is true that banking methods in America have undergone many radical changes since the days of the country's

infancy, and yet, as we review the past, it is impossible not to admit that the systems in vogue in the United States have always been more or less sound. They have changed because conditions have changed, and not so much because they were based upon mistaken ideas. Adapted to the needs of the times they served, they remained in operation until altered conditions had made them obsolete, but then, just as promptly as necessity required, they were altered to meet the effect of the new conditions. See UNITED STATES FINANCES OF 1775–1789.

In the beginning of the financial history of the Republic — a little more than a century ago — the fiscal affairs of the United States were in the hands of the «Bank of the United States,» a national institution which had been modelled quite closely upon the lines of the old Bank of England. With the exception of a brief period just prior to and including the War of 1812, this institution remained as the great American financial power, and its final abandonment was the occasion of one of the most bitter political struggles of which we have any record.

It was through the efforts of Andrew Jackson and his successor, Martin Van Buren, that the State bank system came into existence as a substitute for the former single dominant power, and for more than a quarter of a century this system represented the American method of banking. That it had its good points there can be no doubt. That many of the State banks were as sound and solvent as any banking institution in the world to-day is not a matter for question. Unfortunately, however, there were some of them that could not be classified as «sound» banks, and as there was no uniform basis for their government, no power that should say at what point their operations became dangerous or unwise, the weakness of the system exhibited itself in the discounting of a currency that became more and more demoralized in proportion to its distance from the bank which was responsible for its issuance.

When the Civil War came, with all its insistant demands upon the resources of the country, it was found that this method of banking was utterly unable to respond to the requirements of the new conditions. It was to meet this emergency that another new system was devised, and it is this system that is in use to-day. Around it some of the greatest financial institutions of the world have been developed, for it would be almost impossible to imagine a system that could be more conducive to natural growth and expansion. By avoiding any great centralization of power it distributes its beneficent influence throughout the country. By placing the pledge of the Federal Government upon every banknote issued it makes the contingency of a discounted and demoralized currency impossible.

To trace in detail the history of American banking it is necessary to go back to 1780, when the first bank established in the United States was opened in Carpenters' Hall, Philadelphia. It was known as the Pennsylvania Bank, and was organized, upon personal credit alone, by Robert Morris, George Clymer and a few other gentleman, who took as their only security, the bills that a desperate Congress had drawn upon John Jay, who was then employed in negotiating a loan in Spain. Its object, therefore, was mainly a patriotic one, for practically all its efforts were devoted to the aid of the government in its work of transporting troops and maintaining an army which was then in desperate need of every kind of assistance. Later, when Mr. Morris had been appointed superintendent of finance, and the bank which he had founded had gone out of existence, it was at his request that Congress issued to him and his associates the charter for the new Bank of North America. In January, 1781, this new institution began its business operation in Philadelphia, with Thomas Willing as its first president, and a board of 12 directors. With a capital of $400,000 it conducted its business on a specie basis, its notes having the weight of legal tender. In addition to its national charter, it received a similar authorization from the State of Pennsylvania, and, as it was then the only banking institution in the country, its profits began to accumulate so rapidly that, in the years 1783 and 1784, it was able to declare dividends of 14 per cent. Naturally enough such evidences of prosperity attracted attention, and it was not long before another coterie of wealthy merchants formed a project to open a rival bank. They even went so far as to apply for a charter, but, before the necessary act was passed, the Bank of North America squelched the threatening opposition by permitting its projectors to participate freely in the old bank's new issue of $500,000 worth of stock. In 1787 it was rechartered as a State bank by an act of the Pennsylvania legislature, and with several legislative changes it has continued to exist as a prosperous financial institution.

It was not until 1784 that a similar banking house was established in the city of New York. During the several years that had elapsed since the formation of the Bank of Pennsylvania the merchants of New York had been appropriately interested in the Philadelphia experiment. At one time a number of the prominent business men of the city assembled and discussed the possibility of creating a bank upon a plan which was later dubbed by its opponents as the «land» bank scheme. According to this project only a small part of the capital of this institution was required to be paid in specie, the balance being issued against sight notes, themselves payable in specie and secured by land accepted at one-third of its value. As this plan met with the influential support of Chancellor Livingston it was nearly carried through the legislature to which it had applied for a charter, but finally, and chiefly through the personal efforts of Alexander Hamilton, the passage of the act was defeated.

As the demand for the establishment of a local banking institution became more insistent, however, several of the most prominent business men of New York responded

to a call for a meeting which was held at the Merchants' Coffee House, on 22 Feb. 1784. Gen. Alexander MacDougal presided, and when, after a long discussion of the subject, it was decided to start the bank, he was further honored by election as its first president. It was determined that the bank should begin operations with a capital of $500,000, either gold or silver, divided into 1,000 shares and, when, on 15 March, the first 500 shares had been taken, the corporation was organized with Samuel Franklin, Robert Bowne, Comfort Sands, Alexander Hamilton, Joshua Waddington, Thomas Randall, William Maxwell, Nicholas Low, Daniel McCormick, Isaac Roosevelt, Joshua Vanderbilt and Thomas B. Stoughton, as its directors. William Seton was elected cashier, but the New York business men of that day were so ignorant of everything associated with the organization of a bank and with methods of banking in general, that the new cashier was obliged to go to Philadelphia in search of necessary instruction respecting the nature of his duties. During his absence the directors perfected their arrangements, and, as they had not secured their charter, they decided to operate without one. Accordingly the doors were opened to the public, 9 June 1784, the institution, which was know as the Bank of New York, being located in a three-story, yellow brick house at No. 67 St. George's (now Franklin) Square.

Slight as their experience with banking institutions had been there were many persons in those days who believed that banks were antagonistic to the best interests of the community. During the years 1785 and 1786, therefore, when the evils due to the scarcity of currency began to make themselves felt, popular opinion became very strongly opposed to the entire system, it being held that the banks were hoarding the specie which was so badly needed in the commercial world. To meet the exigencies of the occasion, several of the States in which the feeling rose highest, proceeded to issue paper money by vote of the legislature, but as this action accomplished no other purpose than to temporarily allay the demand for currency, this same lack of confidence in the banks and their purpose prevailed when, under the newly adopted Constitution, Gen. Washington was elected to the Presidency, and Alexander Hamilton took his seat as the first secretary of the treasury. Under his famous financial policy the national Government not only assumed and bonded the debts contracted by the Continental Congress, as well as those contracted by the several colonies during the progress of the war, but it went a step further by establishing, in 1791, the Bank of the United States.

Established under a 20-year charter, this institution was devised to act as the fiscal agent of the Government and to serve as the depository of all public moneys. Its capital was fixed at $10,000,000, divided into 25,000 shares of $400 each, payable one-fourth in specie and three-fourths in six per cent. stocks of the United States. It was further authorized to hold property of all kinds to an amount not exceeding $15,000,000, inclusive of its capital stock; was permitted to issue its notes, payable in specie, and could establish branch banks, in various cities throughout the country. Accepted as the direct agent of the United States Government in every important particular, it is not strange that the institution should have prospered and that, during its entire career, its annual dividends ranged from 8 to 10 per cent. The first branch bank opened by the Bank of the United States was an office of deposit and discount in New York.

As prosperity soon returned under the beneficent influence of Hamilton's wise financial policy the confidence in the American institutions was again quite generally restored, and, while it is true that the spirit of speculation, which was eventually let loose in the land, resulted in a stringency in the currency that would undoubtedly have resulted seriously if Alexander Hamilton and the United States Treasury had not come to the relief of the business community, not once, but three times, business continued to improve.

In New York, however, the sentiment of opposition to the banking system was still so strong that every political influence was exerted to prevent the granting of any new charters. As the banking field, despite this sentiment, was by no means overcrowded, several ineffectual efforts had been made to establish new institutions, and finally, a company headed by Aaron Burr found a means to overcome the difficulties. In 1799, they applied to the legislature and by it were granted a charter for a company which ostensibly proposed to provide pure water for the city of New York. The capital of this corporation, which was known as the Manhattan Company, was fixed at $2,000,000, but, unnoticed by the politicians who had been so active in their opposition to the banking interests, there was a clause in this charter which, after specifying that the capital of the company was to be devoted to the establishment of a water supply, also provided that the surplus might be "employed in the purchase of public or other stocks or other moneyed transactions or operations not inconsistent with the laws and constitution of the State of New York."

It is, of course, unnecessary to add that a corporation with such a clause in its charter found little difficulty in securing the funds requisite to the opening of a new bank. By 1803, however, the establishment of banks had become so general that there were no less than 40 in operation in various parts of the country.

As Congress failed to renew the charter of the Bank of the United States, and as the expiration of this act, in 1811, was almost immediately followed by war with Great Britain, the financial position of the country was a most unsatisfactory one. Having depended upon the Bank of the United States for its credit, the Government had little of its own, and it was, therefor, compelled to depend to a large degree upon the already established banks. There were many of these

institutions, all under State charter, and no less than 123 new ones were created during the four years following the closure of the Bank of the United States. The aggregate capital of all these banks was in excess of $40,000,000, and the face value of the notes which they had issued represented fully $200,000,000. Of this sum a large portion had been issued in the form of loans to the Government, and, at such a time as this, when public credit was prostrated, the strain upon the banks was too great for them to bear. On 1 Sept. 1814, therefore, specie payment was suspended.

It was during this critical stage in the financial history of the nation that the private bank began to assume a position of importance in the commercial world. In 1811, as soon as it had been found that it would be impossible for the Bank of the United States to continue its operations, the building and stock of the institution were purchased by Stephen Girard, a Philadelphia merchant, who proceeded to carry on the business upon his own responsibility. In the beginning his capital was but $1,200,000, but this was eventually increased to $4,000,000.

Moreover, if anything further was necessary to call the attention of the public to this great private institution, Girard's exhibition of patriotism soon made his name known from one end of the land to the other. It was during the last year of the war, at a time when money was the one factor that was necessary to assure a renewal of peace, that the United States Treasury, devoid of funds, discovered that the money it needed was not forthcoming. In desperation the Treasury officials attempted to float a loan for $5,000,000, but, of this amount scarcely $20,000 had been subscribed when Girard, acting solely upon his own faith in the stability of the Government, volunteered to subscribe for the entire loan.

Taught by experience that it would be unwise to remain longer without an accredited fiscal agent one of the first acts of Congress was to grant a new 20-year charter to the Bank of the United States. In accordance with the provisions of this act of incorporation the capital of the new institution was fixed at $35,000,000, divided into 350,000 shares of $1,000 each. Of this amount $7,000,000 was held by the United States Government, while the remainder of the stock was easily disposed of. The bank issued its notes, in amount not less than $5, payable in specie on demand, and transacted a general banking business so successfully that its stock was quoted at 50 per cent. above par. By the provisions of the act of incorporation the operations of the institution were placed in the hands of a board of directors composed of 25 members, five of whom were stockholders selected by the President of the United States. The active direction of affairs, however, was left to a special board of seven directors, chosen by the general board, and headed by the President. In January, 1817, therefore, this new institution began its operations, and its efforts were regarded so favorably that it soon established branch banks in all the important cities throughout the country. In 1830, there were no less than 27 of these branch banks, all engaged in doing a thriving business.

With such a reliable institution at their command it is not surprising that the people should have looked with no little mistrust upon the unsatisfactory methods pursued by the State banks. As soon as the new charter had been issued to the Bank of the United States it was apparent to everybody that the State institutions would either be compelled to resume specie payment, or, as the only alternative, pass out of existence. As the result many of them closed their doors, so many, in fact, that, of the 446 State banks then in operation, only 165 remained. At the same time the aggregate State banking capital of the whole country for the year 1814, $90,000,000, showed a withdrawal of only $30,000,000 by reason of these suspensions. Of this sum only $5,000,000 was an actual loss, this amount being apportioned between the Government and the individual holders. At the same time such institutions continued in existence and precautionary laws to govern their operation were enacted by the legislatures of many States. In April, 1829, for example, the New York legislature adopted a general banking law which was known as the "Safety Fund Act." According to its provisions banks were permitted to issue notes for general circulation to an amount not in excess of twice their capital, while the amount of possible loans was restricted to two and a half times their capital. To make good the payment of the circulation and other debts of banks that might become insolvent a guarantee fund was created by means of which the banks made an annual payment of one-half of one per cent. on their capital stock to the State treasury until a total of three per cent. had been paid.

During the period in which so many of the prominent financial leaders of the country were engaged in the work of reconstructing the Bank of the United States, several Philadelphia business men determined to establish an institution in which persons of meagre income might find it possible to deposit their small savings. In 1816, therefore, the first savings bank was opened in America. It was known as the Philadelphia Saving Fund Society. During the same year a bank of similar character was established in Boston, a third was opened in New York in 1819, and, by the close of 1820, the idea had extended so far that there were no less than 10 savings banks engaged in business in the country, with 8,635 depositors and deposits amounting to more than $1,000,000. See BANKS, BANKING.

During the many years of its existence the Bank of the United States continued to increase in prosperity and influence. On 1 Nov. 1832 it reported that its total liabilities, including such of its notes as were in circulation, its deposits and all other debts, aggregated $37,296,950.20. At the same time, its assets, including specie, cash in Europe, and debts from reliable industrial and banking corporations, were $79,593,870.97. As this left a surplus of $42,296,920.77, the bank was then unquestionably one of the

richest institutions in the world. In 1832, there was no reason to doubt the stability of such a financial establishment.

Strange as it may seem, however, it was nothing less than this continued prosperity that brought about the downfall of the Bank of the United States. At the time of Jackson's election to the Presidency the opposition to it was so strong that he declared that it should not be rechartered, and, when he had taken his seat, he made this promise good by announcing that he should refuse to sign any act that might have a tendency to extend the life of the institution, explaining his position on the ground that such a financial system as that which it represented was not only unconstitutional but was also extremely dangerous to the liberties of the nation. In spite of the fact that the prosperity of the country had been so great during the 20 years of this bank's operations that the Government not only had been able to pay its war debt but actually had a surplus of $40,000,000 on hand, the public funds were withdrawn from the institution at the earliest possible moment, and the surplus, by vote of Congress, was distributed among the States.

It is not difficult to understand that this blow was one from which no financial establishment could easily recover. Its charter threatened, its deposits withdrawn and scattered to the four winds, and with all its operations the object of the enmity of an unrelentingly adverse administration, there seemed to be no alternative but to cease the transaction of business. Determined that he would not give President Jackson the satisfaction of closing its doors, its president, Nicholas Biddle, persuaded the State legislature of Pennsylvania to pass an act incorporating it as the Pennsylvania Bank of the United States, but, while he thus had the satisfaction of stealing a march on the administration, his efforts to save the life of the bank were useless and four years later, in 1840, it finally retired from business.

Such a mishap to such an institution as the Bank of the United States gave the State banks the chance for which they had long been waiting and they proceeded to make the most of it. The demise of the national institution had left the field open to them, and just at the moment when such aid was most needed, the distribution of the public moneys among the several States had come to give an impetus to their deposits. As the result of this favorable combination of circumstances the State legislatures were kept busy granting charters to new State banks, and, by 1837, their number had increased to such an extent that there was no less than 634 of them in the country, their aggregate capital being more than $290,000,000.

In disrupting the established financial system of the country, however, President Jackson had not looked sufficiently far ahead to be able to anticipate the possible troubles that might arise as the result of his action. He had closed the Bank of the United States, but he had provided for no other responsible authority to take its place. When the financial affairs of the country were turned over to the State banks, therefore, the temporary prosperity which followed the appearance of the new issues of State bank-notes assumed the form of the wildest kind of speculation. For a time public lands were chosen as the field for the speculator's operations, and the dealings represented many millions of dollars. As everything was based upon the currency notes, however, and as many of these were worthless, because issued by insolvent, or "wild-cat" banks, it did not take long for men acquainted with the principles of finance to recognize the fact that trouble was inevitable. It was at this time that President Jackson determined to make an effort to establish the finances of the country upon a more sound basis, and, in the hope of assisting in the accomplishment of this purpose, he issued his famous "Specie Circular," in which he notified all agents of public-lands that they must accept nothing but specie in payment.

It was this command that precipitated matters, for the banks, being called upon to redeem all their circulation in specie, were unable to respond, and so, on 9 May 1837, they again suspended payment. Months passed, but no relief came. Accordingly, in the following November, a conference was held in New York to see if some means could not be devised by which the banks would be able to resume payment. No less than 136 banks were represented in this gathering, but, in spite of the fact that many suggestions were made, no plan of relief was deemed practicable. Compelled to take cognizance of a situation which had been so directly the result of the administration's financial policy, President Van Buren, 1837, proposed the sub-treasury plan as a measure which would tend to prevent the loss of public moneys through the failure of banks. Wise as the suggestion was from the governmental point of view, the fact that it presented no remedy to the present difficulties made it an extremely unpopular measure. As the result it was defeated, and, three years later, when it was passed, it was promptly repealed again in the succeeding year. Not until five years later was it finally re-enacted. UNITED STATES: FINANCES OF THE, 1816–1861.

During all this time the State banks were increasing in number. It is true that they were constantly in trouble. The New York banks did not resume payment until May, 1838, and, although they were followed by the Philadelphia and Southern banks in August, the latter were able to hold out much more than a year, suspending payment again on 9 Sept. 1839. In spite of the lack of confidence which such uncertainty necessarily engendered, however, the growth of the country and the exigencies of business resulting from such widening of interests created a demand for more banking houses. In 1840, the number of such banks had increased to 901, and their total capital to $358,000,000.

Of course, during all this period the demand for a national banking system had been constantly increasing, and one of the great issues upon which Gen. Harrison's presidential campaign was fought and won provided that a

new bank should be incorporated at the first possible moment after his inauguration. Fully in sympathy with this project, President Harrison called a special session of Congress to devise the best means of fulfilling his promise, but when he died, before Congress had convened, those who fought so strenously for a return of the old national banking system lost their most influential supporter. President Harrison's successor, President Tyler, was so unalterably opposed to the movement that he twice vetoed the measure to "establish a financial agent of the government" "to act for it in all fiscal matters, and to facilitate mercantile exchanges throughout the country", even when the matter had been passed by Congress and was presented in the form of a bill awaiting his signature. Among all the banks, at this period, none stood so high in public estimation as those which were located in the New England States. During the periods of uncertainty the New England banks had been less affected than those of any other section, a situation which was largely due to the fact that they had adopted what was then known as the "Suffolk Bank System." In other words, they had bound themselves to an agreement by which the Suffolk Bank of Boston was charged with the duty of redemption and collection for all the banks in the New England territory. To facilitate such operations each bank maintained a stipulated deposit with the Suffolk Bank.

The stringency of 1840–43 represents another critical period in the financial history of the United States, but the better times which followed had succeeded in doing little more than to ease the situation when a great impetus was given to national prosperity by the discovery of gold in California. For several years this influence was paramount in American affairs, and, under these new conditions, the bank system, for a time, ceased to trouble.

It was during this period in the financial history of the country that the first clearing-house project was devised and carried into effect. For several years American bankers had felt that they were in need of better facilities in their work of transacting the business of the country, and it was to meet this demand that the New York Clearing House Association was formed, on 11 Oct. 1853. It originally consisted of a membership of 52 banks, and the system which it adopted was so simple, and yet so effective that it is difficult to imagine why its establishment should have been delayed for so long a time. Under the old system each bank was compelled to send to all other banks separately such of their checks as it might hold, for payment, and stood ready, in its turn, to pay cash to the other banks for such of its checks as they might have in their possession. When the clearing-house was established, however, a very different system was adopted, for, at a specified hour, each bank holding a membership in the association sent one of its clerks to the general office with all the checks that it held for collection. Here they were assorted, and the sum total of the checks held by each was compared with the sum total of the checks presented against it. If the result showed a balance in favor of the other banks, each bank paid to the clearing-house a sum equal to the amount due whereas, if the balance stood in favor of the bank, the clearing-house promptly drew its check for that amount. Thus, transactions that several clerks and messengers could not have completed within many hours were finished in a comparatively short space of time.

It was not only as a matter of convenience that the new clearing-house association made its influence felt, however, for its effect was beneficial both in the matter of economizing currency and in giving security to the great banking interests of the country. It is only necessary to remember that the clearing-house transactions often involve daily exchanges of more than $2,000,000 for one to realize what a tremendous amount of idle money would be required to transact this aggregate of business under the old system of separate clearance payments. Under the new clearance system, with its convenient method of balances, this business is transacted with the use of not more than four per cent. of the total amount of currency involved. Moreover, this system is not only an assurance of protection to its members in the matter of individual transactions, but it has, by its more extended operations of issuing loan certificates at critical times, proved a great bulwark of safety to the entire banking world. During these years the average daily exchanges of the clearing-house were $105,964,277, and the average daily balances, $3,939,265.

The New York Clearing House Association consists of 54 members, 53 of the members being representative banks, and the fifty-fourth member the assistant treasurer of the United States stationed at the sub-treasury in New York City. In addition to these active members, all other New York banks and trust companies are permitted to clear through the institutions which hold membership in the association. According to the last annual report, the transactions of the New York Clearing House for the year ending 30 Sept. 1905, were as follows: Total transactions, $95,833,194,343.80; average daily transactions, $315,240,770.86; total balances for the year, $3,953,875,974.80; average daily balances, $13,006,170.97. The total transactions of the association since its organization in 1853 have attained the almost incalculable aggregate of $1,657,547,640,106.75. As the advantages of such a system were too great to escape recognition other cities followed New York's example, and the exchange of the clearing houses of the country for 1905 aggregated $140,501,841,957.

No sketch of the history of the banking interests of the United States would be complete without a more or less detailed reference to the two disastrous periods that are now remembered as the panics of 1853 and 1873. Overspeculation, which was the cause of the former, had been going on for some time and the most conservative minds in the financial world had begun to look with considerable dread into the future, when the storm suddenly broke, on 24 August, when the Ohio Life

and Trust Company announced its suspension with liabilities in excess of $7,000,000. As the result of that failure the Philadelphia banks were compelled to suspend on 25–26 September, and this general suspension extended through Virginia, Maryland, the District of Columbia and even into Rhode Island. In New York the spirit of distrust became so general that runs on all the banks threatened most serious consequences, and, on 14 October, to prevent the utter demoralization of the banking system, the State legislature passed an act authorizing the suspension of specie payment for a term of one year. As the result the banks closed their doors, but the trouble was so largely a temporary one that the city banks were able to resume business again on 24 December. In New England, the panic which had first been felt chiefly in Rhode Island, rapidly extended until it finally became general throughout the entire section of the country. The banks not only suspended, but factories and large workshops shut down. In fact, in some places it was found necessary to call upon the State troops that they might be in readiness to put down the riots that were threatened by the vast army of hungry workingmen. Fortunately for the individual as well as for the nation the panic was of brief duration. By the beginning of 1854, business had renewed its activities and the banks had resumed operations, but, brief as the struggle was, it resulted in no less than 5,123 failures, with total liabilities amounting to $291,750,000. The next few years, however, saw a return to conditions that were not so foreign to the old time prosperity, and, in 1860, just one year prior to the long suspension of specie payment which was the direct result of conditions due to the war, there were in the United States no less than 1,562 banks, with an aggregate capital of $422,000,000, a circulation of about $207,000,000, deposits of $254,000,000, and specie in hand to the amount of more than $83,500,000.

The four years during which the war was in progress gave the banks of the country an opportunity to give unquestionable proof of their loyalty and patriotism, and yet the story of these times, with the Government's issues of its "legal tenders," is more properly a matter of discussion under the head of national finance. (See BANKS, NATIONAL.) Thus, the national banking law, the legislative enactment which regulates the operation of banks to-day, was passed 3 June 1864. Simple as its provisions were, they were drafted with such a clear view as to the security of the banking system, that little reason for dissatisfaction has been found with them. According to these provisions, the establishment of a bank requires the association of not less than five persons, and a fully paid-up capital. To secure its notes of issue it is compelled to hold the Government's pledge in the form of United States bonds, on which the comptroller of the currency authorizes it to circulate such notes to an amount equal to the par value of the securities not exceeding the authorized capital stock. Wise and secure as these conditions were, they would have been of little value in improving the currency situation if the State banks had been permitted to continue to issue their notes under the system that had existed since 1836. To meet this difficulty, therefore, Congress passed a law placing a prohibitive tax of 10 per cent. on the circulating notes of the State banks.

Realizing that the circulation of their notes would be impossible under the new conditions, many of the old State banks changed their organization to meet the requirements of the new national bank law, and, at the close of the war, there were not more than 500 of these institutions that had neither complied with the provisions of the new statutes nor gone out of existence. Those that remained continued to do what they are still doing. They transacted a general banking business of loan, discount and deposit, and left the circulation of notes to the national banks. At the time of the institution of the national banking system, however, it was specified that the comptroller of the currency should not permit the total circulation of the country to exceed $300,000,000. As more and more banks became established, however, the demand for a larger circulation became so insistent that Congress was at last compelled to take recognition of it by making an extra issue of $54,000,000. This was also almost immediately taken up.

The next critical period in the financial history of the United States was the disastrous panic of 1873. Serious as this ordeal was, however, it was not entirely unanticipated, for it was almost inevitable that the nation should pass through such a trying period in its transition from the season of inflation resulting from the great war loans to the normal basis of more peaceful times.

In 1875, Congress again resumed its serious consideration of the financial question, and, as the result of its discussions, several important reforms were instituted. One act removed all restrictions upon the total amount of notes which might be issued by the national banks. Another ordered the resumption of specie payment, which had been suspended since the beginning of the war, and this resumption, which, as it was decreed, took place 1 Jan. 1879, was accomplished without the slightest disturbance of business conditions, a fact which redounds greatly to the credit of America as a nation. From the day when Congress withdrew its restriction upon circulation the number of national banks have increased steadily from year to year. In 1875, there were 2,047 banks in the country, with a total capital of $497,864,833, and an aggregate surplus of $134,123,649. By 1885, only 10 years later, the number of banks had increased to 2,665, while their capital amounted to $524,599,602, and their total surplus to $146,903,495, making an increase of 618 banks, a total gain of $26,734,769 in capital, and an increase of $12,779,846 in the matter of surplus. Even such an increase did not meet the requirements of the ever-growing and prosperous country. Steadily, therefore, the work of the national banks widened, until, at last, in 1905, the report of the comptroller of the currency showed that there were no less than 5,757, such banks in the country, with an aggregate

capital of $799,870,229, a total surplus of $417,757,591, and undivided profits amounting to $202,536,366. Total resources, $7,472,350,878. Loans and discounts, $4,028,414,785. See UNITED STATES — FINANCES OF THE, 1801–1903.

Of course, in the meantime, the country has passed through another period of business depression and financial stringency. Coming more gradually than such crises usually come, it made itself most generally felt about 1892, and, for several years, it continued to exert its baneful influence more persistently than had been the case during any previous period of commercial misfortune. Although there was no actual panic there was a time when the nation stood perilously near the verge of disaster, and, while this condition of affairs was largely the effect of lack of confidence on behalf of the people it operated so conclusively as a check upon business enterprise, that its industrial reactions, which affected all classes, was the means of causing much suffering in all parts of the land. For the first time since the close of the Civil War the money broker reappeared to take his profits in the premiums he placed upon all sorts of currency, for the banks, having all too little money, were compelled to transact their business largely by means of certified checks.

One result of this hoarding of the nation's money was seen in the runs upon the institutions for savings. In the West these became so frequent, and were usually so persistent, that many of the perfectly solvent savings banks, being unable to realize upon their securities quickly enough to save themselves, were compelled to go to the wall. In New York, when the troubles became so threatening that it was impossible to judge how long it would be before the storm would break in an excited mob of depositors all eager to recover their savings, the bank officials held a hurried conference at which they determined that their only hope lay in the law that permitted them to refuse to pay an account except upon three months' previous notice. As they did take advantage of this clause, they succeeded in averting the disaster.

However important a factor the savings bank has become it is the national bank that has been the foundation of America's financial prosperity. During the past 30 years its stimulating influence has extended to almost every town and hamlet in which business is transacted. Well-organized, and carefully supervised, its uniform system of banking has made it of as great importance to the individual as it is to the Government. In fact, if any argument was needed to testify to the solvency of the system, it would only be necessary to remember that, since the establishment of the system, only 439 failures have occurred in a total of 7,966 banks that have been organized. See BANKING INSTITUTIONS, THE EXAMINATION OF.

Among the banks proper the State bank still holds an important position. At the close of the fiscal year, 1904–5, there were in the United States, according to the report of the Treasury Department, no less than 7,794 State banks, while, at this time, their aggregate resources were $3,190,911,378; their capital was $379,756,040; their surplus was $154,439,841; their undivided profits were $63,164,608; their aggregate deposits were $2,365,209,630, and their loans and discounts were $1,906,914,878, an amount which included the sum of $251,814,768, which represented the loans on real estate and collateral securities.

According to the Treasury report for 1904–5 the savings banks in existence numbered 1,237. Their total resources were $3,368,279,857; capital stock, $26,191,294; surplus, $197,582,867; undivided profits, $35,708,852; their aggregate deposits, $3,093,077,357, while the aggregate of their loans was $1,534,114,618, of which sum all but a very small amount was secured by real estate.

In 1905 there were 1,028 private banks in operation throughout the country. At this time their total resources were $165,233,295; capital stock, $22,518,193; surplus, $6,872,918; undivided profits, $2,958,278; their individual deposits were $127,937,098, and their loans and discounts were $107,098,805.

The number of loan and trust companies in existence at the close of this fiscal year, 1904–5, was 683. In spite of the fact that this is the smallest branch of the banking system, considered from a numerical point of view, the total resources of these institutions showed an aggregate of $2,865,976,479; capital stock, $243,133,622; their surplus was $281,289,339; undivided profits, $82,226,383; their loans and discounts amounted to $1,549,633,063, of which sum only $144,394,593 was on real estate, and their total deposits were $1,980,856,737.

From this array of figures it may easily be computed that there were no less than 16,499 banks of all descriptions engaged in business operations throughout the United States in 1905. The total amount of their capital was $1,471,469,378; their surplus amounted to $1,057,942,556, and undivided profits, $386,594,467, certainly a record of a stupendous achievement when we remember that it was not more than 125 years ago that the American banking system had its origin in a little Philadelphia bank which Robert Morris established upon a capital of only $400,000. See BANK BILLS; BANKS AND BANKING; FINANCE; TRUST COMPANIES; COINAGE; MONEY; MONETARY SYSTEMS OF THE WORLD; CANADA, FINANCIAL SYSTEM.

The grand aggregate of resources of all these banks reached the stupendous sum of $17,062,751,887; the individual deposits, $11,387,762,535, and loans and discounts, $9,126,176,149.

LEVI PARSONS MORTON.

Banks, Savings, in their inception, were primarily benevolent institutions, organized for the benefit of the working, thrifty citizen, who desirous of safeguarding the future of himself, and of those dependent upon him, saved small sums from his daily or weekly earnings; commercial and financial banks could not and would not attend to these small accounts, and therefore, the lawmakers, urged by public-spirited citizens, incorporated institutions, wherein the savings of the frugal-minded, industrious and thrifty, whose savings were too small to invest

in public or private securities, or who were not educated to make such investments, could be deposited with absolute safety, and at the same time earn some interest for them.

They may rightly be considered as a benevolence from the State, who thus endeavors to protect itself against the carelessness of its citizens, and to minimize mendicity, destitution, and pauperism, by offering to its people safe depositaries for their surplus earnings; the theory is that many will prefer independence from honest industry to beggarly dependence, the result of idleness or self-indulgence, and that the poor should be helped to help themselves, and to receive the reward for their industry and self-denial. To further foster this spirit, the savings banks are in many communities practically freed from taxation, in the same manner as churches, schools, hospitals, etc.; this enables them to return to their depositors all their earnings, save only the necessary expenses of conducting the business. Savings institutions are the outgrowth of a better social structure, making for order, temperance, virtue, industry, and thrift, as well as upholding public credit and fostering good citizenship; they create self-respect and independence, and may well be considered as among the greatest civilized forces working for the betterment of the condition of mankind.

Savings banks, however, are by no means charitable institutions. He who by careful living has a surplus, however small, over and above his daily needs, is in no sense a subject for charity; as a matter of fact, he is a small capitalist; he, together with many others, by depositing their savings in the savings banks, not only help themselves and encourage thrift in others, but these savings, amounting in the aggregate to enormous sums, instead of being locked up and hidden away, as in the past, are employed to further public and private enterprises, furnishing capital for building waterworks, railroads, State and city and private institutions, and thus this money finds its way back into the pockets of the laborer and mechanic, in the shape of work and wages, a true endless chain.

They are of comparatively modern origin, and it is only towards the end of the eighteenth century that we find any mention of them. Small beginnings were made in 1778 in Hamburg, Germany, and 1787 in Berne, Switzerland; these associations, however, simply cared for the spare cash of servants, mechanics, and laborers, and as a rule did not allow withdrawals, but granted annuities; being different from the English idea of savings banks. In England the matter was suggested, it is said, by Jeremy Bentham, in 1797, in his system of frugality banks, but the first known attempt in that direction was made in 1798 by the Rev. Joseph Smith of Wendover, who offered his parishioners to take care of their savings during the summer months and to repay them at Christmas with a bounty of one third additional; about the same time the "Friendly Society for the Benefit of Women and Children" was established at Tottenham High Cross, by Mrs. Priscilla Wakefield, and this society became regularly organized in 1804; Malthus also suggested, in 1803, the idea of county banks for the laboring classes. The first regular organization brought before the public was in 1810, when the Rev. Henry Dunkin of Ruthwell, Dumfriesshire, Scotland, started a self-sustaining institution, receiving deposits from the general public; during the first year of this "Parish Bank" the receipts amounted to £151, and in four years increased to £922. In 1814 the Edinburgh Savings Bank was established on the basis of Mr. Dunkin's plan. In London the first savings bank was opened in 1816 and was recognized by Act of Parliament in 1817.

Generally speaking it may be said that because of the fact that the paternal governments of Europe have large functions, thereby exerting a powerful influence in the economic life of the nation, and also partly owing to the lack of initiative in private benevolent enterprises, savings banks were started there as national enterprises, usually managed through the post-office department; the investments of such banks being mainly confined to government securities.

In the United States the functions of the government are more limited, and are usually restricted to formulating general legislation, or granting charters to savings institutions under the laws of the different States, and also exerting some supervision over them, by means of periodical examinations by the State bank superintendent or commissioner. Under our system of government we are apt to consider that our citizens are fully able to attend themselves to their banking business, in the same manner as the banks of deposit and discount, and it is a good American practice, that does not allow the State to interfere with the private business of its citizens, and restricts it to its own functions, as well defined in the Constitution. In the United States there is no permanent or perpetual debt, thus making this form of investment impracticable, as it certainly would be injudicious for our savings banks, who are usually looked upon as local institutions, the money which they receive on deposit being loaned out, whenever practicable, in the vicinity of the bank itself. We may trace the first savings bank in the United States to the organization in 1816 of the Philadelphia Savings Fund Society, in Philadelphia, Pa., a private association which was afterwards incorporated by the legislature of Pennsylvania in 1819. The Provident Institution for Savings in the town of Boston, Mass., was incorporated in 1816, and the Savings Bank of Baltimore, Md., in 1818. In New York the first organized savings bank was the Bank for Savings. Efforts had been made for several years by public-spirited citizens of that city, to get a charter from the legislature for such bank, acting on a suggestion received from Patrick Colquhoun, a magistrate in London, by his correspondent in New York, Thomas Eddy; but the then existing hostility to banks rendered this very difficult, and it was not without much work and considerable delay that at last, in 1819, a bill incorporating the Bank for Savings was passed by the legislature and approved by the council of revision. The organizers named in the certificate were nearly all members of the Society for the Prevention of Pauperism, founded in 1817. The trustees (three in rotation) attended for one month each, as a committee, doing the work of the bank; they received no compensation for their services, and were restricted in investing their deposits to government securities and public stocks, issued under the laws

of the United States and of this State. Since then many savings institutions have been organized both in New York and in the other States of the Union.

The primary savings bank being wholly philanthropic, the services of the trustees are usually gratuitous, and on this basis there have been built, in the Eastern States of the United States, a large number of flourishing institutions, answering perfectly to the demands that gave them birth. Criticisms have been made at times, and were echoed in the legislature, disapproving of the requirement of the gratuity of the trustee's services, and arguing that men are sure to become careless in their supervision when not paid for their services; partly because of this contention, the plan of mutual savings banks has not been adopted in the Western and Southern States, where the savings bank business is done by financial institutions furnishing their capital and surplus as a guarantee for the repayment of deposits, and where the directors and stockholders are directly and financially interested in the success of the bank. Another reason to be considered also, was that conditions in these States differ vastly from those existing in the Eastern States. It was generally believed that purely mutual savings banks would not receive sufficient support, and could not succeed in the more sparsely settled parts of our country, and therefore they were instituted as adjuncts, or departments, of regular commercial banks of deposit. A few large and successful mutual savings banks, based on the eastern idea, and flourishing in the Western and far Western States, seem, however, to prove that this reason does not always apply. There is no doubt that mutual savings institutions, protected by wise legislation, strictly restricted as to first class investments and practically freed from taxation, are as safe depositaries of the savings of the nation, as may well be devised; and no institutions created with that object in view can possibly be made too safe. A proposal for postal savings banks has been frequently before the public, but has never met with success. The main arguments against them consist in the difficulty which would be found in investing these large amounts by a body of constantly changing officeholders, and also that the functions of the State should not be increased, but rather diminished.

The average rate of interest paid to savings bank depositors in the United States is about 3½ per cent per annum.

In England the savings banks are both governmental and trustee banks. The trustee banks are based on a plan somewhat similar to our mutual banks in the United States. They have some 2,300,000 depositors, with about $300,000,000, to their credit. The governmental banks are called postal savings banks. Deposits and withdrawals are made through the numerous post-offices in Great Britain, and the deposits, as is mainly the case with trustee banks, are invested in government securities through the commissioners of the public debt. These post-office savings banks have about 8,800,000 depositors, with aggregate deposits of about $700,000,000. The interest paid is about 2¾ per cent per annum.

A short summary of the law of the State of New York, which is considered by many the best savings bank law in the United States, is as follows:

Trustees.— Thirteen or more, to receive no remuneration as such, nor to borrow money from the bank.

Investments.— Government bonds, bonds of States not having defaulted for 10 years, municipal bonds in New York State and several other named cities, railroad bonds as named, bonds and mortgages on real estate in the State for not over 65 per cent of deposits, nor for above 60 per cent of value, if improved, or 40 per cent if unimproved.

No *loans* on personal security.

To hold no *real property,* except banking house, and that acquired under foreclosure, which is to be sold within five years.

Deposits limited to $3,000 for each depositor; *interest* not over 5 per cent per annum; *surplus* fund, not over 15 per cent of deposits; *examination* every two years by bank superintendent.

Savings bank statistics form a very uncertain basis for comparisons and for drawing conclusions, as conditions differ vastly in different countries. In the United States, in addition to the deposits in the savings banks, there is a large accumulation of savings in the life insurance companies ($2,000,000,000), in the building and loan associations ($600,000,000), and in school savings banks ($500,000), not to speak of the savings invested in homesteads and land. In England, where landlordism prevails, nearly all the savings are in the savings banks and life insurance companies. In France, where the land is divided into small holdings, some of the savings of its people are in the savings banks, but they are mainly invested in stocks and in the irredeemable government bonds held by its people direct. In Germany and Switzerland, many communes and cantons have established municipal institutions, doing much the same work as our own savings banks in the United States. In Russia the government takes charge of all savings. In Austria both government postal banks and private banks are organized. In Sweden the post-office banks invest their funds in government bonds, bank stocks, and municipal public stocks.

The following table shows the number of depositors and amount of deposits in savings banks in the different countries of the world, where statistics are obtainable.

Countries	Number of Depositors	Total deposits
Austria-Hungary	6,663,822	$1,309,752,448
British Colonies	2,782,572	330,858,520
Belgium	2,088,448	141,851,419
Denmark	1,203,120	236,170,057
France	11,298,474	847,224,910
Germany	15,432,211	2,273,406,226
Great Britain	11,093,469	966,854,253
Holland	1,330,275	72,738,817
Italy	6,740,138	482,263,472
Japan	7,467,452	40,887,186
Norway	718,823	89,633,481
Roumania	145,507	7,426,031
Russia	5,177,501	466,159,229
Sweden	1,892,586	151,480,442
Switzerland	1,300,000	193,000,000
United States	7,305,433	3,060,178,611
Total	82,639,831	$10,669,885,102

The above figures show average deposits in the savings banks in the world of $101.01 for

each depositor, or $11.00 per capita. The deposits in the United States average $418.89 for each depositor, or $37.38 per capita of population.

The following table shows the growth of the savings banks in the United States:

Year	Number of Depositors	Total deposits
1820	8,635	$1,138,576
1830	38,035	6,973,304
1840	78,701	14,051,520
1850	251,354	43,431,130
1860	693,870	149,277,504
1870	1,630,846	549,874,358
1880	2,335,582	819,106,973
1890	4,258 893	1,524,844,506
1900	6,107,083	2,449,547,885
1904	7,305,443	3,060,178,611

In several States of the Union associations of savings banks have been formed for mutual benefit, and for the purpose of watching over proposed legislation in regard to savings banks so as to protect the interests of their depositors. In 1901 a national union of savings banks was organized as the savings bank section of the American Bankers' Association. This section includes in its membership a majority of the savings banks in the United States, and conventions are held yearly where members from all parts of the United States meet to discuss the many subjects of particular interest to savings banks and to their depositors.

WILLIAM HANHART,
Secretary "Savings Bank Section" The American Bankers' Association, New York.

Banks, United States National. The national Bank of the United States owes its existence to the necessities that were occasioned as the direct result of the outbreak of the Civil War. Prior to 1861 the paper currency of the country had been furnished by some 1,600 private corporations, each organized under its respective State laws. When Congress met in extraordinary session on 4 July 1861, it was confronted by a serious financial situation. With estimates showing a probable expenditure of $1,000,000 a day, the treasury was empty and the nation was already deeply in debt. At the suggestion of Secretary Chase, therefore, the government was empowered to raise $320,000,000, all but $80,000,000 of which should be by loan, and, in anticipation of the revenue, to issue $50,000,000 of treasury notes, redeemable on demand. At the invitation of Secretary Chase the banks in the larger cities soon negotiated the requisite loan, but, while this relieved the temporary necessities of the treasury, the secretary realized that a safer financial policy must be adopted if the nation was to remain upon a secure foundation. When Congress reassembled in December, therefore, Mr. Chase was prepared to suggest a plan to meet these requirements. He explained that while the ordinary revenues of the country might be sufficient to meet the ordinary expenditures, for the extraordinary expenses of the war it was necessary to depend upon loans, and he suggested that the time had come when the government might properly claim a part, at least, of the advantage of the paper circulation then constituting a loan without interest from the people to the banks. He believed that the best way to accomplish this result was to provide a national currency, to be issued by the banks but secured by the pledge of United States bonds.

Before Congress could consider the secretary's recommendations the suspension of specie payment, 28 Dec. 1861, completely changed the aspect of the situation. To provide for the pressing needs for cash, Congress was compelled to authorize the issue of more demand notes and so matters continued until December 1862, by which time the war had reached such a magnitude as to exhaust even the enormous resources provided by Congress. The disbursements in November had amounted to nearly two million dollars a day, while unpaid requisitions had reached the extent of $46,000,000, and the annual statement of receipts and expenditures showed a deficit of $277,000,000 to be provided for. To meet this situation Secretary Chase recommended an increase in the amount authorized to be borrowed on the last 5–20 bonds, but, in order to create a market for these bonds, he again advised the creation of a series of banking associations under a national law that should require them to secure their circulation by a deposit of government securities. Although strongly advocated and introduced in a bill by Mr. Hooper, 7 Jan. 1863, the suggestion met with so little favor that the bill was adversely reported by the Committee on Ways and Means, but on 25 January, after President Lincoln had sent a special message to the House warning Congress that its present financial policy would soon produce disastrous consequences, Senator Sherman introduced another bill providing for a national currency. This measure differed somewhat from Mr. Hooper's bill, which had failed in the committee room, and, as some of the features which had proved objectionable in the former measure had been eliminated in the Senate bill, it met with less opposition, although it was so closely contested that it passed the Senate, 12 Feb. 1863, by a vote of 23 to 21 only. The House concurred in its passage on the 20th by a vote of 78 to 64, and, on the 25th, the measure received the signature of the President, and it was this act which has been productive of the magnificent national bank system of the United States of to-day. See Sumner, 'History of American Currency'; Richardson, 'The National Banks'; Bolles, 'Financial History of the United States.'

Bannatyne Club, a literary club, named after George Bannatyne, the Scotch literateur, founded in 1823 by Sir Walter Scott, its purpose being to publish works on Scottish history and literature. It was dissolved in 1859. The society when founded had 31 members, but when dissolved there were 100, the membership being limited to that number.

Ban'neker, Benjamin, American negro mathematician: b. Maryland 9 Nov. 1731; d. 1806. At the age of 50 he began the study of mathematics for astronomical purposes. He published annually after 1792 an almanac devised by himself, and aided in determining the boundaries of the District of Columbia.

Ban'neret, an abbreviation of knight banneret; a member of an ancient order of knighthood which had the privilege of leading their retainers to battle under their own flag. A banneret was entitled to display a banner instead of a pennon. They ranked as the next

order below the Knights of the Garter, only a few official dignitaries intervening. This was not, however, unless they were created by the king on the field of battle, else they ranked after baronets. The order is now extinct, the last banneret created having been at the battle of Edgehill, in 1642, for his gallantry in rescuing the standard of Charles I.

Bannock, a cake once much eaten in Scotland. It was made of oatmeal, barley-meal, or peasemeal baked on an iron plate or griddle over the fire. From a supposed resemblance the turbot is sometimes called in Scotland the bannock-fluke.

Ban'nock. See BANAK.

Ban'nockburn, Scotland, a village in Stirlingshire, two miles southeast of Stirling, famous for the decisive battle fought near it, 24 June 1314, between King Robert Bruce of Scotland and Edward II. of England, in which the English, though greatly superior in numbers and equipment, were defeated. The Scots owed their signal success partly to their position and partly to the use of covered pits which rendered the English cavalry useless. The Borestone, where Bruce is said to have planted his standard, is still shown near a flagstaff erected in 1870. The village has manufactures of woolens, such as tartans, carpets, etc. Pop. (1900) 2,600.

Banns, the announcement of intended marriage, requiring the hearers to make known any cause why the parties should not be united in matrimony. By the publication of these banns is meant the legal proclamation or notification within the parish, district, or chapelry, of the names and descriptions of the persons who intend to be there married; the object being to secure public knowledge of intended marriages, and that all who have objections to the marriage may be enabled to state them in time. If the bridegroom live in a different parish from the bride, the banns must be proclaimed also in that parish, and a certificate of such proclamation must be produced before the celebration of the marriage. According to the old English canon law, the publication of banns might be made on holidays; but a change was made to Sundays by Lord Hardwicke's Marriage Act in 1753, and although that act was afterward superseded by the 4 Geo. IV. chap. 76, the regulation as to Sundays has been since continued. Seven days' notice at least must be given to the clergyman before publication of banns. Banns were customary in various places before they were prescribed by the entire Church in the Fourth Council of Lateran. The Council of Trent ordered pastors to publish them at the principal mass in the parish church, or churches, of the parties, on three successive Sundays or festivals. This publication should be made within two months preceding the marriage. For grave reasons the bishop can dispense from this obligation. By the English Prayer Book the announcement is required to be made in the words of the rubric on each of the three Sundays preceding the ceremony. If objections are offered by anyone present, the clergyman cannot proceed further. Except in the Roman Catholic Church the custom of thus publishing the banns of marriage is practically obsolete in the United States.

Banquets. It was the famous Mr. Boswell who first defined man as a cooking animal, and yet, appropriate as the definition still is, neither mythology nor tradition offer any clue to aid the student in discovering when it was that the human animal first learned to cook. Of course, it is highly improbable that this secret was known to prehistoric man. Instead of knowing how to cook he undoubtedly ate his food raw, washing it down with pure cold water from the springs and brooks, and many years must have elapsed before he made the surprising discovery that the foods that satisfied his hunger could be vastly improved in taste if subjected to the influence of heat. All this, however, is little more than mere surmise for our only knowledge regarding the customs of eating in vogue during the remote past has been obtained from the relics unearthed by archæology. On walls now ruined and decayed the hand of the ancient painter and sculptor left a record of the customs of his time and from this source the student has been able to gather some little information regarding the gastronomic progress of the human race.

Such records, however valuable they may be in the absence of other facts, are vague and unsatisfactory at best, and so, turning to ancient literature, one finds that the earliest references to food preparation are contained in the Bible. In Genesis, when Abraham bade Sarah make ready three measures of fine meal that he might be prepared to entertain the angel, the student finds his first direct reference to breadstuffs, and, from that time, the Scriptures often make mention of some foods by means of which the reader may obtain a more or less correct idea of the slow stages by which this branch of the human race progressed from its habits of primitive simplicity to the stately banquets of King Solomon and the extravagant feasts of Belshazzar.

As our meagre records show that the art of feasting was practically contemporaneous with the Egyptians and the Hebrews it is not improbable that the latter race may have learned the secrets of good living from the former during the time of the captivity, for at the period when both Greek and Roman were still content with the simplest fare the Hebrews had been initiated into the pleasures of the table, a fact which explains the many quaint Biblical warnings against the sin of gluttony, as in Esdras, where it is said that "the faces of them that have used abstinence shall shine above the stars."

Among the ancient Jews all festive repasts were held toward the close of the day, after all matters of business had been concluded. If the feast was to be one of great ceremony guests were not only invited long before the occasion, but again, on the day and as near as possible to the hour appointed, servants were sent to their houses to deliver orally the second, or "express" invitation, which announced that the host was now prepared to receive his guests. As this "express" invitation was sent to none but those who had already declared their acceptance, honor and propriety required that they answer the summons at once and in person, a fact which explains and justifies the feelings of resentment which were entertained by the master of the house in the parable of the great supper, on which occasion, as will be remembered, each

person invited met the bearer of the "express" with a frivolous apology for his inability to be present at the feast to which he had already accepted an invitation.

Guests at Hebrew banquets were required to bring their cards of invitation and these were presented to servants stationed at the entrance door. Upon being admitted the guests were conducted to the receiving-room where water, oils and perfumes awaited them. If the host desired to exhibit a great mark of courtesy he provided each guest with a richly embroidered garment, light and showy and cut in a flowing fashion, which all were required to wear during the feast.

If the banquet was of a private character the master of the house presided, but on occasions of public festivity a governor of the feast was selected and it was his duty to see that the banquet was not only properly conducted but that the company present preserved at least a semblance to order. Appointment to this office was always regarded as a great honor, and, among the Greeks and Romans, the position was prized so highly that the choice of the individual to fill it was often decided by chance, as by the throw of the dice.

The positions of the guests at the tables were not fixed by inviolable rule. Sometimes they selected their own places, while, at other times, they were arranged by seniority of family, or even according to the whim of the host who might desire to assign the most distinguished guests to places near his own person. In the earliest days, as is shown by the habits of the ancient Israelites, guests sat cross-legged around a low table and the custom of reclining while eating was not introduced until about the last of the Old Testament days. At least, it was about this time that the Jews adopted this custom, as well as the habit of having but two thirds of the table spread with a cloth, the portion where the food was to stand being left bare. In ancient Egypt and Persia the tables were arranged along the sides of the room and guests faced the wall.

At this time such articles as spoons, knives and forks were unknown and those who ate obtained the morsel they desired by dipping their slices of bread in the dish before them, folding the piece of meat or other food substance within it by the use of the thumb and two fingers. Later centuries saw the invention of the spoon but many hundred years elapsed before any other substitute for the fingers was suggested. Naturally the hands became besmeared with grease but they were cleaned by being rubbed on slices of bread, kept for that purpose. This bread was then thrown to the dogs who waited beneath the tables for just such morsels from the feast. If the fingers became too badly soiled, however, servants appeared with water and assisted the guests to wash by pouring a stream over the hands into a basin.

When the party was a large one it was the custom for two persons to eat from one dish and the host often showed the height of hospitality by dipping his hand into his own dish, lifting a portion of the food, and offering sop to his guest. To decline such an attention was a breach of etiquette that stamped one as being extremely ill-bred. In order that the hands should be always clean from dirt, however, the rabbis enjoined the "first water" and the "last water," or the washing before and after eating, and, in the case of travelers at least, the "first water" included the washing of the feet. After the adoption of the reclining posture guests lay with their faces toward the table, the left arm resting upon a cushion and the feet stretched out behind, while during the progress of the banquet both head and feet were frequently sprinkled with perfume to overcome any unpleasant odor that might arise from too copious perspiration.

The foods served at these ancient banquets consisted of flesh, fish, fowl, melted butter, bread, honey and fruit, all of which were brought to the table at one time, the service being accomplished by the use of trays, the number and quality of the dishes varying under different circumstances. In ordinary cases the portion of each guest consisted of four or five dishes, but if the guest was a person of great distinction this portion was increased until the dishes became so numerous that they were piled one upon another, completely covering the table. All this food, which was usually prepared in liquid or with a sauce, as in a stew, had been cut into conveniently small pieces before it was served.

From the earliest days within the recollection of history sacrificial occasions have always included a banquet, however crude a festival it may have been, and it was the adoption of this custom that gave a religious as well as a social significance to so many of the Hebrew feasts. As the Lord's Supper of the Christians was derived from the Passover, so all the great religious festivals had, as their accompaniment, a domestic feast. On the occasion of the religious banquets, however, the wine was mixed according to rabbinical regulation, or with three parts water; four brief benedictions being pronounced over the cup before it was passed by the master of the feast.

The Greeks, like the Persians, began and ended their feasts with libations of wine, and some idea of the nature of an ancient Greek banquet may be obtained from the following curious account of a dinner given by Achilles in honor of Ulysses:

> He cast down a great fleshing block in the firelight, and laid thereon a sheep's back and a fat goat's and a great hog's chine, rich with fat. And Automedon held them for him while Achilles carved. Then he sliced well the meat, and pierced it through with spits. Then, when the fire was burned down and the flames waned, he scattered the embers and laid the spits thereupon, after he had sprinkled them with holy salt. Then when he had roasted the meat and apportioned it in platters, Patroklos took bread and dealt it forth in fair baskets, and Achilles dealt the meat; and he sate himself over against godlike Odysseus and bade his comrade Patroklos to sacrifice to the gods, so he cast the first fruits into the fire. Then they put their hands to the good cheer lying before them.

Later, of course, the Greeks became more delicate eaters and vied with the Romans as to the elaborate character of their feasts. Like the Egyptians and Hebrews they reclined at table and their sumptuous repasts were divided into two courses: the first consisting of fish and meat, accompanied by the vegetables and several hors d'œuvres or entrees, while the second course comprised the pastry, fruits and other kinds of dessert.

As soon as the regular meal was finished the tables were removed and the floor was cleaned of all fragments. Other tables were then brought in by the servants, tables covered with

salted cakes, cheeses and other foods provocative of thirst, as well as the great mixing bowls, the pitchers of water cooled in snow, and the jugs of unmixed wine, for the Greeks loved to drink heavily after eating, and as they drank, to an accompaniment of music, song and dances, young and handsome slaves garlanded their heads and breasts with twining vines and flowers, not, as has sometimes been said, as a sign of festivity, but because the garlands were supposed to cool the forehead and counteract the heady effect of the wines.

Like the Hebrews the Greeks obtained their first lessons in cookery from the Egyptians and they soon put them to good account. The Athenians were particularly apt pupils in the kitchen science and they finally came to excel the rest of Greece in gastronomic achievements just as the modern French excel the rest of Europe in this day. An excellent proof of this assertion is to be found in the circumstance that what is regarded as one of the most valuable of the lost works of antiquity is a didactic poem on gastronomy, written by Archestratus, the intimate friend of one of the sons of Pericles. «This great writer,» says Athenæus, «has traversed earth and sea to render himself acquainted with the best things which they produced. He did not, during his travels, inquire concerning the manners of nations, as to which it is useless to inform ourselves, since it is impossible to change them; but he entered the laboratories where the delicacies of the table were prepared, and he held intercourse with none but those who could advance his pleasure. His poem is a treasure of science, every verse is a precept.»

Among the great nations of ancient times the Romans were the last to learn the art of cookery. As late as the year 174 B.C. there were neither cooks nor public bakers in Rome, and the people were satisfied with and asked for nothing better than a kind of porridge made of pulse. This in addition to their vegetables and some leguminous fruits formed their principle articles of diet. The Asiatic wars, however, introduced the Romans to the luxuries of the table and, in a day as it were, Rome, discovering that it had a palate, went mad on the subject of gastronomy. Slaves who could cook, bake, or make sweets were brought to Rome in large numbers but, as every man of wealth was eager to purchase them, they brought the highest of prices.

As this was the dawning of the day of Rome's expansion it was not long before her agents began to supply her capital with dainties from all parts of the world. From the far East to the far West whatever seemed delicate of taste or that might help to tempt a nation of palates already craving a new flavor was brought to the cooks in the Roman kitchens. To improve the quality of his cuisine the Emperor Vitellius, one of the most enormous eaters the world has ever known, sent his legions to every part of the empire to shoot game for him, while entire fleets were employed in doing nothing but catching the fish that were to grace his table. In fact it seemed as if Rome, so long satisfied with the humblest of fare, could not find a sufficient variety of foods to gratify its desire for novelty.

Even as early as Cæsar's time, however, the Roman table was liberally provided with a variety of foods sufficient to satisfy almost any appetite. As an example of a feast given in those days one may take the following menu which was served at a pontifical banquet long before the advent of the golden days of Imperial Rome:

The first course, which was intended to merely whet the appetite, consisted of conger eels, oysters, two kinds of mussels, thrushes served on asparagus, fat fowls, a ragout of oysters and other shell fish, with black and white marrons. The second course included a variety of shell fish and other marine animals, becaficos, haunches of venison, a wild boar, and a pasty of becaficos and other birds. The third, and principal course, comprised the udder of swine, boar's head, a fricassee of fish, a fricassee of sow's udder, ducks of various kinds, roast fowl, with pastry and Picentine bread.

As the years passed Rome experienced no deterioration in its love for the good things of the table. In fact, on the other hand, this pontifical menu was really a meagre bill of fare as compared to those which were afterward prepared by the Roman cooks for the delectation of the later Cæsars. As an illustration the following description of a banquet in the time of Nero, which is taken from Dean Farrar's 'Darkness and Dawn,' is admitted by students to be a vivid but not exaggerated picture of a feast in the days of Imperial Rome. At this banquet, which was prepared under the directions of Otho, Nero entertained eight guests. The walls of the room «were inlaid with mother-of-pearl and slabs of ivory. . . . The table was of cedar-wood, and it sparkled with goblets of gold and silver. . . . among which were scattered amber cups. . . . Although it was winter, garlands of exotic roses were provided for every guest, and none but the most youthful and beautiful of Otho's slaves were permitted to wait upon them. The supper was no supper of Trimalchio, with its coarse and heavy gluttonies. . . . The oysters were from Richborough; the lampreys were from the fishponds of a senator who was said to have flung into them more than one slave who had offended him; the mullet came from Tauromenos; the milk cheese from Sarsina. There were two tiny dishes which represented the last and most extravagant devices of Roman gourmets, the one composed of the tongues of nightingales, the other of the brains of Samian peacocks and African flamingoes, of which the iridescent and crimson feathers adorned the silver plates on which they lay. Sea and land had been swept with mad prodigality to furnish every luxury. The wines were of the rarest vintages, and whereas four kinds of wine were thought extravagant in the days of Julius Cæsar, Otho set 80 different sorts before his guests. . . . Hot mushrooms alternated with bits of ice.» Perfumes were sprinkled on the hair and feet of the guests, and the amusements that were provided were dancing by Andalusian girls, dice and gambling. Offerings to the gods were not forgotten, however, and these were thrown into the hearth.

If this was a dainty repast, however, Rome was not always so dainty for the wealthy gourmands were not satisfied with eating well. They wanted to gluttonize, to eat of everything immoderately until they found it impossible to eat any more, when, by resorting to the ever-convenient feather, they were able to return to the

feast and stuff themselves once more to repletion. On such occasions the more distinguished the company, the earlier began the banquet and the later it lasted.

Nor did the Roman table ever go dry for the want of rare and choice wines. In Greece the juice of the grape was almost invariably mixed with water, but Rome wanted no dilution of its revelling. Wildly extravagant and prodigal in everything, the Romans made no exception in the case of their drink. The wines that they used were preserved in jars or bottles of baked clay, and, as they were prized in proportion to their age, each receptacle bore a label on which it was distinctly stated in what consulship the beverage had been made. Many of these wines came from Italy, the Campania being considered the best, but the wines of Greece were also there, side by side with all the drinks that time or money could gather from every part of the world.

The fact that civilization and cookery go hand in hand was never more strikingly illustrated than in the case of the ancient Britons, for, in the earlier days of their history their cuisine was marked by all the limitations of primitive simplicity. The Roman conquest, however, appears to have applied to the kitchens of the country as thoroughly as to the government, for as the Roman conquerors were unwilling to eat the crude culinary preparations of the native Briton they proceeded to teach the conquered how to cook for them. Then, too, at about the same time, the appearance of the German immigrants, with their own more wholesome cookery, was not without its good effect, and the transformation in Mme. Britannica's methods of cooking may be said to have been almost as wise as it was radical.

The centuries which succeeded the fall of the Roman Empire, and which comprised the greater part of the Middle Ages, was as dark a period for gastronomy as it was for all other arts. For a time it seemed as if man had forgotten how to cook; as if he had lost his taste for the well seasoned dishes which had once been his chief delight, and that he had no desire to get it back again. Even Charlemagne, who, according to his Capitularies, took a warm personal interest in his table, was a novice both in the art of cooking and in that of service, for his banquets were barbaric affairs composed of huge roasts of meat dripping from the spit, and other crude features that would have put the ancient Roman gourmets to the blush. Personally, too, the great Emperor of the West was extremely abstemious and seldom, even at dinner, permitted himself to be served with more than four dishes.

The reading of the description of Prince John's banquet in Sir Walter Scott's 'Ivanhoe' certainly gives the impression that the Normans, who appeared two or three centuries later, were justified in priding themselves upon their superior taste and discrimination in matters of eating, but even such flashes of light were but faint illuminations for so black a night for art as that of the dark ages.

Highly as the cuisine is esteemed to-day; idolized as it was before the fall of Rome and Greece called a halt upon civilization and placed a check upon progress, it seems somewhat strange that there was no one chronicler of affairs bright enough to detect the fact that the revival in the lost art of cookery had commenced. As the historians of those days dealt in facts, not in manners, however, it is impossible to state at just what period gastronomy began to be cultivated again, although, of course, it is well known that its revival, like the revival in learning, was brought about in Italy. According to the best authorities, however, it was the merchant-princes of Florence who made the first attempt to improve the cuisine of the country and their experiments met with such success that their efforts were greeted with the most heartfelt encouragement by travelers from foreign countries who were invited to sit at their tables. It was to the Italian cuisine, in fact, that the French owed their instructions in the gastronomic art, for when Catherine de Medicis returned to Paris she carried several professors of the new cookery in her train. The effect of their importation was almost immediately noticeable. They improved the *pot-au-feu;* they expounded a new theory of taste; they expatiated upon the value of sauces, but, and this was more to the purpose so far as the progress of civilization was concerned, they introduced the art of making ices. Even the 16th century Montaigne, whose life was certainly cast in pleasant places, among the people who composed the best French society, was unable to appreciate the estimate that the Italian cooks of that day had so properly put upon their vocation. In one of his contemporaneous, if not somewhat reminiscent studies, he says:

> I have seen amongst us one of those artists who had been in the service of Cardinal Caraffa. He discoursed to me of this science de gueule with a gravity and a magisterial air, as if he was speaking of some weighty point of theology. He expounded to me a difference of appetites: that which one has fasting; that which one has after the second or third course; the methods now of satisfying and then of exciting and piquing it; the police of sauces, first in general, and next in particularising the qualities of the ingredients and their effects; the differences of salads according to their seasons; that which should be warmed, that which should be served cold, with the mode of adorning and embellishing them to make them pleasant to the view. He then entered on the order of the service, full of elevated and important considerations —
>
> "Nec minimo sane discrimine refert
> Quo gestu lepores et quo gallina secetur."
>
> And all this expressed in rich and magnificent terms, in those very terms, indeed, which one employs in treating of the government of an empire.— I well remember my man.

The period which intervened between the arrival of Catherine de Medicis from Italy and the accession of Louis XIV. is one concerning which there is practically no authentic culinary record, although there is not the slightest reason to doubt that prodigious advances were made by the gastronomic art during that time. In fact, one has but to refer to one of the menus from the table of Louis XIV. to realize that cookery had ceased to be an experiment, and it is necessary to go but a step further and compare the foods of Paris in Louis' time with those in use in other parts of the world, to realize the progress that had been made by the French cooks by the middle of the 16th century. In Paris, for example, the foods were not dissimilar to those of our own day, to which the following menu of a dinner which was served to Emperor Charles V., by the city of Halle, would certainly be a contrast:

> (1) Raisins in malt flour; (2) fried eggs; (3) pancakes; (4) steamed carrots; (5) fried slices of bread;

(6) a covered porridge; (7) a high pasty; (8) a pea-soup with marrow, covered richly with peas and eggs; (9) yellow codfish boiled in butter; (10) carps, boiled; (11) fried fish, with bitter oranges, spiced; (12) sweet pikes; (13) pulverized kernels, with almonds (14) maize in almonds' milk; (15) fried fish with small olives; (16) cakes; (17) pears and confect.

And during this time England, too, had made some little progress in the improvement of its cuisine, although Henry VIII. was one of the first monarchs who exhibited any liberality in rewarding originality in cookery. Henry, however, seemed unable to do enough for those who ministered to the gratification of his appetite, and on one occasion, he was so much delighted with the flavor of a new pudding that he presented a manor to its inventor.

From the early days when the housewives of Briton had adopted a cuisine which may quite properly be termed an amalgamation of German and Roman cookery England had maintained a position of her own in the world of gastronomy. By no means as ostentatious as the ancient disciples of the art; less dainty, perhaps, than the more modern disciples in the various European countries, their school of the kitchen was so largely their own that it is not strange that Cardinal Campeggio, one of the legates charged to treat with Henry VIII. concerning his divorce from Catherine should have been requested to draw up a report on the state of English cookery as compared with that of Italy and France, by the express desire and for the especial use of his Holiness the Pope.

There are certain historical documents connected with the Seymour family still on file in London, which throw a most interesting light upon the culinary customs in vogue in England during the reign of the Eighth Henry. They show, for example, the manner in which he was entertained at Wulfhall on the occasion of his marriage to Jane Seymour. The facts, presented in a paper prepared by the Duchess of Somerset, are as follows:

The king, with his whole household and nobility, arrived at Wulfhall on Saturday, 9 Aug. 1539. They remained Sunday, Monday, and Tuesday. How or where so many were lodged does not appear; but "covers," as we should call them, "messes," as the book calls them, were laid for two hundred the first day. There are only two meals a day accounted for, and it appears that on Saturdays, as well as on Fridays, no meat was eaten, abstinence from flesh on those days having been ordered by a Royal proclamation, not only for health and discipline, but for the benefit of the commonwealth and the profit of the fishing-trade. The king's supper on his arrival, therefore, consisted only of fish.

Country places in Wiltshire must have been better supplied with fish than they are now, for the bill of fare included pikes, gills, salmon, tenches, lobsters, bream, plaice, trouts, congers, carps, roach, eels, potted sea-fish and salmon pasties, a sack of oysters, salt haberdine (which was cod-fish salted at Aberdeen), soles, and whitings.

The next day being Sunday, there were messes for four hundred, and the provisions amounted to 6 oxen, 2 muttons, 12 meals, 5 cygnets, 21 great capons, 7 good capons, 10 Kentish capons, 3 dozen and 6 coarse capons, 70 pullets, 91 chickens, 38 quails, 9 mews, 6 grets, 2 shields of brawn, 7 swans, 2 cranes, 2 storks, 3 pheasants, 40 partridges, 2 peachicks, 21 snipe, besides larks and brews — whatever they were.

It is scarcely necessary to trace the history of the banquet — which is, of course, but another name for the history of eating — with more close attention to detail. In contrasting the banquets of other days with those of to-day, however, one is struck by the fact that the modern peoples have also made some considerable improvement in the manner of eating and drinking, for one has but to turn to the menus of meals served at the beginning of the 19th century to find that dinners were not infrequently burdened by 20 or more entrees.

In the last century before the Christian era a stoic, Posidonius of Rhodes, in discussing the methods of cookery, took advantage of the opportunity to preach simplicity. He insisted that man, who had been blessed with good teeth, glands, and secretions, a tongue and the usual apparatus for digestion was independent of the cuisine, and this ancient pagan idea that the object of all repasts should be to take away the desire of eating and to maintain health and vigor has become more acceptable to thoughtful people during the past century. To-day our private banquets at least are simplicity itself when compared with those of even a century ago, and while their somewhat monotonous dearth of any entertainment except that of eating and drinking, with occasional music, has recently resulted in a sort of mania for the odd and eccentric, it is so obvious that these banquets are based upon the old desire for notoriety, the wish to dazzle which has inspired so many of the world's great feasts since the days of King Solomon's entertainment of the Queen of Sheba, that no particular attention is paid to such purile attempts to provide a novelty.

To obtain a correct idea of the modern banquet, however, the public banquet conceived and executed in the most perfect taste, it is only necessary to recall the dinner recently given at Compeigne by President Loubet of France in honor of the Czar and Czarina of Russia. One of the most magnificent and perfectly appointed affairs of modern times, its 500 covers were served at a cost to the French Government of something more than $15,000, exclusive of the wines. And as these were the choicest brands and of the most ancient lineage their cost must have been fully as great as that of the dinner itself.

A story is told that upon this occasion the correspondent of one of the great foreign journals interviewed the chef for the purpose of securing some authentic details concerning the dinner. Among other questions he asked: "And what was the chief novelty of the menu?" Instantly the great man stood upon his dignity and his voice was strong in its wrath as he replied: "Novelties! I would have you know that on the table of the guests of our country we lay no second editions." A reply which might have been made by Vatel, the chef who killed himself, being unable to survive the dishonor of the table for which he was responsible.

In the various descriptions of President Loubet's banquet to the reigning sovereigns of Russia little is said in regard to the decorations or service, the writers confining themselves to the menu, that being the most important feature of the feast. Mention is made, however, that the flags, flowers, ribbons, and spun-sugar ornaments united in a decorative scheme with effectively beautiful results.

In regard to the menu, however, it is apparent that it left nothing to be desired. The soups were clear turtle and Creme du Barry, which gave the guests a choice, after which "came a wonderful dish of soft roes called on the bill of fare 'Caisses de laitances Dieppoise,'

and another, 'Barbues dorees a la Vatel,' served with a remarkable sauce in which a hundred elements harmonized in a perfect whole. Venison with an acid dressing and braised quail, the most delicate bird of the species, a native of the vineyards of central France, followed the entrees. Afterward, in turn came sherbets, granites, etc., succeeded by truffled pheasants with champagne sauce, salad Potel, named for the chef who invented it, and similar delicacies." The triumphal achievement, however, was a savory entremet which is described as a "small pudding of asparagus heads served with a cream sauce." Hot-house fruits, ices, cheese, and coffee comprised the final courses of the feast.

One of the exhibits which attracted the most attention at the last Paris Exposition was a service of Sevres which was admittedly the most beautiful and costly production that the famous potteries had ever attempted. Upon each piece of china was pictured a danseuse, but no two were the same in either pose or type of loveliness. Realizing that the one "hobby" of the czarina was her love for beautiful china, of which she already had a famous collection, including the best specimens of the work of all the great potteries of the world, it was decided to copy this magnificent service in every detail. It was thus used at the banquet and was afterward presented to the first lady of Russia in the name of President Loubet.

The occasion upon which one nation entertains the rulers of another nation is an event when, if at any time, even the most ostentatious display might be regarded as permissible. If contrasted with the seemly manner of living in vogue among modern diners at ordinary times this banquet of the French President may, in some respects perhaps, have bordered upon ostentation. When compared to the extravagan feasts of other days, however, it seems striking in its simplicity, for nothing could have been in greater contrast to the extravagant luxury of the banquets of the ancients, to say nothing of that of many more modern rulers, that luxury which precedes, if it does not lead to, decadence.

MILES BRADFORD,
Author of 'Carlotta and I.'

Banquette, băn-kĕt', in fortification, the elevation of earth behind a parapet, on which the garrison of a fortress may stand, on the approach of an enemy, in order to fire upon them. Its dimensions vary, and it is frequently made double; that is, a second is made still lower.

Banquo, băn'kwō, a famous Scottish thane of the 11th century. In conjunction with Macbeth, cousin of Duncan, the king, he obtained a victory over the Danes, who had landed on the Scottish coast. Macbeth, shortly afterward, violently dethroned Duncan and caused him to be secretly assassinated. Banquo, though not an accomplice, was a witness of the crime; and being subsequently regarded by Macbeth with fear and suspicion, the latter invited him and his son, Fleance, to supper, and hired assassins to attack them on their return home during the darkness of night. Banquo was slain, but the youth made his escape. Shakespeare has interwoven this occurrence with the theme of his tragedy of 'Macbeth.'

Ban'shee, an imaginary female being supposed by some of the peasantry in Ireland and the Scottish Highlands to wail or shriek near a house when one of the inmates is about to die.

Bantam, băn-tăm', or băn'tam, a province occupying the whole of the west end of the island of Java, and containing a population of about 520,000. It long formed an independent kingdom governed by its own sultan, but at the beginning of the 19th century was formally incorporated by the Dutch with their other possessions. Rice is now the staple product. Its capital, which bears the same name, was once the principal mart of the Dutch, and was surpassed by few towns of the East in antiquity and celebrity. It is now very much decayed. Bantam is believed to give name to the well-known small but spirited breed of domestic fowl.

Ban'tam, any one of various breeds of diminutive fowls kept for pleasure, and partaking of the characteristics of the several breeds which they imitate in miniature. Thus the game-bantams are miniatures of exhibition game-cocks, and weigh about 22 ounces. The golden and silver Sebright bantams originated in America from a cross between a Polish fowl and a bantam, and are exceedingly beautiful in plumage. The rose-comb bantams are little copies of Hamburg fowls, and should be either lustrous black or pure white; and the cocks have a rose comb, square in front, evenly corrugated, and ending in a spike with a slight upward curve. Booted white bantams are those which have their shanks heavily feathered. The Cochin fowl is imitated in all its varieties by a bantam the cock of which weighs about 28 ounces. Most beautiful of all are the Japanese bantams, of which there are several varieties. The typical one is white with the tail black, and composed of long, sickle-like, white feathers held erect and edged with white. The wing quills are dark slate color edged with white, so that when the wing is folded it shows only white.

Bantayan, Philippines, a town in the province of Cebu, 62 miles north of the town of Cebu. Pop. 10,000.

Ban'teng, a wild ox (*Bos sondaicus*) of the mountain forests of the Malay Peninsula and Archipelago (except Sumatra), which greatly resembles the gaur (q.v.), and is by some considered a variety of that animal. These cattle are exceedingly fierce, and are regarded by sportsmen as among the most dangerous of game. Nevertheless they have been tamed, and when crossed with the domestic cattle of the region yield a serviceable hybrid.

Bant'ing, William, an Englishman of notable corpulence: b. 1797; d. 1878. By adopting a diet he was able to relieve himself of his superfluous flesh, and accordingly he wrote a pamphlet called 'A Letter on Corpulence' (1863), describing his system, which attracted so much attention that the term "to bant" has been incorporated in the English language to express the reduction of obesity by diet. See also OBESITY.

Ban'try, Ireland, a seaport town in county Cork, 56 miles west-southwest of Cork. It consists of four principal streets and a spacious square, but the town generally has a mean ap-

pearance. It has a growing trade, and fishing is carried on to some extent. Pop. (1901) about 3,000.

Bantry Bay, a deep inlet of Cork County, Ireland, remarkable both for its beauties and for its natural advantages, although the latter are turned to but little account. It is about 25 miles long and from 3 to 5 miles wide, and is safe and commodious for vessels of any size, the water being deep close to both shores, with few rocks or shoals. A French force tried to land here in 1796. The entrance is guarded by Crow Head on the northwest and by Sheep's Head on the southeast.

Bantu, bän'too, or bä-ntoo, the ethnological name of a group of African races dwelling below lat. 6° N., and including the Kaffirs, Zulus, Bechuanas, the tribes of the Loango, Kongo, etc., but not the Hottentots. The term is also used to denote the homogeneous family of languages spoken in Africa throughout the vast region lying between Kamerun, Zanzibar, and the Cape of Good Hope, with the exception of the Hottentot, Bushmen, and Pigmy enclaves. Ba-ntu, in almost all of these languages, signifies "the people," and hence is applied to the whole linguistic family. The Bantu family, although divided into hundreds of dialects, is evidently derived from one mother tongue.

Banu, bä'noo, or bän'noo, or **Bannu,** British India, a district in the Punjab; area 3,868 square miles; Pop. over 330,000. The district is watered by the Indus, which here, during inundations, becomes a vast body of water many miles wide. Nearly all the inhabitants are Mohammedans. Agriculture thrives, especially in the cultivation of the ordinary cereals, sugar-cane, cotton, and various oil seeds. The chief towns are Trakhel and Kalabagh.

Banvard, John, American artist, poet and dramatist: b. New York, about 1820; d. 1891. He was best known by his panorama of the Mississippi River, covering three miles of canvas, which was exhibited in the chief cities of Europe and America. He wrote a great number of poems; several plays: 'Banvard, or the Adventures of an Artist' (1849); 'Pilgrimage to the Holy Land' (1852), etc.

Banvard, Joseph, an American Baptist clergyman and historical writer, brother of the preceding: b. New York, 1810; d. 1887. Among his writings were 'Plymouth and the Pilgrims' (1851); 'Romance of American History' (1852); 'Memoir of Webster' (1853); 'Priscilla' (1854) a historical novel; 'Soldiers and Patriots of the Revolution' (1876), etc.

Banville, bän-vel, **Theodore Faullain de,** French poet and novelist: b. Moulins, 14 March 1823; d. Paris, 13 March 1891. He was the son of a naval officer, and went early in life to Paris, where he devoted himself exclusively to literature, contributed to many journals and reviews, and lived in close friendship with some of the foremost artists and men of letters of the day. First known as a poet through two volumes entitled 'The Caryatides' (1842) and 'The Stalactites' (1846), he established his reputation with the 'Odes Funambulesques' (1857), a sort of great lyrical parody, published under the pseudonym BRACQUEMOND, which immediately found great favor and was followed by 'New Odes Funambulesques' (1868, afterward reprinted as 'Occidentales'); 'Russian Idyls' (1872); 'Thirty-six Merry Ballads' (1873); etc. His dramatic efforts did not meet with equal success, only 'Gringoire' (1866) holding the stage for some time. As a prose writer he is favorably known by a number of humorous and highly finished tales and sketches, like 'The Poor Mountebanks' (1853); 'The Parisians of Paris' (1866); 'Tales for Women' (1881); 'The Soul of Paris' (1890), etc. Of considerable literary interest is 'My Recollections' (1882).

Banxring, bänks'rĭng, a tree-shrew of Java. See TREE-SHREW.

Banyan, bän'yän, or bän-yän', or **Banian-tree** (*Ficus Benghalensis*), an East Indian tree of the natural order *Urticaceæ,* noted for the roots which descend from the branches and become accessory trunks, thus permitting the original tree to extend over a wide area. In the Calcutta botanical garden one specimen, known to be upward of 100 years old, has more than 3,000 small trunks, 230 that vary from 2 to 3½ feet in diameter, and a main trunk 13 feet in diameter. Among these trunks 7,000 people could stand. The trees often attain a height of more than 70 feet. The leaves are ovate heart-shaped, five to six inches long; the inconspicuous axillary flowers are succeeded by cherry-like scarlet fruits which are eaten by monkeys. The seeds seldom germinate on the ground, but usually among the leaf bases of palms, the roots descending the palm trunks, embracing and finally killing them. As the banyan ages its original trunk dies and decays, leaving the younger trunks to support the life of the tree. The Hindus ascribe various medicinal virtues to this tree, which they regard as sacred. Its light porous wood, its juice, and its fruit have no important economic uses. Its close relative, *Ficus indica,* which does not root from the branches, is sometimes erroneously called the banyan-tree.

Banyumas, bän-yoo-mäs' (Javanese, "golden water"), a residency and town of Java. The area of the residuary is 2,100 square miles, and its population about 1,300,000. The chief culture is rice; but coffee, tea, sugar, indigo, cinnamon, and other exotics are produced by *corvée* labor, as enforced by the Dutch in other parts of Java. The town is on the river Seraic 22 miles inland. Pop. about 9,000.

Banyuwangy, the extreme eastern district of the island of Java, noted for its extensive coffee gardens, and for the remarkably pure sulphur obtained from the Goonong-Marapi volcanic mountain. This is also the name of the capital, an important seaport and Dutch military post, on the Strait of Bali, about 550 English miles east-southeast from Batavia.

Banz, bänts, once one of the richest and most famous of the Benedictine monasteries, on the right bank of the Maine, three miles below Lichtenfels, Bavaria. Founded in 1071, and destroyed in the Peasants' war in 1525, it was rebuilt, and although plundered again in the Thirty Years' war it gradually became famed for the scientific attainments of its monks. In 1803 it was broken up, and its library and collections were divided between the Munich museum and other institutions.

Baobab, bā'ō-băb (*Adansonia digitata*), a tree belonging to the natural order (or sub-order) *Bombaceæ,* and forming the only known species of its genus, which was named after the naturalist Adanson. It is also called the monkey-bread tree. The leaves are deep green, and are divided into five unequal parts radiating from a common centre, and each lanceolate in shape. This tree is a native of western Africa and is likewise said to be found in Egypt and Abyssinia; it is cultivated in many of the warmer parts of the world. It is one of the largest known trees, its trunk being sometimes not less than 30 feet in diameter. In Adanson's account of Senegal some calculations are made regarding the growth of this tree, founded on the evidence of the annular layers. The height of its trunk by no means corresponds with the thickness which it attains. Thus, according to his calculations, at one year old its diameter is one inch; and its height five inches; at 32 years old it has attained a diameter of two feet, while its height is only 22 feet, and so on; till at 1,000 years old the baobab is 14 feet broad, and 58 feet high; and at 5,000 years the growth laterally has so outstripped its perpendicular height that the trunk will be 30 feet in diameter and only 73 feet high. The roots, again, are of a most extraordinary length, so that in a tree with a stem 77 feet in girth the main branch or tap-root measures 110 feet in length. It often happens that the profusion of leaves and of drooping boughs almost hide the stem, and the whole forms a hemispherical mass of verdure 140 to 150 feet in diameter, and 60 to 70 feet high. The wood is pale-colored, light, and soft, so that in Abyssinia the wild bees perforate it and lodge their honey in the hollow, which honey is considered the best in the country. The negroes on the western coast apply their trunks to a very extraordinary purpose. The tree is liable to be attacked by a fungus which, vegetating in the woody part without changing the color or appearance, destroys life and renders the part so attacked as soft as the pith of trees in general. Such trunks are then hollowed into chambers, and within these are suspended the dead bodies of those to whom are refused the honor of burial. There they become mummies, perfectly dry and well preserved, without further preparation or embalming, and are known by the name of *guiriots.* The baobab is emollient and mucilaginous; the pulverized leaves constitute *lalo,* a favorite article with the natives, which they mix with their daily food to diminish excessive perspiration, and which is even used by Europeans in fevers and diarrhœas. The flowers are large, white, and handsome; and in their first expansion bear some resemblance to the white poppy, having snow-white petals and violet-colored stamens. Both flowers and fruit are pendant, and the leaves drop off before the periodical rains come on. The fruit is of an oblong shape, of considerable size, and tastes like gingerbread, with a pleasant acid flavor. The expressed juice, when mixed with sugar, forms a cooling drink much used in putrid fevers; this juice is generally used as a seasoning for corn gruel and other food.

Baour-Lormian, bă-oor-lōr-myäṅ, **Louis, Pierre Marie François,** French poet and dramatist: b. Toulouse, 1772; d. 1854. He first attracted wide notice through his 'Poems of Ossian' (1801), an extremely clever imitation of Caledonian verse; and afterward won success with a tragedy, 'Omasis, or Joseph in Egypt' (1807). Other works of his are 'Political and Moral Vigils' (1811), in the manner of Young; 'Duranti or The League in the Province' (1828), a historical novel; and 'Legends, Ballads, and Fabliaux' (1829). But his best work is probably a poetical translation of the book of Job, completed after he had lost his eyesight.

Bapaume, bă-pōm, France, a town in the department of Pas-de-Calais, 12 miles south of Arras. Here, on 2 and 3 Jan. 1871, took place two fierce struggles between the French Army of the North and the Prussian Army of Observation; the French being defeated with a loss of over 2,000.

Baph'omet, the name of a mysterious image which the Knights Templars were charged with worshipping when the order was suppressed by Philip IV. of France. It is probably a corruption of Mahomet, and the charge may have arisen from the circumstance that some of the Templars had gone over to the Moslem faith.

Baptan'odon, an extinct ichthyosaur or fish-lizard of the Jurassic period. Its remains have been found in the marine Jurassic shales of Wyoming and other western States, which have hence been called "Baptenodon Beds." It is distinguished from the true ichthyosaurus (q.v.) (found only in the Old World) by the form of the paddle-bones, which are rounded instead of polygonal, and was incorrectly supposed to be toothless, as its name indicates. The skulls are two to three feet long, so that the entire animal probably measured 10 to 15 feet, and resembled the ichthyosaurus in proportions and habits.

Baptism (from the Greek *baptizō,* from *baptizein,* to immerse or dip), the application of water to a person as a sacrament or religious rite. It is generally thought to have been usual with the Jews even before Christ, being administered to proselytes, but was probably nothing more than a ceremony of purification. From this baptism, however, that of John the Baptist differed, because he baptized Jews also as a symbol of the necessity of perfect purification from sin. Christ himself never baptized, but directed his disciples to administer this rite to converts (Matt. xxviii. 19); and baptism, therefore, became a religious ceremony among Christians, taking rank as a sacrament with all sects which acknowledge sacraments.

In the primitive Church the person to be baptized was immersed in a river or in a vessel, with the words which Christ had ordered, and a new name was generally bestowed at this time further to express the change. Sprinkling, or, as it was termed, clinic baptism, was used only in the case of the sick who could not leave their beds. The Greek Church and various Eastern sects retained the custom of immersion; but the Western Church adopted or allowed the mode of baptism by pouring or sprinkling, since continued by most Protestants. This practice can be traced back certainly to the 3rd century, before which its existence is disputed. Since the Reformation there have been various Protestant sects called Baptists, holding that bap-

tism should be administered only by immersion and to those who can make a personal profession of faith.

The Montanists in Africa baptized even the dead, and in Roman Catholic countries the practice of baptizing church bells,— a custom of 10th century origin,— continues to this day. Being an initiatory rite, baptism is, therefore, administered only once to the same person. The Roman and Greek Catholics consecrate the water of baptim, but Protestants do not. The act of baptism is accompanied only with the formula that the person is baptized in the name of the Father, Son, and Holy Ghost; but among most Christians it is preceded by a confession of faith made by the person to be baptized, if an adult, and by his parents or sponsors if he be a child.

The Roman Catholic form of baptism is far more elaborate than the Protestant. This Church holds that baptism is a sacrament which has the effect to remove in the individual the penal consequences of the sin of Adam, to restore him to a state of supernatural grace, and to give him a right to the beatific vision of God, remitting all actual sins committed by the individual. It also imprints an indelible character, which is both an ornament to the soul and a capacity for receiving the other sacraments. The effect of the sacrament is produced *ex opere operato*; that is, by an act of the Holy Ghost infallibly accompanying the performance of the external rite. Bishops, priests, and deacons are the ordinary ministers of baptism, and all others are forbidden to baptize except in case of necessity. Baptism is, however, valid when duly administered by any person, and any one may lawfully baptize in case of necessity. On the part of children and others who have never attained the use of reason no dispositions are required. In order to receive the sacrament validly a person who has the use of reason must know what he is doing and intend to receive baptism. In order to receive the grace of the sacrament he must have faith, and, if he has committed mortal sins, repentance; otherwise the grace of the sacrament remains suspended until he acquires the proper dispositions. Besides sacramental baptism, called *baptismum fluminis*, there are two substitutes which can supply its place, called, in a wide and improper sense, *baptismum sanguinis* and *baptismum flaminis*. The former of these is martyrdom, the second is the desire of baptism, accompanied by faith and perfect contrition or the love of God. These only supply the place of baptism when it cannot be had, and confer sanctifying grace, but not an indelible character. Solemn baptism is accompanied with the application of chrism and holy oil, and several other ceremonies of great antiquity.

Baptist Young People's Union of America, an association representing many young people's societies connected with the Baptist churches in the United States and Canada, organized June 1891 in Chicago, which place has since been its headquarters. Upon the formation of the Union, as the withdrawal of the Baptist societies was feared by the Christian Endeavor societies, a plan of federation was adopted for the establishment of young people's societies over which no constitution should be required. Conventions are held yearly.

Baptista, John, Carmelite poet: b. Mantua 1448; d. 1516. His poetical writings were well known throughout Europe during his lifetime; their correctness of form and choice Latinity caused them to be used as texts in the schools. His greatest poem is 'De Calamitate Temporum' ('On the Evils of the Day'), and is divided into three parts.

Baptistery, that part of the church, or a special building in which is administered the sacrament of Baptism. In the earliest ages of Christianity the solemn administration of this sacrament was reserved to the bishop, and to the episcopal church was generally annexed a special building called the baptistery. As the converts to Christianity increased it became necessary to set aside for the baptismal ceremonies a small space within the main building of the various parish churches.

Baptistines. (1) A religious order of women founded in 1744 in Genoa by Baptista Solimani. Their rule enjoined a strict fast throughout the entire year, the chanting of the office at midnight and conversation with friends or relatives restricted to three times during the year. (2) A congregation of secular priests founded in 1755 by Dominic Olivieri and placed under the jurisdiction of the Cardinal Prefect of the Propaganda by Pope Benedict XIV. The congregation ceased to exist at the end of the 18th century.

Baptists, a religious body originating in England early in the 17th century as a result of the Separatist movement. Among the Separatists was John Smyth, who emigrated from Gainsborough with his people to escape persecution, and at Amsterdam established a new congregation upon the principle of baptism on confession of faith. Some members of this Church returned to England and in 1611 formed in London the first of the churches known as General Baptists, because they held the Arminian doctrine of a general atonement. The Particular Baptists (holding the Calvinistic doctrine of a particular atonement, that is, for the elect only) arose in 1633, when a number left a Separatist church in London to form a new congregation and were baptized anew on confession of faith. Another group withdrew from the same church in 1640, and shortly after introduced the practice of immersion, which was soon adopted by all the other churches and gave rise to the name by which they were known from 1644 onward. The Particular and General Baptists continued to be separate bodies until 1891, when they united.

There are other divisions among the general body, but all the churches agree in holding to the supremacy of the Scriptures as the rule of faith and practice; the necessity of personal faith and credible evidence of regeneration before baptism; immersion as the only baptism commanded by Christ or practised by his apostles; the independence of each church; and the entire separation between civil and ecclesiastical authority. On the question of communion English Baptists have been divided from the beginning. The earliest declarations were that only the baptized are authorized to partake of the Lord's Supper, but the practice of some churches was not in accord with this principle. At pres-

ent many churches admit not only to the communion but to membership those who have not been baptized. There are at present in Great Britain and Ireland 2,747 churches with 372,219 members. Baptist missions have established churches in many of the countries of Europe, as well as in Asia and Africa, and in the world there are now 50,978 Baptist churches and 4,705,953 members. The English Baptists may be traced back through the Continental Anabaptists, the Waldensians, Petrobrusians, and various other sects, to the 11th century. None of these bodies regularly practised immersion, so far as we know, but they agreed in holding the fundamental Baptist principle of a regenerate Church and rejected the baptism of infants as an unauthorized and post-apostolic practice.

Baptists in Amer'ica. (1) *From the first settlements to the Great Awakening.*— There were a few Baptists (or, as they were then usually called, Anabaptists) among the early settlers of the colonies, especially Massachusetts, but the first Baptist church was of independent origin. Roger Williams, a graduate of the University of Cambridge, a Puritan unable to conform to the Church of England, emigrated to the Massachusetts colony and landed in Boston in 1631. Here he soon developed theories that made him obnoxious, and he was therefore banished by the General Court, 8 Oct. 1635. The chief count against him was that he denied the authority of the civil magistrate to punish religious offenses. He made his way to Rhode Island, purchased land from the Narragansett Indians, and founded the colony of Providence on the principle of complete separation between civil and religious affairs. His study of the Scriptures led him to reject infant baptism, and others having come to his opinion a church of 12 members was constituted. Williams was baptized by one of them, Ezekiel Holliman, and he then baptized the others. As there is no indication of subsequent change in the method of baptism, here or elsewhere, it is reasonable to conclude that American Baptists have practised immersion from the beginning. Not long after this a church was established in the colony at Newport under the leadership of John Clarke, an English physician. A Welsh Baptist church emigrated bodily to Massachusetts in 1633 and ultimately settled at Swansea in 1667. This church was not greatly disturbed, but in Boston the Baptists experienced severe persecution. John Clarke and Obadiah Holmes, of the Newport church, visited the colony to comfort and confirm in the faith the few scattered brethren there, and were arrested for holding a religious service in a private house in Lynn. They were sentenced to be fined heavily, and in default to be "well whipped." This sentence was executed upon Holmes, in the streets of Boston, 6 Sept. 1661. Clarke's fine was paid by a friend, and he escaped. In 1665 a Baptist church was formed in Boston, consisting of nine members. Thomas Goold, its leading member and first minister, was so continuously imprisoned and ill-treated that his health was shattered, and he died in 1675. Other members suffered in like manner. A small meeting-house was built in 1678, whereupon the doors were nailed up by order of the court. The new charter of the colony, in 1691, granted "liberty of conscience to all Christians except Papists," but Baptists were still taxed for the support of the churches of the "standing order." Even when the heavy hand of the Puritan official was restrained, progress did not become much more rapid, for prior to 1740 there were but eight Baptist churches in Massachusetts. In the other New England colonies growth was proportionally slow. The first church in Connecticut was that at Groton, established in 1705, probably by Baptists from Rhode Island.

The most marked progress of Baptists was in the group of colonies afterward known as the Middle States. The centre of this growth was the town of Philadelphia. In the near-by village of Pennepek or Lower Dublin (now incorporated in the city) a church was founded in 1688, mainly of Baptists from Great Britain, and a preaching-station was appointed in Philadelphia, which was not formally recognized as a separate church until 1746. The Welsh Tract Church was formed in 1701 in a place now in the State of Delaware. In the neighboring colony of New Jersey a simultaneous beginning had been made. The church at Middletown had been formed in 1688, and the following year a church that had been organized at Dover, N. H., emigrated in a body and became the Piscataway Church. Churches at Cohansey (1690), Cape May (1712), and Hopewell (1715) followed.

In the New York colony the first church was established at Oyster Bay, L. I., about 1700, and in 1714 a second church was formed in New York city — both organized through the labors of some Rhode Island Baptists. After 1730 the New York church ceased to exist, and it was not until 1745 that another attempt was made to found a Baptist church there; and so feeble was this that it did not attempt an independent existence until 1762.

The oldest church in the southern colonies was first constituted in Maine, then a part of the Massachusetts settlement. A few people at Kittery were baptized in Boston and organized a church, but they were so much disturbed by persecutions that they decided to emigrate to Charleston, S. C., and became the First Baptist Church of that city in 1684. Some General Baptists settled in the Virginia colony in 1714, and other churches were rapidly formed. From 1727 onward Baptist churches were founded in North Carolina, and a church was established in Maryland in 1772. The Carolina churches proved to be especially fruitful. From these feeble and unpromising beginnings there resulted a great growth during the remaining years of the 18th century.

The division that from the first existed among the English Baptists seemed likely to be perpetuated in America. In New England the majority of the earliest churches were or became Arminian in theology, and the first churches in the colony of New York appear also to have been of that order, together with several of the New Jersey congregations. But the Philadelphia group and part of the New Jersey churches were strongly Calvinistic, and gradually they took the lead and became the controlling force.

This result was promoted, if not caused, by the formation of the Philadelphia Association. The five oldest and nearest churches (Pennepek, Welsh Tract, Middletown, Piscataway, Cohansey) from the beginning cultivated close relations with one another, and were accustomed to hold "general meetings" with the various

churches in turn, at which members of all the others attended as far as possible. These meetings were at first annual, and then came to be held twice a year, in May and September. As the churches grew, such mass-meetings became less practicable, and in September 1707, when the meeting was held in Philadelphia, the other churches sent delegates. The practice continued thenceforth without interruption, and so the first association of Baptist churches was formed. Such associations differ from the synods and conferences of other denominations in that they have no legislative or judicial authority over the churches, which retain their complete independence. The association has advisory powers only, and considers questions of common interest to the churches composing it, especially measures for the more effective spread of the gospel. It thus becomes a missionary and evangelic institution, and as such has been one of the most powerful agencies in the growth of Baptist churches in America.

The Philadelphia Association gradually drew to its membership not only all the Baptist churches of the middle colonies, but those farther south, and at its most flourishing early period had 31 churches on its roll, extending from New York to Virginia. By 1742, seemingly before, this association adopted a Calvinistic confession of faith,—in large part identical with the Westminster Confession,—and this Philadelphia Confession soon became by common consent the standard of faith and practice among American Baptist churches, and still holds that position over large regions. It ought to be added, however, that among Baptists no confession has any real authority, such documents being regarded as only convenient statements of what the Scriptures are believed to teach; and among Baptists it is to the Scriptures, and not to any confession, that appeal is always made.

2. *From the Great Awakening to the Founding of the General Convention.*—The spiritual movement known as the Great Awakening (q.v.), judged by its results, was the most important single event in the history of American Christianity. On no religious body did it have more happy, far-reaching and permanent results than upon the Baptists. The new spiritual life into which they were quickened is shown by the rapid advance made by them in all the colonies after 1740. In 40 years the churches increased in Massachusetts from 8 to 73, and the members from about 200 to over 3,000. This means, of course, that not only were many new churches constituted in the colonies already named, but that the other colonies were entered. From 1750, churches were organized in New Hampshire, and from 1780 in Vermont. In Maine the planting of churches began again in 1768. In 1784 there were in New England 151 churches with 4,783 members—an enormous increase, nearly 10 times the number of churches and quite 10 times the number of members that existed a generation before.

In the South the increase was even more rapid, especially in Virginia and the Carolinas. In Virginia the Baptists were rigorously persecuted, their preachers being imprisoned and fined with great severity, but even in prison they preached the gospel and made converts. The Kehukee Association, organized in 1765 in Virginia, and the Ketockton, in 1766 in North Carolina, testify to the rapid progress made in these regions. By a series of statutes passed between 1776 and 1798 Virginia repealed all her punitive and incorporating laws, and placed all forms of religious belief on an equal footing before the law. The progress of the Revolution so broadened men's ideas that the other colonies followed her example, although New England lagged behind, and Massachusetts did not fully banish intolerance from her laws until 1833. This principle of separation of Church and State, long advocated by Baptists and at length made the fundamental law of the United States and of each several State, is recognized by foreign jurists as the most important contribution to political philosophy and the science of government yet made by America.

The war of the Revolution naturally caused a serious check to religious progress in the colonies, but less to the Baptists than to most other bodies. The Episcopal Church was badly disorganized, and almost destroyed, because her ministers were mostly Tories and were driven from their parishes; but the Baptist ministers were patriots, with but a single known exception. The Methodists were greatly embarrassed in a similar way—their preachers were nearly all from England, and John Wesley was a violent writer against the cause of the colonies and their "wicked rebellion." Except where actual hostilities prevailed, the Baptist churches suffered little, and as a whole were stronger at the close of the war than at the beginning, ready for an immediate advance and a rapid growth, since they could take advantage of every favorable opportunity.

And one of the greatest opportunities ever offered any religious body was theirs at the close of the war. The settlement of the great West began actively at once. Two great tides of immigration set westward: the one from New England, by the fertile valleys of central New York toward Ohio, and Illinois; the other from Virginia, Maryland, and Pennsylvania, over the mountains by the old Indian trail to Pittsburg, and thence into Ohio or down the river to Kentucky and Tennessee. Among the early settlers of these new regions were not a few Baptists; and the churches and associations in the older regions sent out missionary preachers to visit the new settlements and organize churches wherever possible. It thus came to pass that Baptist churches were often the first, always among the first, to be formed in the new communities of the West, and their growth was rapid. By the year 1800 the denomination had increased to 1,200 churches, and their members to more than 100,000. The formation of associations had kept pace with the growth of churches; prior to 1800 there were 48 such bodies formed, nearly all of which carried on active missionary operations for the planting of new churches and the aiding of those newly planted to sustain themselves. This missionary activity of the associations is the distinctive feature of the period, and more than any other thing explains that unexampled growth, far outstripping that of the population.

3. *From the Formation of the General Convention to Its Division in 1845.*—The most important forward step of American Baptists was their engaging in the work of foreign missions. This was done through no plan of their own, but in obedience to the leadings of Divine Providence.

Some young men of New England Congregational churches, while students at Williams College and later at the Andover Theological Seminary, became deeply interested in the giving of the gospel to the heathen, and in consequence the American Board of Commissioners for Foreign Missions was constituted in June 1810. Three of the first missionaries sent out,—Adoniram Judson, his wife, and Luther Rice,— became convinced from independent study of the Scriptures that only believers should be baptized, and that immersion was the sole apostolic baptism. Accordingly they were baptized by English Baptist missionaries at Calcutta shortly after their arrival, and by consequence severed their relations with the Board that had sent them out. Mr. Rice returned to America to tell the story and enlist the Baptist churches in the support of these missionaries. This was comparatively easy, but by his tour among them the churches had become so aroused to their unfulfilled duty toward the heathen that they were not content merely to support the Judsons. Local missionary societies were formed in several States, and at length delegates from churches throughout the country met at Philadelphia in May 1814, and organized the «General Convention of the Baptist Denomination in the United States for Foreign Missions.» This furnished the churches what they greatly needed,— a common cause, a rallying-point,— and at once the Convention and its work became a strongly unifying influence. The missionary work thus begun was prosecuted with zeal, liberality, and success. The Judsons went to Rangoon and began a mission among the Burmans in 1813; the Karens were reached in 1828; and missions followed among the Chinese (1833), Telugus (1836), and Assamese (1836).

For a time it seemed that all Baptist churches would unite in the support of this work, but after some years opposition began to develop among the churches that held to an extreme form of the Calvinistic theology. This opposition finally became directed against ministerial education, Sunday-schools, and all organization for evangelic effort, as well as against the Convention. The agitation of these extreme views finally led to a withdrawal of a part of the churches from all fellowship with the others, and those thus withdrawing became known as Old School, or Primitive Baptists, since they claimed to be faithful to the original principles of the body, from which the others had departed. The agitation was most bitter in the central Atlantic States, but the Primitive Baptists became most numerous in some of the southern States, especially Tennessee and Georgia, where, among the mountain districts, they are still very numerous. They are popularly known as «Hard Shells.»

The Convention, in addition to its foreign missionary enterprise, also for a time conducted some home-mission operations, and local societies in several States were organized for this work. All of these agencies proved insufficient, and in 1832 the American Baptist Home Mission Society was formed in New York to take special charge of this enterprise, setting free the General Convention to devote its whole attention to foreign missions. But this was not the end of organization. The efficient conduct of home missions was found to demand further subdivision of effort, and after the second decade of the century State conventions were rapidly formed in the various States for the supervision of missionary work in the older communities, leaving the national society to overlook the newer regions of the great West. The rise of Sunday-schools was synchronous with this development of missionary effort, and called into being new forms of organization. Among Baptists it gave new life to a tract society that had been formed in 1824 in Washington, and caused its removal to Philadelphia and its growth into the American Baptist Publication Society, which, since 1840, has given a great share of its capital and effort to the publication and circulation of Sunday-school literature. The work of foreign missions led to the making and printing of versions in the various languages of the mission fields. Some of these were printed by aid from the American Bible Society, formed in 1816 by representatives of the chief evangelical denominations; but after a time Baptists were denied equal rights in this body, and in April 1837 a convention held at Philadelphia formed the American and Foreign Bible Society for doing this work.

This was the period, not only of perfecting organization, but of controversies that resulted in great loss to Baptists. The rise of the body now known as Disciples of Christ, led by Alexander Campbell and others, from 1815 to 1835, caused great disturbance and loss to Baptists in the middle West and South. Mr. Campbell had been a Baptist preacher, and many Baptist churches went bodily into the new movement. In the Middle and Eastern States, during the same period, William Miller led many astray by his predictions regarding the speedy end of the world, and the ultimate result of his teaching was the formation of the Second Advent body, into which many Baptist churches and members went. At nearly the same time and in the same region the famous anti-Masonry agitation (q.v.) also convulsed the churches and hindered their progress, where it did not actually deplete their numbers. But this was also a period of great revivals and rapid numerical growth, not peculiar to any one part of the country. Beginning the century with some 1,200 churches and 100,000 members, Baptists had grown to 8,406 churches and 686,807 members in 1845, about one Baptist to each 32 persons of the population.

The greatest controversy of the period, and that which had most lasting results, was that caused by the institution of slavery. After about 1825 anti-slavery sentiment rapidly grew strong in the northern States, and among the Baptist churches of that region the opinion generally prevailed that a Christian man could not consistently be the owner of slaves. The General Convention had been organized on the principles of the Federal Constitution — of giving equal rights to slaveholders and non-slaveholders; but as in the State, so in the Church, this compromise proved unworkable after a time. For several years fierce debates were held on the subject at the meetings of the Convention, and the feelings of both sections grew more embittered. At length the Executive Board declared that they could not appoint a slaveholder as a missionary, and the southern churches felt this to be a denial of their constitutional rights. Accordingly in May 1845 a convention met at Augusta, Ga., and formed the Southern Baptist Convention. The mission

work, home and foreign, of the southern Baptist churches has been done since that time through this body, under the supervision of various boards appointed for the purpose. This work was necessarily interrupted by the Civil War, but was resumed with new vigor at the conclusion of that struggle, and has been prosecuted with increasing liberality and success. The Convention is a strictly delegated body.

4. *The Last Half Century.*—The last 50 years have been a time of great increase in numbers and wealth. At the close of the 19th century there were 43,959 churches and 4,181,686 members, about one person in 18 of the population. The rate of progress has therefore been almost double that of the population, marvelous as the latter has been, and a very small percentage of this had been gained by immigration. The valuation of church property in 1900 was $86,648,982, the expenditure for public worship $9,622,166, the contributions for missions $1,123,839, and for all other purposes $12,348,527. Corresponding facts for 1850 and earlier years are not ascertainable, but it is certain that the wealth of the churches has increased fully twice as fast as the membership, and within the last 15 years the contributions have doubled, showing a commensurate growth of liberality.

But in this last half century the most marked feature of denominational progress has been in educational work. Very early in their history Baptists began to found colleges and other institutions of higher learning. Brown University was established in 1764, and was followed by Colby (1818), Colgate (1819), Columbian (1821), and Lewisburg (1846). Two theological seminaries were early founded: Hamilton (1817) and Newton (1825). In the West and South 16 other institutions that still survive were established before 1850, not to mention a few academies. The combined endowments of all these schools in 1850 would probably not have exceeded $500,000. In 1900 there were 7 seminaries, 31 colleges, 32 schools for women only, 46 academies, and 17 schools for negroes and Indians. These schools had over 38,000 students enrolled, and in them has been invested over $44,000,000, of which fully half is productive endowment.

Two thirds of the Baptists of the United States are in the south, and of these far more than half are negroes. The separate organization of the colored Baptists dates, of course, from the Civil War. The first of their State conventions was formed in 1866 in North Carolina, and like societies have been organized in 15 States. In the North a large part of their churches are members of the regular associations. The National Baptist Convention was organized in 1880, and was expected to perform an office for their churches similar to that of the Southern Baptist Convention for the white churches. But there have developed ambitious leaders among them, and divided counsels have resulted, and there has been in consequence a multiplying of organizations very confusing to those who attempt to follow their history and work. Owing to the lack of education among them, reports of meetings are defective and statistics untrustworthy, and no definite statements of their work can be attempted.

Besides what are often called the "regular" Baptists,—those in full fellowship with each other and enumerated above,—there are numerous other bodies, aggregating 500,000 members, that hold substantially the same principles. The Freewill Baptists are perhaps the largest of these. The name describes two different groups of churches: one originating in North Carolina about 1729, and having its representatives mainly in the South; the other arising in New Hampshire about 1780. The former are known as Original Freewill Baptists, and practise feet-washing and anointing the sick with oil as gospel ordinances. The latter have of late adopted the name Free Baptists, are Arminian in theology, and practise "open" communion. They are strongest in New England and the Middle West. A general conference was organized in 1827, a Foreign Mission Society in 1834, and an Education Society in 1840. They now have about 85,000 members, and the southern churches may have 12,000 more. The Six-Principle and Seventh-Day Baptists also originated in New England. The former began in Rhode Island, where several of the earliest churches came to be known by this name. The churches of this order mostly held Arminian views, but differed from other Baptist churches mainly in insisting on the laying on of hands immediately after baptism, believing this to be one of the six principles enumerated in Heb. vi. 1, 2. The first Seventh-Day church was formed in Newport in 1671; their distinctive principle is indicated by their name. The German Seventh-Day Baptists had a separate origin in Pennsylvania about 1728, from the Dunkards or Tunkers, who settled in Germantown from 1719 and onward. They are sometimes called German Baptists, but that name is more properly applied to German congregations of the "regular" Baptists. The Church of God, or Winnebrennerians, the River Brethren, and one branch of the Mennonites, also agree in the main with the principles and practices of Baptists.

Besides the United States, Baptists are represented in all parts of North America, especially in Canada. Since 1778, Baptist churches have existed in Nova Scotia and New Brunswick, and about 1794 began a like movement in lower Canada, near the Vermont line. The organization of the Maritime churches came first, beginning with an association formed in 1800, and extending until a convention for general missionary purposes united several earlier societies in 1846. Churches were planted in Ontario after 1803, and organization proceeded along the usual lines. In 1888 all previously existing societies were consolidated by act of the Dominion Parliament into the Baptist Convention of Ontario and Quebec, which conducts its work through five executive boards. The Canadian Baptists have now grown to over 1,000 churches and 100,600 members.

In Mexico and the West Indies the Baptist churches are of recent missionary origin. The chief exception is in Jamaica, where English Baptists began operations nearly a century ago, the first church having been formed in 1816. The Southern Baptist Convention has taken Cuba as its special field, while Northern Baptists have established a mission in Porto Rico. In the West Indies, Mexico, and Central America there are now not far from 50,000 Baptists.

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Bar, Karl Ludwig von, German jurist: b. Hanover, 1836. He was trained in the universities of Göttingen and Berlin, and sat in the Reichstag 1890–3. He has been a strong advocate of publicity as well as of more humane procedure in all criminal trials. Important works by him are: 'Das Internationale Privat- und Strafrecht' (1862); 'Die Redefreiheit der Mitgleider gezetzgebender Versammlungen' (1868); 'Die Lehre vom Kausalzusammenhange in Rechte (1871); 'Das Deutsche Reichsgericht' (1875); 'Staat und Katholische Kirche in Preussen' (1883).

Bar-Cochba, Simon, celebrated Jewish impostor of the 2d century A.D., who pretended to be the Messiah. He called himself, or was called by his followers, Bar-Cochba, meaning Son of the Star, and applied to himself Balaam's prophecy, "There shall come a star out of Jacob,' etc. He obtained the support of the celebrated Rabbi Akiba, and availing himself of the general dissatisfaction produced among the Jews by Hadrian's attempt to erect a temple to Jupiter on the site of the temple of Jerusalem, raised the standard of revolt, and soon mustered numerous followers. After carrying on a kind of guerilla warfare, he made himself master of Jerusalem about 132, and gained possession of about 50 fortified places. Hadrian, who had at first despised the insurrection, now saw the necessity of acting more vigorously, and sent to Britain for Julius Severus, one of his ablest generals, who, avoiding a general engagement, gradually made himself master of the different forts which the rebels possessed, and then, though not without great loss, took and destroyed Jerusalem. Barcochba retired to a mountain fortress, and perished in the assault of it by the Romans three years after, about 135.

Bar, Russia, a town in the government of Podolia; so called after the birth-place of its foundress, Bona Sforza, the wife of King Sigismund I. of Poland. It is famous as the place where a confederation of the Polish people was held with a view to combating the Russian influence and the adherents of Russia in Poland, 29 Feb. 1768. The Russians took Bar by storm on the following 28 May, together with 1,400 men and 20 pieces of cannon. Eleven fairs are annually held here. Leather-dressing, distillery, and brick-making are carried on. Pop. (1900) 13,000.

Bar. In heraldry, one of the charges known as ordinaries. It is formed by two horizontal lines passing over the shield and occupying one fifth of the surface.

In hydrography, a barrier of sand in the channel of a river or along the seacoast. Rivers are constantly engaged in the transportation of sediment seaward, and whenever the current is checked the suspended material sinks and accumulates along the bottom. Bars thus formed may disappear during periods of floods when the water gains increased velocity, and they frequently change their position with slight alterations in the course of the current. Sand bars are also common at the mouths of rivers where the flow of the water, and therefore its transporting power, is lessened before entering the sea. The precipitation of the sediment is assisted in this case by the mingling of the fresh and saline water. The formation of such bars does not differ from that of a delta (q.v.). The transporting action of currents and waves sometimes builds up a long line of bars or reefs along the seacoast, as is seen on the Atlantic and Gulf shores of the United States. See REEF.

In law, a word having several meanings; thus, it is the term used to signify an enclosure or fixed place in a court of justice where lawyers may plead. In English superior courts queen's counsel are admitted within the bar; other members of the bar sit or stand outside. A railed-off space within the Houses of Lords and Commons is similarly called the bar. The dock, or enclosed space where accused persons stand or sit during their trial is also called the bar; hence the expression "prisoner at the bar." It has also a general meaning in legal procedure, signifying something by way of stoppage or prevention. There is also a trial at bar — that is, a trial before the judges of a particular court, who sit together for that purpose in banc (q.v.). The term is used both in England and the United States as a synonym for the legal profession.

In music, a line drawn vertically across the staff, for the purpose of dividing the music into equal measures of time. The term is very often improperly applied to measures themselves. The quantity of time included between two bars varies as the time is triple or common, the former being equivalent to three crotchets and the latter to four. The thick bar at the end of a piece of music is called the double bar. Bars were first used about the middle of the 15th century. See MEASURE.

Bar Har'bor, Me., a popular summer resort in Hancock County, Me.; on the east shore of Mount Desert Island. It derives its name from a sandy bar which connects Mount Desert with the largest of the Porcupine group. The surrounding scenery is very pleasing, and within a short distance are many points of interest readily accessible to the tourist. Among these are the summit of Green Mountain, Eagle Lake, Mount Newport, Kebo, The Ovens, Great and Schooner Heads, Spouting Horn, Thunder Cave, and Eagle Cliff. Pop. (1900) 1,600.

Bar Shot, a double-headed shot, made of two half-balls connected by a bar, and formerly used in naval battles for cutting away the masts and rigging of the enemy's ship.

Bar-le-Duc, bär-lĕ-dük, or **Bar-sur-Ornian,** bär-sür-ôrnăn, France, capital of the department of Meuse, 125 miles east by south from Paris. It consists of an upper and a lower town, the former of which commands a fine view. The lower town extends into the valley traversed by the Ornain, here crossed by three stone bridges. It is a busy active place, with many shops, manufactories, and warehouses. The streets are wide and well laid out, but the public buildings are inferior. The chief manufactures are cotton yarn, cotton, and woolen stuffs, printed calicoes, and colored handkerchiefs. The preserved fruits and confectionery, as well as the wines of Bar-le-duc, are in repute. Pop. (1896) 18,249.

Bar-sur-Aube, bär-sür-ōb, France, a town 30 miles east of Troyes, notable as the scene of a victory of the allied forces commanded by Schwarzenberg over the French, commanded by Macdonald and Oudinot, 27 Feb. 1814. The

council which decided the plan of campaign of the allies was held here the day before the battle. Pop. (1896) 4,548.

Bar-sur-Seine, bär-sür-sān, France, an ancient town in the department of Aube, notable as the scene of a victory of the allied forces over the French, in March 1814. Pop. (1896) 3,157.

Bara, bä'ra, **Jules,** Belgian statesman: b. Tournai, 1835; d. Brussels, 26 June 1900. He early displayed oratorical gifts, and soon after beginning the practice of law was appointed professor of law in the University of Brussels. He entered the House of Deputies in 1862 as a Liberal, and was appointed minister of justice in 1865. For the remainder of his career he was prominent in the Liberal ranks whether in the Cabinet or as a member of the House of Deputies, his power of scathing invective being instrumental in causing the resignation of the clerical ministry of d'Anethen in 1871 and the fall of that of Malou in 1878.

Baraba, bä-ra-bä', a steppe of Siberia, in the government of Tomsk, occupying more than 100,000 square miles. Covered with salt lakes and marshes, it was colonized in 1767 by the Russians, who have since cultivated parts of it. Pop. 250,000.

Barabas, ba-răb'as, the principal personage in Marlowe's tragedy, 'The Jew of Malta.'

Barab'bas, the robber released by Pilate at the Passover when Jesus was condemned to death. It was a custom of the Roman government, for the sake of conciliating the Jews, to release one Jewish prisoner, whom they might choose, at the yearly Passover. Pilate desired thus to release Jesus, but the Jews demanded Barabbas (Matt. xxvii. 16–26). (2) The title of a novel by Marie Corelli, having him as the central figure.

Barabbas: A Dream of the World's Tragedy, a romance by Marie Corelli. It is the story of the last days of Christ, his betrayal, crucifixion, and resurrection. The story is dramatically told, but the style is florid and meretricious, appealing more to the emotions than to the reason.

Barabins'ki, a Tartar tribe living on the banks of the river Irtish, and engaged in pastoral and agricultural pursuits. Their religion is Shamanistic, but Christianity has made some progress among them.

Baraboo, băr'a-boo, Wis., a city and county-seat of Sauk County, on the Baraboo River, and the Chicago & N. W. R.R.; 40 miles northwest of Madison and 3 miles from Devil's Lake. It is an agricultural region; has important manufacturing interests, which are promoted by an excellent water power; is a noted fruit centre; and has a national bank, city hall, water works, electric light, gas works, daily, weekly, and monthly periodicals. It is governed by a mayor, elected biennially, and a municipal council. Pop. (1900) 5,751.

Barabra, bä-rä'bra, a Nubian people living on both sides of the Nile, from Wady Halfa to Assouan. They are about 40,000 in number, and are believed to belong to the same stock as the ancient Egyptians.

Baracoa, bä-ra-kō'a, Cuba, a seaport near the eastern end of the island, and its capital, 1518–22. The town was founded in 1512. Near it is the mountain noted as the «Anvil of Baracoa.» In the vicinity Maceo and his men began in 1895 the struggle for Cuban independence. Pop. (1899) 4,937.

Barada, bä-rä'da, the Abana of the Bible, a river of Syria, rising in the Anti-Libanus and flowing across the plain to the east past Damascus. It loses itself in a lake called Bahret-el-Ateibeh. Around Damascus its waters are used for irrigation by means of canals.

Baraga, băr'a-ga, **Frederic,** Austrian Roman Catholic prelate and missionary: b. Treffen, Carniola, 29 June 1797; d. Marquette, Mich., 19 Jan. 1868. He came to the United States in 1830 and spent the rest of his life among the Chippewa and Ottawa Indians in Michigan. His Chippewa grammar (1851) and Chippewa dictionary (1851–3) are of philological importance, and he was also the author of a work in German on the 'History, Character, Manners, and Habits of the North American Indians' (1837).

Baraguay d'Hilliers, bă-ra-gā-de-yā', **Achille, Count,** marshal of France: b. Paris, 1795; d. 1878. He was the son of Louis Baraguay d'Hilliers (q.v.). In 1830 he took part in the expedition to Algeria, in which his success gained him the confidence of the government, which created him a lieutenant-general. In 1841 he was made governor-general of Algeria. On the fall of Louis Philippe in the revolution of 1848 the provisional government appointed him to the command of the military division of Besançon. He replaced Changarnier in the command of the Army of Paris, and concurred in the accomplishment of the *coup d'état* on 2 Dec. 1851. In the war with Russia in 1854 Baraguay d'Hilliers was commander-in-chief of the Baltic expedition, and for his services received the dignity of marshal of France, and later was nominated a senator. He took an active part in the campaign of 1859, when France leagued with Sardinia to free Italy from Austrian domination.

Baraguey d'Hilliers, Louis, French general: b. Paris, 1764; d. Berlin, 6 Jan. 1813. Receiving an appointment in the army of Italy from Napoleon, he shared all the success of the campaign of 1796–7. Made general of division and commandant of Venice, in 1798 he accompanied the expedition to Egypt; and afterward successively held appointments on the Rhine, in the Tyrol, and in Catalonia. He commanded a division in the Russian campaign of 1812, but during the retreat incurred the displeasure of Napoleon and appears to have died from chagrin and disappointment.

Baralt, bä-rält', **Rafael Maria,** Venezuelan poet and historian: b. Maracaibo, Venezuela, 2 July 1814; d. Madrid, Spain, 2 Jan. 1860. He was educated in Bogotá and at Caracas; served in the Venezuelan army, and went to Spain in 1843, where he held posts of honor and attained literary fame. He wrote 'Ancient and Modern History of Venezuela' (1841); and 'Odes to Columbus and to Spain.'

Baranoff, bä-rä'nōf, **Alexander Andrevich,** Russian trader: b. 1746; d. 1819. He founded a trading colony on Bering Strait (1796) and established commercial relations with the United States, China, and Hawaii. He was the first governor of Russian America.

Baranoff Island, the most important of the Alexander Islands, Alaska. It is about 75 miles long. On its northwest coast is the town of Sitka. The island derives its name from the Russian trader, Baranoff (q.v.), who in 1799 took possession of it.

Barante, bă-rănt, **Aimable Guillaume Prosper Brugière, Baron de,** French historian and statesman: b. Riom, Auvergne, 10 June 1782; d. 23 Nov. 1866. After filling some subordinate offices he was appointed in 1809 prefect of La Vendée. In this year was published his 'Tableau de la Littérature Français au XVIIIe Siècle,' of which Goethe has said that it contains neither a word too little nor a word too much. In 1815 Louis XVIII. made Barante secretary of the Ministry of the Interior, and about the same time he took his seat in the Chamber of Deputies, where he voted with the Moderate Liberals. In 1819 he was raised to the Chamber of Peers. His principal work, 'Histoire des Ducs de Bourgogne de la Maison de Valois, 1364–1477' (1824–8), secured his election to the Academy in 1828. Between 1830 and 1840 he represented France at Turin and St. Petersburg, but after the revolution of 1848 he devoted himself entirely to literary pursuits. Other works of his are: 'Histoire de la Conventionale' (1851–3); 'Histoire du Directoire' (1855); 'Etudes Historiques et Biographiques'; 'Etudes Littéraires et Historiques' (1858). Consult also 'Souvenirs du Baron de Barante' (1890–9).

Baran'ya, Hungary, a province of, bordering upon the Danube River, having an area of 1,966 square miles and a population of 361,743 in 1900.

Barasingha, băr-ạ-sĭn'gạ. See SWAMP-DEER.

Barata'ria Bay, a body of water in the southeastern part of Louisiana, extending north from the Gulf of Mexico, between the parishes of Jefferson and Plaquemine. It is about 15 miles long by 6 wide, and it and the lagoons branching out of it were rendered notorious about the years 1810-12 as being both the headquarters and rendezvous of the celebrated Lafitte and his buccaneers.

Barata'ria, Pirates of, a company of outlaws under the leadership of a notorious bandit, Jean Lafitte, who established their rendezvous in the Bay of Barataria, 40 miles south of New Orleans. They committed great depredations on English and Spanish shipping, but their colony was broken up in 1814 by a United States naval force. Lafitte and some of his men subsequently served under Jackson in the battle of New Orleans.

Bar'athron, the name of a deep gorge near Athens, into which criminals condemned to death were thrown. It was originally a quarry, but was enlarged in order to serve for purposes of punishment. Usually persons were thrown into it after execution, but occasionally while living.

Baratier, bä-rä-tēr', **Johann Philipp,** German littérateur, remarkable for the precocity of his intellect: b. Schwabach, 1721; d. Halle, 5 Sept. 1740. At the age of 7 he understood Greek and Hebrew, and 2 years later he compiled a Hebrew dictionary. He was 13 when he translated the 'Itinerary of Benjamin of Tudela.' Excess of work and perhaps a too rapid development of his intellectual faculties brought about a languid malady, and at the age of 19 he died.

Baratynski, bä-ra-tĭn'ske, **Jevgeni Abramovich,** Russian poet: b. within the government of Tambov, 1800; d. Naples, 1844. He enlisted as a private soldier at 18, and by 7 years' service in Finland fought his way to the rank of an officer, which, however, he soon resigned to devote himself to a literary life. His first poem, 'Eda,' is a mirror of Finnish life and feeling: his greatest, 'The Gypsy.'

Barb, a horse of the Barbary breed, introduced by the Moors into Spain, and of great speed, endurance, and docility. This breed is said to be a variety of the Arabian, and most of the progenitors of the present thoroughbred horse were of the same strain.

Bar'bacan, or **Barbican,** a projecting watch tower or other advanced work before the gate of a castle or fortified town. The term barbacan was more especially applied to the outwork intended to defend the drawbridge, which in modern fortifications is called the *tête du pont.* At the castles of Warwick and Alnwick the mediæval barbacans still remain, but the barbican gate at York is almost entirely of modern construction.

Barbacena, bär-ba-sā-'na, a flourishing town of Brazil in the State of Minas Geraes, 125 miles northwest of Rio de Janeiro. It is situated in the Mantiqueira Mountains, about 3,500 feet above the sea. Pop. 5,000.

Barba'dos, an island of the West Indies, lying in the Atlantic Ocean more than 100 miles east of the nearest members of the chain of Lesser Antilles. (See ANTILLES.) No other country, with the possible exception of some of the provinces of China, is more densely populated, the inhabitants (about 20,000 white persons, and approximately 169,000 negroes) averaging 1,120 to the square mile. The entire area of the island available for the purpose,— or 100,000 acres out of a total acreage of 106,470,— is under cultivation. Some of the white inhabitants are of the best English stock, being descendants of early settlers who were closely allied by the bond of blood or ties of friendship with the colonists of Virginia. The only foreign journey ever taken by George Washington was in 1752, when he visited this island in company with his invalid brother, Lawrence. The rainfall is abundant, and the climate agreeable, thanks to trade-winds blowing steadily across the Atlantic. Barbados is a colony of England, with its own governor, legislature, etc. In addition to many lesser educational institutions the island has Codrington College, which is affiliated with the University of Durham, England. Its principal city, Bridgetown, headquarters of the Royal Mail Steamship Company, is an attractive place of residence and a favorite resort of tourists. It is also the see of the bishop of Barbados. There is one narrow-gauge railway, and the highways are excellent. The chief and almost the sole industry is the cultivation of sugar-cane, to which the soil is peculiarly adapted. Food supplies are imported largely from the United States, to which country nearly the entire sugar product is sent. The value of the annual exports is about $3,600,000; of the average annual imports about $5,000,000. Like

Guadeloupe and its dependencies, and Désirade and Maria Galante, Barbados is a coral island. Its length is 21 miles, and its width 15 miles. It is situated in lat. 13° 4′ N., and lon. 59° 37′ W. Consult Stark, 'History and Guide to Barbados.'

MARRION WILCOX,
Authority on Latin-America.

Barba'dos Cedar, a cedar or juniper (*Juniperus barbadensis*). It is found in Florida and the other warm parts of America.

Barbados Cherry, a West Indian shrub or small tree (*Malpighia glabra*) of the natural order *Malpighiaceæ,* with handsome crimson axillary flowers, cultivated to some extent in warm countries for its acid fruit, inferior to but resembling a white cherry. *M. urens* also bears an edible but smaller fruit, and is sometimes also called Barbados cherry.

Barbados Flower Fence, or **Barbados Pride,** the beautiful plant *Poinciana pulcherrima.* It belongs to the leguminous order, and the sub order *Cæsalpinieæ.* It is a low, spiny tree with an odor like savin. It is a native of the tropics of both hemispheres, and in Barbados especially it is used for fence purposes.

Barbados Goose'berry, Blad Apple, or **Lemon Vine** (*Pereskia aculeata*), a shrubby, slender, tropical American cactus which bears lemon-yellow, smooth, edible pear- or egg-shaped fruits as large as olives. The species is widely used in greenhouses as a stock on which to graft other species of cacti. Its more sturdy relative, *P. bleo,* is similarly used for larger species of cacti.

Barbados Leg, a name frequently applied to the disease called elephantiasis. It is common in Barbados, and is endemic in many tropical and semi-tropical countries. See ELEPHANTIASIS.

Barbados Lil'y, the *Amaryllis equestris,* now called *Hippeastrum equestre,* an ornamental plant from the West Indies.

Bar'bara, Saint, virgin and martyr much honored in the Greek and Roman Catholic Churches who is supposed to have flourished in the 3d or early part of the 4th century. Her history has been related by various chroniclers, but with so many discrepancies that it is difficult to ascertain either the events of her life or the circumstances of her martyrdom. According to Jacobus de Voragine, the author of the 'Aurea Legenda,' she was born at Heliopolis, in Egypt, of pagan parents. On arriving at the age of womanhood she was very beautiful, and her father, fearing lest she should be taken from him, confined her in a tower, and in the pictures of this saint the tower is therefore one of her most frequent attributes. In her seclusion she heard of the preaching of Origen, and wrote to him begging for instruction, whereupon he sent one of his disciples, who taught and baptized her. On learning this her father was so incensed that he put her to death. Metaphrastes and Mombritius inform us that she was martyred at Heliopolis in the reign of Galerius, and their account agrees with the Emperor Basil's Menology and with the Greek Synaxary. Others again hold that she suffered at Nicomedia, in 235, under Maximian I. Her festival occurs 4 December.

Barbara Allen's Cruelty, an old English ballad preserved in Percy's 'Reliques.' While Barbara's lover, Jemmy Groves, was on his death-bed, her only remark to him was, "Young man, I think you're dying." For this unnatural composure she subsequently endured the pangs of remorse.

Barbara Frietch'ie, the title of a noted poem by Whittier (1863) founded upon an incident reported to have occurred in Frederick, Md., in the Civil War. Recent investigations have thrown some doubt upon the authenticity of the account. A play upon this theme has been written by the dramatist Clyde Fitch.

Bar'bara's History, a novel by Amelia Blandford Edwards, published in 1864. It is the romance of a pretty girl, clever and capable, who, passing through some vexations and serious troubles, settles down to an unclouded future.

Barbarelli, Giorgio. See GIORGIONE.

Barba'rian, a term used by the Greeks to designate a foreigner; one who could not speak Greek. At first the Romans were included by the Greeks under the term barbarian; but as the inhabitants of the great Italian city gradually gained imperial power, and, moreover, began to consider the Greek language a desirable if not even an indispensable part of a liberal education, they were no longer placed in the category of barbarians, nor was their speech deemed barbarous. When the Greeks became the most civilized people in the world, the term barbarian came to be used with some reproach, but less so than among ourselves now.

Barbaros'sa, Arooj, or **Horuk,** corsair chieftain, styled "Barbarossa" from his red beard. He was the son of a Greek at Mitylene, and in 1516 assisted Selim, king of Algiers, in driving the Spaniards out of that country. Having taken possession of the capital he put Selim to death and mounted the throne himself. He died in 1518.

Barbarossa, Khair-ed-Din, the younger brother and successor of the preceding. He surrendered the sovereignty of Algiers to Selim I., Sultan of Turkey, in exchange for a force of 2,000 janissaries and the title of dey. He was afterward appointed "captain pasha" or high admiral of the Turkish fleet, conquered Tunis, and in 1538 gained a victory over the imperial fleet under the command of Andreas Doria in the Bay of Ambracia. He died in 1546.

Barbaros'sa. See FREDERICK BARBAROSSA.

Barbaroux, bär-bä-roo, **Charles Jean Marie,** celebrated French revolutionist of the Girondin party: b. Marseilles, 6 March 1767; d. Bordeaux, 25 June 1794. At first an advocate and journalist at Marseilles, he was sent by that city to the Constituent Assembly at Paris. There he opposed the Court party and took part with the minister, Roland, then out of favor. After the events of 10 Aug. 1792 he returned to his native town, where he was received with enthusiasm, and was soon after chosen delegate to the convention. In the convention he adhered to the Girondists, and belonged to the party who at the trial of the king voted for an appeal to the people. He boldly opposed the party of Marat and Robespierre, and even directly accused the latter of aiming at the dic-

tatorship; he was, consequently, in May 1793 proscribed as a royalist and an enemy of the republic. He fled to Calvados, and thence with a few friends to the Gironde, where he wandered about the country, hiding himself as best he could for about 13 months. At last, on the point of being taken, he tried to shoot himself; but the shot miscarried, and he was guillotined at Bordeaux. He was one of the great spirits of the Revolution. There was no loftier-minded dreamer in the Girondist ranks; hardly a nobler head than his fell in that reign of terror.

Barbary, a general name for the most northerly portion of Africa, extending about 2,600 miles from Egypt to the Atlantic, with a breadth varying from about 140 to 550 miles; comprising Morocco, Fez, Algeria, Tunis, and Tripoli (including Barca and Fezzan). Bordered by the Mediterranean on the north, and by the Sahara on the south, the temperature of this region is generally moderate and remarkably uniform, seldom descending to the freezing-point, and seldom coming up to sultry. From March to September is the dry season, when the ground is frequently so parched as to render walking upon it impracticable. From September to March is the wet season, but the rains are moderate, and almost every day affords a respite of sunshine. The soil is fertile, though sandy and light on the coast, the climate healthy, and agricultural productions are various and abundant. The range of production gives a combination of both tropical and temperate fruits. Agriculture is, nevertheless, greatly neglected. For three centuries the inhabitants of the Barbary states have rendered themselves the pest of human society by their depredations upon the commerce of the seas. Anciently, all Africa was comprehended under two divisions — Egypt and Libya — while Libya was subdivided into northern and southern Libya. North Libya comprised mainly what is now known as the Barbary states. Herodotus says that in his day northern Libya was inhabited by the indigenous race of Libyans and by the foreign Phœnicians and Greeks. These latter settled at various points, from Egypt to Carthage, while the indigenous Libyans occupied from the east to the west, throughout the entire extent. Of the origin of the Libyans, whom Herodotus calls indigenous, we have no trace. Arabian tradition says they colonized Libya from Yemen. The Phœnicians early settled Carthage (869 B.C.) and perhaps the still more western coasts of Mauritania,— at least it appears that Carthage was a powerful state at the invasion of Greece by Xerxes. The Cyrenians, who were Greeks, had colonized at Cyrene, just east of the bay of the Mediterranean called Syrtis Major (Gulf of Sidra), in what is now known as Barca. West of Carthage lay Numidia and Mauritania, even to the Pillars of Hercules; east of Cyrene was Egypt; while between these two foreign colonies stretched the narrow coast line, from the Major to the Minor Syrtis, known as Emporia. The rapidly growing Carthaginian power soon extended colonies along the entire coast from the Pillars of Hercules to Grecian Cyrene. The jealousy of Rome was not long in being awakened against so threatening a rival. The history of the Punic wars is well known. At the end of 117 years the Carthaginian power was extinguished. Carthage herself in ruins, and Africa a Roman province from Mauritania to Cyrenaica. The more complete subjugation of Numidia was accomplished in the Jugurthine war, and that of Mauritania in the reign of Claudius. Thus the territory of the Barbary states, from independent native sovereignties and foreign colonies, had come into the hands of Rome. About 400 A.D. several Teutonic tribes, overrunning Gaul and crossing the Pyrenees, settled in Spain. When, in 428, Boniface revolted against Honorius, the Vandals crossed the Fretum Gaditanum into Africa, led by Genseric, drove out the inhabitants, utterly expelled the Roman power from upper Libya, and reigned 100 years. Then came the struggle under Justinian for the re-establishment of the Roman ascendency. By Belisarius it was conducted to a successful issue, and northern Africa was united to the eastern empire. For over 300 years this relation continued until about the middle of the 7th century; the Saracens overran Numidia and Mauritania to the Atlantic, and, notwithstanding the disastrous death of their leader Okba, the sceptre of upper Libya passed again from the hands of Rome into that of Arabia. Fifty years later the conquests of Musa and Tarik were pushed across the straits, and a Saracenic empire established in Spain. But the revolution which brought the Abbasides to the caliphate of Arabia and drove the only surviving caliph of the Ommiades into Spain, prepared the way for the independence of the western colonies, and Africa began to throw off the Saracenic yoke (788). A succession of fortunes now attended the states of upper Libya. For eight centuries they were alternately tributary and independent, passing from hand to hand, like the stakes of a faro bank, till in the 16th century the two brothers Barbarossa conquered the whole territory of Numidia and Carthage, and erected the regencies of Algiers and Tunis. A few years later the Turkish Sultan, whose supremacy the younger Barbarossa had acknowledged, erected the pashalic of Tripoli over the ancient Cyrenaica, while in the west there was a gradual consolidation of power into the hands of Mohammed ben Hamed, and his son, who finally established the dynasty of Sherifs in the empire of Morocco, while the French erected, between Morocco and the possessions of the Porte, the regency of Algeria. The religion of the Barbary states is generally Islamism. The European settlers are of course Christians, or Jews, while the blacks, who are slaves, are pagans. There seem to be at present six races or tribes of men inhabiting the Barbary States: (1) The Moors. (2) The Arabs. (3) The Berbers, who are indigenous, and from whom the states probably received the appellation Barbary. (4) The Jews. (5) The Turks, who are the military of the country. (6) The Blacks. The Arabs call the Barbary states *Moghreb* (west). The language of the people inland differs from that of Arabia and Syria, though not so much as on the coast. See ALGERIA; BARCA; FEZZAN; MOROCCO; TRIPOLI; TUNIS.

Bar'bary Ape, or **Magot,** a small species of ape of the genus *Macacus,* interesting as being the only animal of the monkey kind in Europe. It is found on the rock of Gibraltar, where the individuals are few in number; whence it has been concluded by M. de Blainville that they have sprung from domesticated

apes escaped from confinement in the houses of Gibraltar. The Barbary magot is a small tailless monkey completely covered with greenish-brown hair. In its wild state it is lively and intelligent, but becomes sullen and intractable in captivity.

Barbary Powers, U. S. Treaties and Wars with the. The four Mohammedan states of Morocco, Algiers, Tunis, and Tripoli, though either independent or nominally tributary to Turkey, were for some three centuries a common foe to Mediterranean commerce and travel. Almost their entire subsistence was on the produce of piracy: either the avails of captured stores, the ransoms for prisoners held in slavery, or the blackmail paid by other powers for immunity. The large states paid them a regular annual tribute,—though by joining forces they could have stopped the piracy at any time,—on the express ground that it gave them the monopoly of Mediterranean trade against the small ones which could not afford it; and England, which paid about $280,000 a year, deliberately put the price high to prevents others from bidding up to it. Even these sums bought only temporary truce, as the pirate state lived on depredations, and the tribute had to be supplemented with constant presents and concessions. A part of this tribute was always demanded in armed vessels, ammunition and naval stores, so that the civilized powers furnished the means for plundering themselves. The ransom of captives from them was a leading object of public and private charity, and collections were taken up in churches for this end. In 1786 there were 2,200 Christian captives in Algiers alone. When the United States began to send vessels to the Mediterranean no longer protected by the English flag, the pirates at once assailed them; and in July 1785, the Algerines captured 2 vessels and 21 men. Congress appropriated $80,000 in 1784 to buy immunity after the European model; but it seemed likely to cost nearer $1,000,000, and, reversing their usual parts, John Adams preferred to pay as a cheaper resort than fighting, while Jefferson considered fighting both cheaper, more honorable, and the preparation for a better future. Morocco, for some reason much the most amenable, signed in 1787 a 50-years' peace without tribute, though with the understanding of some presents to the Sultan, and kept it, save for a short time in 1803. The Dey of Algiers asked $59,496 for his captives, or over $2,800 each, though the last French captives ransomed had only cost $300, or with costs, $500; and the matter hung fire for several years, 11 of the 21 dying before the final ransom of 1795. In 1793, by the carelessness or bad faith of an English consul, the Algerine corsairs gained entrance to the open sea beyond the Strait of Gibraltar, and captured 10 United States vessels at a blow, the number of our captives in their hands in November being 115. Negotiations were set on foot, and on 5 Sept. 1795 Congress paid Algiers $992,463.25 for peace and the ransom of all our prisoners—this sum including a 36-gun frigate costing $99,727, and about $100,000 worth of stores and ammunition. It also engaged to pay $21,600 a year thereafter in naval stores, $20,000 on presentation of a consul, biennial presents of $17,000, and other regular and incidental gifts. In 1798 it sent four armed vessels as arrears. A treaty was made with Tripoli in November 1796, on much the same terms save that there were no ransoms; and one with Tunis, in 1799, for $107,000. The cost of immunities and ransoms in 1802 had been over $2,000,000; and of course even this bought nothing permanent. The pasha of Tripoli broke the treaty in three years and a half, demanding $225,000 with $25,000 annually, and on refusal declared war, 14 May 1801. A squadron under Commodore Dale was sent to the Mediterranean and blockaded Tripoli, also forcing Algiers and Tunis to think better of their threatened alliance with it and to renew their treaties. Morris succeeded him, but was soon recalled. Preble, who took his place, 1803–4, forced Morocco, which had joined Tripoli, to withdraw from the alliance and renew its treaties; carried on a vigorous blockade; and bombarded Tripoli five times. Barron succeeded Preble, but in the middle of 1805 turned over the command to Rodgers, who at once prepared for a grand bombardment and assault. The scale was turned, however, by William Eaton (q.v.), who took up the cause of the pasha's elder brother, Hamet Caramelli, driven from the throne some years before, organized at Alexandria a singular rabble of cosmopolites, and after a desperate six weeks' march across the desert, captured, with the aid of the navy, the seaport of Derne in Barca, several hundred miles east of Tripoli. The pasha feared an insurrection as well as Rodgers' attack; and hastily signed on 3 June 1805, with Tobias Lear, United States consul-general at Algiers, who had come to Tripoli on purpose, a treaty by which the United States paid $60,000 ransom for the prisoners, left Hamet's supporters to the pasha's vengeance and Hamet himself to beg the United States for a pension, and allowed the pasha four years to deliver up Hamet's wife and children. The need and honor of this abject surrender of our government belongs to historical polemics. The embargo of 1807 prevented further trouble for some years by annihilating our commerce; but after its removal in 1810 the depredations were renewed, and in 1812 Algiers was ready for more gratifications. The dey had received from us $378,363, but made out a case for $27,000 arrears, forced the United States consul to borrow it at usurious rates, and then ordering him out of the country, declared war. The War of 1812, however, having denuded the Mediterranean of our trading-vessels, he captured only 1 brig and 11 persons; and after the war our naval force under Decatur was turned against Algiers. He found its entire fleet at sea; captured two and cut off the rest from port; entered the city 30 June 1815, 41 days after sailing; and forced the dey to sign within three hours, without gift or present, on pain of having his city destroyed and his fleet captured, a treaty abolishing all tribute or presents of any sort thereafter from the United States, delivering up all his captives and agreeing that henceforth prisoners of war should not be made slaves, and paying indemnity for the captured brig. Tunis and Tripoli having allowed English ships to seize American prizes in their harbors, Decatur proceeded to both places and forced their rulers to make similar treaties, pay indemnities, and release all their Christian prisoners of whatever nations. This magnificent action of the United States induced the English

government to take similar steps the next year, but Tunis and Tripoli did not abandon piracy till 1819, and Algiers was not finally reduced till 1829 by France. It was the United States which first lifted this incubus of "Algerine" (as the entire system was compendiously called) piracy and slavery from the Christian world. See Schuyler, 'American Diplomacy' (1886); Henry Adams, 'History of the United States,' Vols. I., II., IX. (1889–90); Felton, 'Life of Eaton,' in Sparks, 'American Biography.' See Treaties; United States — Diplomacy of the.

Barbastro, bär-bä'strō, Spain, a city of Arragon, 30 miles east-southeast of Huesca. The city has straight, well-made, and paved streets, a cathedral with paintings by Galeran, parish church, college, Latin and three other schools, town-house, session-house, ecclesiastical court-house, extensive hospital, two prisons, several convents with churches attached, two palaces, a theatre, and bull-ring. It also possesses philosophical, agricultural, commercial, and other literary and beneficent associations. The manufactures of Barbastro have greatly declined, consisting only of hats, hardware, cutlery, shoes, and ropes; while a little trade is carried on in cattle, horses, and mules. Pop. (1901) 8,300.

Bar'bauld, Anna Letitia, English writer, daughter of the Rev. John Aikin: b. Kibworth, Leicestershire, 20 June 1743; d. 9 March 1825. She received from her father a classical education, and early showed a disposition for poetry. Her earliest production was a small volume of miscellaneous poems, printed in 1772, which in the year following was succeeded by a collection of pieces in prose, published in conjunction with her brother, Dr. John Aikin, of Stoke-Newington. In 1774 she married the Rev. Rochemont Barbauld. Her 'Early Lessons and Hymns for Children,' and various essays and poems, have secured for her a permanent reputation. In 1812 appeared the last of her separate publications, entitled 'Eighteen Hundred and Eleven,' a poem of considerable merit; previous to which she had edited a collection of English novels, with critical and biographical notices. A similar selection followed from the best British essayists of the reign of Anne, and another from Richardson's manuscript correspondence, with a memoir and critical essay on his life and writings. She will be longest remembered by her beautiful and much quoted lyric beginning: 'Life, we have been long together.' See Aikin, 'Works of A. L. Barbauld'; Mrs. Thackery-Ritchie, 'Book of Sibyls' (1883).

Barbazan, bär-bä-zŏn, **Arnauld Guilhem, Sire de,** French captain, distinguished by Charles VI. with the title of "Chevalier Sans Reproche," and by Charles VIII. with that of "Restaurateur du Royaume et de la Couronne de France": b. about the end of the 14th century; killed at Bullegneville, 1432. He earned the former of his titles, while yet young, by his successful defense of the national honor in a combat fought in 1404 between six French and six English knights, before the Castle of Montendre; and the latter designation he acquired by his extraordinary exertions on the side of the Dauphin, at a time when the cause of native royalty, powerless in presence of the Anglo-Burgundian league, boasted few adherents.

Barbé-Marbois, bär-bā-mär-bwä, **François, Marquis de,** French statesman: b. Metz, 3 Jan. 1745; d. 14 Jan. 1837. After fulfilling diplomatic offices at several German courts he was sent to the United States as consul-general of France. He organized all the French consulates in this country, in which he resided 10 years, and married the daughter of William Moore, governor of Pennsylvania. In 1785 he was appointed by Louis XVI. superintendent of St. Domingo, and introduced many reforms into the administration of justice and of finance in that island. He returned to France in 1790 and was again employed in German diplomacy. During the excitement of the Revolution he was exiled to Guiana as a friend of royalty, but being recalled in 1801 he was made director of the treasury, a title which he soon exchanged for that of minister. In 1803 he was appointed to cede Louisiana to the United States for $10,000,000, but had the skill to obtain the price of $16,000,000, a piece of diplomacy for which he was liberally rewarded by Napoleon. In 1813 he entered the Senate, and the next year voted for the forfeiture of the emperor and the re-establishment of the Bourbon dynasty. He was well received by Louis XVIII., appointed a peer of France and honorary counsellor of the university, and confirmed in the office of first president of the court of accounts, which he had formerly held. He was an object of the indignation of Napoleon after his return to France from Elba, and was ordered to leave Paris. He resumed his offices after the return of the Bourbons, but, moderate in his principles, and an enemy of all reaction, he was not in harmony with the majority of those with whom he associated; and in the Chamber of Peers he succeeded with difficulty in effecting the substitution of banishment for death as a penalty for political offenders. After the revolution of July he exercised the same adulation and took the same oaths of fidelity to Louis Philippe which he had formerly given to Napoleon and the Bourbon princes. The desire to die first President, which had been the motive of all his flexibility, proved at last a vain one, and in 1834 he was succeeded in his office, and as a consolation received the portrait of the king, accompanied by an autograph letter. His numerous works contain curious details concerning St. Domingo, Louisiana, and Guiana, which he studied in his exile, and he wrote also upon the treason of Arnold.

Bar'becue, a large gathering of people, generally in the open air, for a social entertainment or a political rally, the leading feature of which is the roasting of animals whole to furnish the members of the party with food. The word is said to have been employed in Virginia prior to 1700, and the institution of the barbecue is of southern origin.

Barbel (*Barbus*), a genus of fresh-water abdominal malacapterygious fishes, of the family *Cyprinidæ*, or carps, distinguished by the shortness of the dorsal and anal fins, a strong spine replacing the second or third ray of the dorsal, and four fleshy filaments growing from the lips, two at the nose and one at each corner of the mouth, and forming the kind of beard to which the genus owes its name. Of the several species, generally named after the country or river where they are found, the European one, com-

mon in most of the rivers of its temperate climates, and hence called *B. vulgaris*, is most deserving of notice. Its average length is from 12 to 18 inches, but individuals have been taken measuring 3 feet, and weighing from 15 to 18 pounds. The head is smooth and oblong, and the upper jaw is much longer than the lower. Its dorsal spine, which is strong and serrated, often inflicts severe wounds on the fishermen and damages their nets. It lives on small fishes, and also on aquatic plants, worms, and insects, which it obtains by boring with its barbels into the banks of the stream and turning up the loose soil. Its flesh is very coarse and unpalatable, and at the time of spawning, the roe is dangerous to eat. Another species, common in the Nile, is described as weighing upward of 70 pounds, and has a flesh which is fine, delicate, and well-flavored. When caught, the fisherman puts an iron through its jaw and fastens it by a short cord to the bank of the river, where it remains alive till required.

Barber, Edward Atlee, American archæologist: b. Baltimore, Md., 13 Aug. 1851. He was graduated at Williston Seminary in 1869, and was assistant naturalist in the U. S. Geological Survey in 1874–5. Subsequently he was engaged in gold-dredging. His writings include a history of the ancient Pueblos; a large number of magazine articles on ceramics; 'Pottery and Porcelain of the United States'; 'Manual for Collectors of Blue China'; 'Genealogies of the Barber and Atlee Families,' etc.

Barber, Francis, American soldier: b. Princeton, N. J., 1751; d. Newburg, N. Y., 11 Feb. 1783. He graduated at Princeton in 1767, and became principal of a school in Elizabethtown, where Alexander Hamilton was one of his pupils. He was successively major and lieutenant-colonel of the 3d New Jersey artillery, and assistant inspector-general under Baron Steuben. He took part in the battles of Trenton, Princeton, Brandywine, and Germantown, and was severely wounded at Monmouth and in Sullivan's Indian expedition, 1779. He was of the greatest service to Washington in securing intelligence of the enemy's movements and in putting down the mutiny of New Jersey and Pennsylvania troops. In 1781 he commanded a battalion of infantry in Lafayette's Virginia campaign, and was present at Yorktown. He was killed by a falling tree at the close of the war.

Barber, John Warner, American author: b. Windsor, Conn., 1798; d. 1885. He wrote a 'History of New Haven' (1831); 'Incidents of American History' (1847); 'Elements of General History' (1844); and 'Our Whole Country' (1861), etc.; and assisted in compiling the historical collections of New York, New Jersey, Virginia, and Ohio.

Barber, one who shaves beards and dresses hair. The occupation of barber is an institution of civilized life, and is only known among those nations that have made a certain progress in civilization. It is referred to by the prophet Ezekiel: «And thou, son of man, take thee a barber's razor, and cause it to pass upon thine head and upon thy beard.» (Ezek. v. 1.) We do not read of a barber at Rome till about the year 454 of the city; but there, as elsewhere, when once introduced, they became men of great notoriety, and their shops were the resort of all the loungers and newsmongers in the city. Hence they are alluded to by Horace as most accurately informed in all the minute history, both of families and of the state. But in early times the operations of the barber were not confined, as now, to shaving, hair-dressing, and the making of wigs; but included the dressing of wounds, blood-letting, and other surgical operations. It seems that in all countries the art of surgery and the art of shaving went hand in hand. The title of barber-chirurgeon, or barber-surgeon, was generally applied to barbers. The barbers of London were first incorporated by Edward IV. in 1461, and at that time were the only persons who practised surgery. The barbers and the surgeons were separated, and made two distinct corporations — in France, in the time of Louis XIV., and in England in 1745. The sign of the barber-chirurgeon consisted of a striped pole from which was suspended a basin; the fillet round the pole indicating the riband or bandage twisted round the arm previous to blood-letting, and the basin the vessel for receiving the blood. This sign has been generally retained by the modern barber. In the United States, however, it is only occasionally that the basin may be seen hanging at the door of a barber's shop. The character of the barber is amusingly illustrated in one of the tales of the 'Arabian Nights Entertainments,' and has been immortalized by Beaumarchais, Mozart, and Rossini, under the name of 'Figaro.'

Barber-fish. See SURGEON-FISH.

Bar'ber Poet, The. See JASMIN, JACQUES.

Bar'ber of Seville, The, a five-act comedy by Pierre Augustin Caron (who later assumed the *nom de guerre* BEAUMARCHAIS). It is the first of the Figaro trilogy, the later plays being the 'Marriage of Figaro' and the 'Guilty Mother.' Upon it have been founded 'Il Barbiere di Liviglia,' an opera by Paisiello (1780), and 'Il Barbiere di Liviglia,' an opera by Rossini, first presented in 1816 and ever since extremely popular.

Barberini, bär-bär-rē'ne, celebrated Florentine family which became powerful through Cardinal Maffeo Barberini, who was elected Pope in 1623 as Urban VIII. Few of the Popes have carried nepotism so far as Urban, who, during his reign of 21 years, seemed intent on only one object, the aggrandizement of his three nephews. Two of them were appointed cardinals, and the third became Prince of Palestrina. The principality of Palestrina continued in the possession of the Colonna branch of the family until 1889, becoming extinct in the male line in that year.

Barberini Faun, a famous piece of Greek sculpture, so called from its having once been in the possession of the Roman family of Barberini. It is now in the Glyptothek at Munich.

Barberini Palace, the residence of the Barberini family in Rome, begun by Pope Urban VIII., its most distinguished member, but not finished till 1640. It contains a famous picture-gallery and a library with over 10,000 volumes and 10,000 MSS.

Bar'berry (*Berberis*), a genus of about 100 species of low ornamental shrubs of the natural order *Berberidaceæ*, natives of temperate climates, sometimes subdivided into species with

simple deciduous leaves (*Berberis*) and species with pinnate persistent leaves (*Mahonia*, q.v.). The yellow flowers are succeeded by red, dark-blue, or black fruit which in some species is used for making jellies of beautiful color and distinct flavor; that of some other species is dried and used like raisins. The yellow roots and sometimes the stems of several species are used in dyeing, and the bark of some in tanning. Many of the species are used for ornament and for hedges, but in wheat-growing sections they should not be planted, because they are host-plants for the æcidium stage of wheat-rust (*Puccinia graminis*), which, however, has been known to develop in localities remote from barberry bushes. *B. vulgaris* and its varieties and *B. thunbergii* (considered by some botanists a form of *vulgaris*) are probably the most common and valuable simple-leaved species planted in America. The former, an American species, is a rather erect shrub about 10 feet tall, with large leaves and racemes of flowers which are followed by red fruits that persist during the winter and even well into the second summer; the latter, a Japanese species, is a low, spreading, graceful shrub with dainty little leaves which become brilliant red in autumn, and with solitary yellow flowers followed by orange-red persistent fruits. The stamens, which in many if not all species are sensitive, spring up when touched. Propagation is usually effected by means of seeds or cuttings of green wood, but sometimes by grafts and layers. For description of species cultivated for ornament in America, consult Bailey and Miller, 'Cyclopedia of American Horticulture' (1900–2).

Barberry Blight or **Rust.** See RUSTS.

Barbers' Itch. Two distinct diseases of the skin are known by this name — one of a parasitic nature, the other not parasitic. In the latter there is an inflammation of the hair follicles characterized by the formation of papules and pustules pierced by hairs. It affects the hairy part of the face and runs a chronic course. It is more inclined to affect the upper lip and upper parts of the face. The more important disease is the *Tinea barbæ*, or parasitic disease. Here the hair follicles are infected by a fungus, the *trichophyton*. It is a form of ringworm of the beard. It affects the lower part of the face and neck, causing itching, scaly eruptions that secrete a thick mucus and spread out ring-like from the centre. The disease is always contracted from another person or sometimes from lower animals. Uncleanly barbers' implements are the chief agents in its spread. In the early stages — the parasitic form — it is readily curable, but in the chronic stages it may prove very difficult to treat successfully.

Bar'berton, Ohio, city in Summit County, 7 miles from Akron, and 39 miles from Cleveland; on the Erie, the Baltimore & Ohio, and the Pennsylvania Railroads. The town was founded in 1893 by O. C. Barber, president of the Diamond Match Company, whose works are located here. It is known as the "magic city" having acquired a population of 7,000 in less than 10 years. It is a progressive manufacturing centre having sewer-pipe mills, rubber works, potteries, iron works, paint mills, salt wells, strawboard works, and other industries. The city is governed by a mayor and city council elected biennially.

Barbès, Armand, bär-bĕs, är-mŏñ, French politician and revolutionist: b. Island of Guadaloupe, 1810; d. 1870. At an early age he was taken to France, and in 1830 went to Paris to attend the law classes, where he had an opportunity of manifesting his political opinions at that period of public excitement. During the whole reign of Louis Philippe he was constantly engaged in conspiracies. In consequence of an unsuccessful attempt to overthrow the government he was condemned to death, a sentence which was commuted to perpetual confinement. The revolution of 1848 restored Barbès to liberty. He then founded a club, which took his name, in which the doctrines of socialism were superadded to republicanism. After the insurrection of May 1849, Barbès was sentenced to deportation. In 1854 he was again set at liberty, and left France, a voluntary exile.

Bar'bet, any of the tropical South American birds of the families *Capitonidæ* and *Bucconidæ*, both of which are characterized by prominent bristles about the mouth, which assist them in catching flying insects. The birds of the former family are more usually called "thickheads," and those of the latter "puff-birds" (qq.v.).

Barbette, bär-bĕt', the platform or elevation of earth behind the breastwork of a fortification or an intrenchment, from which artillery may be fired over the parapet. An ascent leads from the interior of the intrenchment to the barbette. When the garrison has much heavy ordnance, or the enemy has opened his trenches, or when it is determined to cannonade the intrenchments of a given point,— as, for example, a bridge or pass,— and the direction of the cannon is not to be materially changed, it is usual, instead of making a barbette, to cut embrasures in the parapet; on the contrary, firing from the barbette is expedient when one expects to be attacked only by infantry, or wishes to cannonade the whole surrounding country. See FORTIFICATION.

Barbette Gun. See ORDNANCE.

Barbette Turret. See TURRET.

Barbey d'Aurevilly, bär-bā-dō-rĕ-vē-yę, **Jules,** French critic and novelist: b. Saint-Sauveur-le-Vicomte, Manche, 2 Nov. 1808; d. Paris, 24 April 1889. As a contributor to the *Pays* in Paris he created a sensation by the unreserved tone and peculiar style of his literary criticisms. He wrote 'On Dandyism and G. Brummel' (1845); 'The Prophets of the Past' (1851); 'Gœthe and Diderot' (1880); 'Polemics of Yesterday' (1889); 'Nineteenth Century: The Works and the Men' (1861–92). Of his novels the best are 'The Bewitched' (1854); and 'The Chevalier des Touches' (1864).

Barbiano, bär-byä'nō, Abrechtda, an Italian military officer, who formed the first regular company of Italian troops organized to resist foreign mercenaries, about 1379. This organization, named the "Company of St. George," proved to be an admirable school, as from its ranks sprang many future officers of renown. He became grand constable of Naples in 1384, and died in 1409.

Bar'bican. See BARBACAN.

Barbié du Bocage, bär-byā-dü-bō-kazh, **Jean Denis,** distinguished French geographer: b. Paris, 1760; d. there 1825. He laid the foun-

dation of his fame in 1788 by the publication of his beautiful Atlas to the 'Voyage du Jeune Anacharsis,' and was appointed in 1792 keeper of the maps of the Royal Library, and in 1809 professor at the Sorbonne. In 1821 he founded the Geographical Society, of which he became president. He was also a member of the Institute. His maps and plans to the 'Voyage Pittoresque en Grèce, de Choiseul Gouffier,' and to the works of Thucydides, Xenophon, etc., exhibit much erudition. He also prepared many modern maps, and published excellent dissertations in various scientific collections. Although the progress of time has necessarily deprived much of his work of its original value, his labors have not the less given a decided stimulus to the progress of science.

Barbier, bär-byā, **Antoine Alexandre,** French bibliographer: b. Coulommiers, 1765; d. 1825. In 1794 he went to Paris, where he was chosen a member of the committee appointed to collect works of literature and art existing in the monasteries, which were then suppressed. This was the cause of his being appointed in 1798 keeper of the library of the Conseil d'État, collected by himself, and when it was transported to Fontainebleau in 1807 Napoleon appointed him his librarian. On the return of the king he had the care of his private library. His excellent 'Catalogue de la Bibliothèque du Conseil d'État' (1801–3) is now very rare. His 'Dictionnaire des Ouvrages anonymes et pseudonymes' (1806–9, 4 vols., 3d ed. 1824), is, on account of its plan, its accuracy, and its fulness (at least in respect to French literature), one of the best works in this branch of bibliography.

Barbier, Henri Auguste, French poet: b. Paris, 29 April 1805; d. Nice, 12 Feb. 1882. Having written a historical novel (1830) with Royer, depicting French mediæval society, he entered his proper sphere, that of poetical satire, in which he obtained a brilliant success with 'The Iambes' (1831; 31st ed., 1882), a series of poignant satires, political and social, lashing the moral depravity of the higher classes,— notably the ignoble scramble for office under the new government, the subject of 'The Quarry,' the most famous among these satires. His next works, 'Lamentation' (1833), bewailing the misfortunes of Italy, and 'Lazarus' (1837), in which he describes the misery of the English and Irish laborer, show a considerable falling off; and in those that followed, the poet of 'The Iambes' is scarcely to be recognized. He was elected to the Academy in 1869.

Barbier, Paul Jules, a prolific French dramatist: b. Paris, 8 March 1825; d. 1901. Having won success with his first effort, 'A Poet' (1847), a drama in verse, he produced 'The Shades of Molière' (1847); 'André Chenier' (1849); 'Willy Nilly,' a comedy (1849); and thereafter in collaboration, mostly with Michel Carré, a number of dramas and vaudevilles, also countless librettos for comic operas. After the war of 1870-1 he published 'The Sharpshooter, War Songs' (1871), a collection of patriotic poems; and later two other volumes of lyrics, 'The Sheaf' (1882) and 'Faded Flowers' (1890); besides 'Plays in Verse' (2 vols., 1879).

Barbier de Seville. See Barber of Seville.

Barbiera, bär-byā'ra, **Raphael,** Italian poet and journalist: b. Venice, 1851. His contributions to periodical literature are particularly valuable, and he has published also several works on Italian literature and numerous anthologies.

Barbieri, Giovanni Francesco. See Guercino.

Barbieri, Giuseppe, Italian poet and pulpit orator: b. Bassano, 1783; d. Padua, 1852. He was distinguished for the tasteful eloquence of his sermons.

Barbizon, bär-bę-zôn, a village on the skirts of the forest of Fontainebleau; a favorite haunt of artists and tourists which has given its name to a school of French landscape painters. See also Barbizon School.

Barbizon School, the name applied to a school of French artists who settled in the village of Barbizon about 1844. Théodore Rousseau was the earliest of these, and after 1849 Jean François Millet lived in Barbizon; also Corot, Troyon, Diaz, and Daubigny were of this school, and the term came presently to denote those artists who went to nature for inspiration. See Millett, 'The Painters of Barbizon' (1890). Also see Corot; Millet.

Barbo'sa, Duarte, Portuguese traveler: b. Lisbon, 1480; d. 1521. He traveled all through India, visited the Molucca Islands, and was Magellan's companion and historiographer in his circumnavigation of the globe. He was murdered by the natives of the island of Cebu.

Barbou, bär'boo, the name of a celebrated French family of printers, the descendants of John Barbou, of Lyons, who lived in the 16th century. From his press issued the beautiful edition of the works of Clement Marot in 1539. His son, Hugh, removed from Lyons to Limoges, where among other works, his celebrated edition of 'Cicero's Letters to Atticus' appeared in 1580. Joseph Gerard, a descendant of the same family, settled in Paris, and continued in 1755 the series of Latin classics in duodecimo,— rivals to the Elzevirs of an earlier date,— which had been begun in 1743, by Coustelier. This series of classics is much prized for its elegance and correctness.

Barbour, bär'bėr, **Erwin Hinckley,** American geologist: b. near Oxford, O. He was assistant palæontologist in the United States geological survey in 1882–8; Stone professor of natural history and geology in Iowa College in 1889–91; became professor of geology in the University of Nebraska, and acting State geologist in 1891; and curator of the Nebraska State Museum in 1892. In 1893 he took charge of the annual Morrill geological expeditions, and since then he has also been engaged in the United States geological and hydrographic surveys.

Barbour, James, American statesman: b. Orange County, Va., 10 June 1775; d. 8 June 1842. He was admitted to the bar when 19 years old. He served in the Virginia legislature 1796–1812, becoming governor of the State in the latter year. Three years later he was elected to the United States Senate. He was secretary of war 1825–7, and minister to England 1828–9. In politics he was strongly anti-Democratic. He was chairman of the convention which nominated Harrison and Tyler for the presidency and vice-presidency.

Barbour, John, Scottish poet, of whose life but little is known. He is supposed to have been born about 1316; was educated at Oxford and Paris; and was a clerk in the king's household. He died in Aberdeen, 13 March 1395. His great epic, 'The Bruce,' tells the story of Robert Bruce and the battle of Bannockburn. It was written in 1375 and brought him favor from the king. First printed in Edinburgh in 1571; best modern edition by Skeat (Early English Text Society). He also wrote 'Legends of the Saints,' of 33,533 verses; and a fragment on the Trojan war.

Barbour, John Humphrey, American educator: b. Torrington, Conn., 29 May 1854; d. 29 April 1900. He was graduated from Trinity College in 1873, and ordained in the Protestant Episcopal Church in 1878. He was rector of Grace Church, Hartford, till 1889, and then became professor of New Testament literature and interpretation at the Berkeley Divinity School.

Barbour, Oliver Lorenzo, American lawyer: b. Cambridge, N. Y., 12 July 1811; d. 17 Dec. 1889. He received an academical education, and was admitted to the bar in 1832. During 1847–76 he was reporter of the New York court of chancery and the New York supreme court. He compiled a large number of legal digests, treatises on several branches of practice, and annotated editions of Collyer's, Chitty's, and Cowen's works.

Barbour, Philip Pendleton, American jurist: b. Orange County, Va., 25 May 1783; d. 24 Feb. 1841. He studied law at William and Mary College and began to practise in 1802. He led the war party in the Virginia legislature 1812–14, when he was elected to Congress, becoming speaker of the House in 1821. Four years later he was appointed a judge in his native State, returning to Congress in 1827; but later resigning through ill-health. He was subsequently appointed a Federal judge, and in 1836 was promoted to the supreme court of the United States. In politics he was a Democrat.

Barbour, William McLeod, American Congregational clergyman: b. Fochabers, Scotland, 29 May 1827; d. Malden, Mass., 5 Dec. 1899. He was graduated from Oberlin College in 1859, and from Andover Theological Seminary in 1861; was pastor in South Danvers (now Peabody), Mass., 1861–8; professor in Bangor Theological Seminary 1868–77; professor of divinity and college pastor in Yale 1877–87; and became principal and professor of theology in the Congregational College in Montreal, Canada, in 1887–96.

Barboursville, Ky., a town and county-seat of Knox County, 185 miles southeast of Louisville, on the Cumberland River, and the Louisville & N. R.R. The chief industries are mining and lumbering, but oil wells have recently been drilled and the region is being rapidly developed. Pop. (1900) 1,010.

Barboursville, W. Va., a town of Cabell County, situated on the Guyandotte River, and on the Chesapeake & O. and Guyandotte Valley R. R.'s It is the seat of Barboursville College, a Methodist institution, and is of historic interest as the scene of a Federal victory in the Civil War, 13 July 1861. Pop. (1901) 429.

Barbox Brothers, a short story by Dickens, with a second part known as 'Barbox Brothers & Co.'

Barbuda, bär-boo'da, West Indies, one of the Leeward Islands, belonging to Great Britain. It has a fertile soil, and produces tobacco, cotton, corn, and pepper. There are forts on the west side of the island, and a roadstead, but no port. The population is almost entirely negroes, and numbers less than 1,000.

Barbudo, bär-boo'dō, or **Barbu,** Spanish names in the West Indian region for the strange fishes of the family *Polynemidæ*. See MANGO-FISH.

Bar'by, Prussia, a town in the province of Saxony, on the left bank of the Elbe, 16 miles south-southeast of Magdeburg. It is well built and has an old castle, and manufactures of linen and cotton, soap-works, breweries, and distilleries. Pop. (1900) 5,137.

Bar'ca, a province of northern Africa, lying east of Tripoli, and belonging to Turkey, about 500 miles long by 400 miles wide. It forms a portion of the ancient Cyrenaica, in its widest sense, where the Greeks had two flourishing colonies. The Greeks were followed in possession of the country by the Romans, and the monuments of both peoples remain in the ruins of their cities. The sides and summits of the hills in the east and north are fertile, and yield abundant crops and excellent pasture. The loftiest heights do not exceed 1,800 feet. Flowering shrubs occur in great variety, including among others, roses, laurestinas, honeysuckles, etc. The Bedouin inhabitants have numerous camels and other cattle, constituting their principal wealth. Among beasts of prey the most common are hyenas and jackals; noxious insects also abound. There are hardly any permanent streams, most of the water-courses being of the nature of mountain torrents, which lose themselves in the sands of the Libyan Desert. The eastern portion, however, is tolerably well supplied with water by rains and springs. The chief exports of the country consist of grain and cattle, along with ostrich feathers and ivory, brought by caravans from the interior. Next to Bengazi, the capital, the seaport of Derna is the chief town. Barca used to form a dependency of Tripoli, but since 1879 has been an independent vilayet of the Turkish empire. The population is variously estimated, but probably does not much exceed 325,000.

Barcarolle, bär'ka-rōl, a song of the gondoliers at Venice, often composed by themselves, to some simple and pleasing melody, such as may be timed to the stroke of the oar. Such melodies are sometimes introduced into operas, and have been written for the piano.

Barcellona, bär-chĕl-lo'na, Sicily, a town in the province of Messina, situated on the Songanto River, 27 miles west of the town of Messina. It is noted for its sulphur baths which are frequented from May to September. It has a considerable trade, mostly in oil and fish. Pop. (1901) 23,493.

Barcelo'na, the second largest city of Spain. It is the capital of the province of the same name and of the military department of Catalonia, and is handsomely built, in the shape of a half-moon, on the coast of the Mediterranean, between the mouths of the Llobregat and the Besos. It was, even in the Middle Ages, one of the principal commercial places on this sea; is fortified; and has on the east side a

strong citadel, built in 1715. On the west lies the hill of Monjuich, with a fort which protects the harbor. Barcelona is divided into an upper and lower town, and contained, including the adjoining Barcelonetta, 509,589 inhabitants in 1897. Its manufactures are the most important in Spain. The principal are cottons, silks, woolens, machinery, iron castings, paper, glass, mathematical instruments, chemicals, stoneware, soap. There are also dyeworks, tanneries, etc. The harbor is spacious, and has an entrance 300 yards wide between two long piers. The entrance is protected by a large mole, which has been recently extended, and there is a large dry-dock. The exports largely consist of manufactured goods, wine and brandy, fruit, oil, etc. The so-called Barcelona (hazel) nuts are not exported from Barcelona, but from Tarragona. The city contains a university (in a noble pile of buildings begun in 1872), several libraries, a museum, a school for engineers and artillery, an academy of belles-lettres, a foundling hospital, a general hospital, large enough to contain 3,000 sick persons, a deaf-and-dumb institution, a large arsenal, a cannon foundry, several large theatres, a cathedral dating from the 13th century. It is altogether a beautiful and agreeable town, with various interesting features and highly picturesque surroundings. Electric lights and electric tramways have been introduced. Barcelona was an important city from a very early date, and was from the 9th till the 12th century governed by its own counts; but afterward by the marriage of Raymond IV. with the daughter of Ramiro II., king of Aragon, it was united with that kingdom. In 1640 it withdrew, with all Catalonia, from the Spanish government, and submitted to the French crown; in 1652 it submitted again to the Spanish government; in 1697 it was taken by the French, but restored to Spain at the Peace of Ryswick. In the war of the Spanish Succession Barcelona took the part of the Archduke Charles; but in 1714 was besieged by the troops of Philip V., under the command of the Duke of Berwick, and taken after an obstinate resistance. The strong citadel on the east side of the city was then erected to overawe the inhabitants. On 16 Feb. 1809, Barcelona was taken by surprise by the French troops under Gen. Duhesme, and remained in the power of the French till, in 1814, all their troops were recalled from Catalonia to defend their own country. In 1821 the yellow fever carried off 40,000 of the inhabitants. The city has been the scene of many serious and sanguinary revolts, particularly in 1832, 1836, 1840, and 1841. Latterly, industry and commerce have rapidly increased, the construction of railways contributing to this result. This city is regarded as the centre of anarchist movements in Spain.

Barcelona, Venezuela, the capital of a district and of the State of Bermudez, near the mouth of the Neveri, 160 miles east of Caracas. The surrounding country is fertile, but the city is very unhealthy. Cattle, jerked beef, hides, indigo, cotton, and cacao are the chief exports. Pop. (1900) about 13,000. The district, formerly a separate state, has since 1881 formed one of the divisions of the State of Bermudez.

Barchester Towers, a novel by Anthony Trollope. It is the second of the eight volumes comprised in his 'Chronicles of Barsetshire,' and is a study of social life in the clerical circle centring at the episcopal palace of Barchester.

Barclay, Alexander, English, or more probably Scottish, poet: b. about 1475; d. 1552. Very little is known concerning him except from his writings, which inform us that he was a priest and chaplain at St. Mary Ottery, in Devonshire, and afterward a Benedictine monk of Ely. His principal work is a satire, entitled 'The Shyp of Folys of the Worlde,' a free translation of a German composition. Barclay also wrote Eclogues, which are curious and interesting for the descriptions they afford of the characters and manners of the age.

Barclay, James, Canadian educator: b. Paisley, Scotland, 19 June 1844. He was licensed by the Paisley Presbytery in 1870; and was called to St. Paul's Church, in Montreal, in 1883. While in Scotland he was frequently summoned to Balmoral to preach before Queen Victoria. He served through the Riel rebellion in the Northwest Territories, in 1885, and, besides being connected with various local institutions, has been president of Trafalgar Institute since its opening.

Barclay, John, Scottish poet: b. Pont-à-Mousson, France, 1582; d. 1621. He accompanied his father to England, where he was much noticed by James I., to whom he dedicated a politico-satirical romance, entitled 'Satyrikon,' in Latin, directed against the Jesuits. He wrote also several other works, among which is a singular romance, in elegant Latin, entitled 'Argenis,' which first appeared at Paris in 1621. It is an allegory, of a character similar to that of Satyrikon, and alludes to the political state of Europe, and especially France, during the league. Like the earlier work, it has been several times reprinted, and has also been translated into several of the modern languages, including English.

Barclay, John, Scottish anatomist: b. Perthshire, 1760; d. Edinburgh, 1826. He studied divinity and was licensed as a preacher at Dunkeld. In 1789 he commenced the study of anatomy, and graduated in 1796, when he visited London and studied under Dr. Marshall. On his return to Edinburgh in 1797, he gave lectures on anatomy. He published several works on subjects connected with the sciences of medicine and surgery; he also made some efforts toward reforming the system of nomenclature then in use among anatomists. He bequeathed his valuable anatomical collection to the Royal College of Surgeons of Edinburgh, where it is known as the Barclayan Museum. He published 'Description of the Arteries of the Human Body' (1812).

Barclay, Robert, a distinguished member of the Society of Friends: b. 23 Dec. 1648, at Gordonstown, in the County of Moray, of an ancient and honorable family; d. 3 Oct. 1690. The troubles of the country induced his father, Col. Barclay, to send him to Paris, to be educated under the care of his uncle, who was principal of the Scots College in that capital. Under his influence he was easily induced to become a convert to the Roman Catholic religion, upon which his father sent for him to return home; and Col. Barclay soon after becoming a Quaker, his son followed his example. Uniting all the advantages of solid learning to great natural abilities, he soon distinguished himself by his talents and zeal in the support of his new opinions. His first treatise in support of

his adopted principles was published at Aberdeen in the year 1670, under the title of 'Truth Cleared of Calumnies,' etc. To propagate the doctrines, as well as to maintain the credit he had gained for his sect, he published, in 1675, a regular treatise, in order to explain and defend the system of the Quakers, which production was also very favorably received. These and similar labors involved him in controversies with the leading members of the University of Aberdeen, and others; but he was at the same time busy with his great work in Latin, 'An Apology for the True Christian Divinity, as the Same is Preached and Held Forth by the People in Scorn Called Quakers,' published at Amsterdam in 1676; an English translation appeared later in the same year. He traveled with William Penn and George Foxe through the greater part of England, Holland, and Germany, to spread the opinions of the Quakers. The last of his productions, in defense of the theory of the Quakers was a long Latin letter addressed, in 1676, to Adrian de Paets, 'On the Possibility and Necessity of an Inward and Immediate Revelation.' It was not published in England until 1686. With few exceptions, both partisans and opponents unite in the profession of great respect for the character and talents of Barclay. Besides the works already mentioned or alluded to, he wrote 'Cathechism and Confession of Faith' (1673); 'Theses Theologiæ' (1675), of which the Apology was a defense; 'The Anarchy of Ranters' (1676); 'Universal Love Considered and Established Upon Its Right Foundation' (1677); and various replies to the most able opponents of his Apology. In 1692 a collected edition of his works appeared under the title 'Truth Triumphant.' It was republished in 1717–18.

Barclay-Allardice, Robert, known as Capt. Barclay, the pedestrian: b. 1779; d. 8 May 1854. He entered the army (1805), and served in the Walcheren expedition (1809), but afterward devoted himself to agriculture, cattle-breeding, and the claiming of earldoms (Airth, Strathearn and Menteith). His feat of walking 1,000 miles in 1,000 consecutive hours took place at Newmarket, in June and July, 1809.

Barclay de Tolly, Michael, Prince, distinguished Russian general: b. Livonia, 1761; d. Insterburg, 14 May 1818. He entered the army at an early age, and his long service as a subordinate in campaigns against the Turks, Swedes, and Poles, laid the basis of a valuable experience, and served to develop his great natural capacity for command. In 1810 he was named minister of war. He occupied this position in 1812, when Napoleon invaded Russia, but was soon appointed to the chief command of the army. He adopted a plan of retreat, which was soon seen to be a strict necessity, as the Russian army, officially estimated at more than 500,000, did not greatly exceed 100,000 men. In this difficult campaign Barclay proved no unworthy opponent of Napoleon himself. Notwithstanding, the Russians became impatient of a policy which seemed to show no active results, while jealousy of the Scottish extraction of Barclay and other causes completed his overthrow, and after the capture of Smolensk by the French he was superseded by Kutusoff. Serving under his successor, he commanded the right wing of the Russian army at the battle of Moscow, maintained his position, and covered the retreat of the rest of the army. After the battle of Bautzen, in 1813, at which he again distinguished himself, he was reappointed to the chief command, which he had soon after to resign to Prince Schwarzenberg. He forced the surrender of Gen. Vandamme, who had been detached by Napoleon for some special operations, after the battle of Dresden, and took part in the decisive battle of Leipsic. On crossing the Rhine at the head of the Prussian troops he issued a strict proclamation, forbidding all license on the part of his soldiers, and by the maintenance of an exact discipline he conciliated the French as much as possible to the invaders. He was made a field-marshal in Paris. In 1815 he commanded a mixed corps of continental troops. In this year he received from the emperor the title of prince, and from Louis XVIII. the badge of the order of Military Merit. The Emperor Alexander caused a statue to be erected to him in one of the principal places of St. Petersburg.

Barclay Sound, an inlet on the west coast of Vancouver Island. It is some 35 miles in extent and the Alberni Canal continues it yet farther inland. It contains several islands and iron ore is found along its shores.

Bard, John, American physician: b. near Philadelphia, February 1716; d. 30 March 1799. He was of a family which had fled from France upon the revocation of the edict of Nantes. He practised his profession a few years in Philadelphia, but removed to New York in 1746, where he rose to the first rank among physicians. In 1759, the citizens of New York were alarmed by the arrival of a ship, on board which a malignant fever was raging, and Dr. Bard was appointed to take measures to prevent the disease from spreading. He succeeded in keeping the pestilence within the limits of a temporary hospital, but to guard against similar dangers in future, at his suggestion, Bedloe's Island was purchased, and hospital buildings erected thereon, which were placed under his charge. He continued the practice of his profession to an advanced age, and upon the establishment of the New York Medical Society in 1788, was elected its first president.

Bard, Samuel, American physician: b. Philadelphia, 1 April 1742; d. 24 May 1821. He practised in Philadelphia and New York; organized the medical school of Kings (Columbia) College, and was dean of the faculty; also was president of the New York College of Physicians and Surgeons that succeeded the medical school. He published several works, including 'The Shepherd's Guide' (1807); and a 'Manual of Midwifery' (1807).

Bard, Thomas Robert, American politician: b. Chambersburg, Pa., 8 Dec. 1841. He engaged in railroading in Maryland 1858–64, when he went to California to look after the interests of Col. Thomas A. Scott. Since then he has resided in Ventura County, engaging in wharving and warehousing, banking, sheep grazing, real estate, and petroleum mining. In 1892 he was the only Republican elector for California. He was elected to the United States Senate 7 Feb. 1900 by the unanimous vote of the Republican majority in the legislature.

Bard, a fortress and village in Italy, about 23 miles southeast of Aosta. When the French crossed the St. Bernard, in 1800, the fortress of Bard, manned by 400 Austrians, maintained for 10 days a resistance to their further advance into Italy. Ultimately Napoleon contrived to elude the vigilance of the garrison, and passed by a mountain-track during the night.

Bard, a designation applied to the ancient poets of the Celtic tribes, who, in battle, raised the war-cry, and in peace sang the exploits of their heroes, celebrated the attributes of their gods, and chronicled the history of their nation. Their early history is uncertain. Diodorus tells us that the Celts had bards, who sang to musical instruments; and Strabo testifies that they were treated with respect approaching to veneration. There is a passage in the 'Germania' of Tacitus in which a word occurs that some have read as *barditus,* and translated BARD'S SONG; but *baritus* appears to be the true reading, and the true signification merely WAR-CRY. The first Welsh bards of whom anything is extant are Taliesin, Aneurin, and Llywarch Hen, of the 6th century; but their language is imperfectly understood. From the days of these early representatives of the bards we have nothing further till the middle of the 10th century, when the reputation of the order was increased under the auspices of Howel Dha. A code of laws was framed by that prince, to regulate their duties and fix their privileges. They were distributed into three classes, with a fixed allowance; degrees of rank were established, and regular prize contests, known as *eisteddfods,* were instituted. Their order was frequently honored by the admission of princes, among whom was Llewellyn, last king of Wales. The Britons, kept in awe as they were by the Romans, subsequently harassed by the English, and eternally jealous of the attacks, the encroachment, and the neighborhood of aliens, were, on this account, attached to their Celtic manners. This situation and these circumstances inspired them with a proud and obstinate determination to maintain a national distinction, and preserve their ancient usages, among which the bardic profession is so eminent. Sensible of the influence of their traditional poetry in keeping alive the ideas of military valor and of ancient glory among the people, Edward I. is said to have collected all the Welsh bards, and caused them to be hanged by martial law as stirrers up of sedition. On this incident is founded Gray's well-known ode 'The Bard.' We, however, find them existing at a much later period, but confining themselves to the humble task of compiling private genealogies. But little is known of the music and measures of the bards; their prosody depended much on alliteration; their instruments were the harp, the pipe, and the crwth. Attempts have been made in Wales for the revival of bardism, and the Cambrian Society was formed in 1818, for the preservation of the remains of this ancient literature, and for the encouragement of the national muse. The bardic institution of the Irish bears a strong affinity to that of the Welsh. The genealogical sonnets of the Irish bards are still the chief foundations of the ancient history of Ireland. Their songs are strongly marked with the traces of Skaldic imagination, which still appears among the «tale-tellers,» a sort of poetical historians, supposed to be the descendants of the bards. There was, also, evidently a connection of the Welsh with Armorica. Hence, in the early French romances, we often find the scene laid in Wales; and, on the other hand, many fictions have passed from the Troubadours into the tales of the Welsh. In the Highlands of Scotland there are considerable remains of compositions supposed to be those of their old bards still preserved. Of these, the poems of Ossian, said to be collected and translated by MacPherson, were the most celebrated, but the best authorities have decided that they are spurious.

Bardell', Mrs., the obliging landlady of Mr. Pickwick in Dickens' 'Pickwick Papers,' and the heroine of the famous 'Bardell vs. Pickwick' case.

Bardesanes, bär-dē-sā'nēz, Syrian poet and theologian, who lived in the latter half of the 2d century, in Edessa, and is memorable for the peculiarity of his doctrines. He considered the evil in the world only an accidental reaction of matter, and all life as the offspring of male and female Æons. From God, the inscrutable Principle of all substances, and from the consort of this first Principle, proceeded Christ, the Son of the Living, and a female Holy Ghost; from these, the spirits or created powers of the four elements; thus forming the holy eight, or the godlike fulness, whose visible copies he found in the sun, moon, and stars, and therefore attributed to these all the changes of nature and of human destiny. The female Holy Ghost, impregnated by the Son of the Living, was, according to him, the Creator of the world. The human soul, originally of the nature of the Æons, was confined in the material body only as a punishment to its fall, but not subjected to the dominion of the stars. He considered Jesus, the Æon destined for the salvation of souls, only a feigned man, and his death only a feigned death, but his doctrine the sure means to fill the souls of men with ardent desires for their celestial home, and to lead them back to God, to whom they go immediately after death, and without a resurrection of the earthly body. Bardesanes propagated this doctrine in Syrian hymns, and is the first writer of hymns in this language. The Bardesanists did not formally separate themselves from the orthodox Christian Church, and they maintained themselves until the 5th century. A fragment of the work of Bardesanes upon destiny is preserved in the Greek language, by Eusebius, 'Præpar. Evangel. lib. vi. cap. 10.' He led an irreproachable life.

Bardili, Christoph Gottfried, German metaphysician: b. Blaubeuren, Würtemberg, 28 May 1761; d. Stuttgart, 5 June 1808. He was distinguished as a critic and opponent of Kant, and philosophically a forerunner of Schelling and Hegel through his exposition and defense of the reality of pure abstract thought as a ground of concrete thinking and being.

Bar'dolph, Shakespearean character. He is one of the dissolute comrades of Falstaff and appears in the plays 'Henry IV.' parts I. and II; 'Henry V.'; and 'Merry Wives of Windsor.'

Bardowick, bär'dō-vēk, a town in Hanover, once the commercial centre of northern Germany, but now an insignificant village, famous for the ruins of a one time magnificent cathedral, dating from before the destruction of the town in 1189. Pop. (1900) 2,002.

Bardsley, Charles Wareing, English clergyman and author: b. Keighley, Yorkshire, 1834. He was graduated at Oxford in 1868, and ordained deacon in 1870. His publications include 'English Surnames, their Sources and Significations' (1875); 'John Leeley's Troubles' (1876); 'Memorials of St. Anne's, Manchester' (1876); 'Curiosities of Puritan Nomenclature' (1880); 'Her Grandfather's Bible, a Tale of Furner's Fells' (1886), etc.

Bardwan, bŭrd-wän', a division of Bengal, upon the Hugli. Area, 13,850 square miles; pop. (1901) 2,245,000. Apart from its products, rice, grain, hemp, cotton, indigo, etc., it has a noted coal field of about 500 square miles in area, with an annual output of about 500,000 tons. The capital of the same name has a population of 34,080.

Bare'bone, or **Barbon, Praise-God,** the name of a leather seller in Fleet Street in London, well known in his day as a prominent preacher among the Baptists: b. about 1596; d. 1679. He made himself notorious as an enemy of the monarchy, and in 1660, on Monk's arrival in London, Barebone, at the head of a numerous mob, presented a petition to Parliament against the restoration of the Stuarts. In 1661 he was committed to the Tower, and remained for some time in confinement.

Barebones Parliament, a derisive term applied to the "Little Parliament" summoned by Oliver Cromwell, 4 July 1653. It consisted of 140 persons, "faithful, fearing God, and hating covetousness," but mostly of very destructive social principles. These began by abolishing the court of chancery, and were proceeding to abolish tithes, to the alarm of the more moderate members, and of Cromwell himself, who dissolved the Parliament on 12 December of the same year. See Gardiner, 'History of the Commonwealth and Protectorate' Vol. II. (1897).

Barefooted Friars. See FRIARS.

Barége bä-rāzh, a light, open tissue of silk and worsted or cotton and worsted for women's dresses, originally manufactured near Baréges, France, and in that country known as crêpe de barège. The fabric is now chiefly manufactured at Bagnères de Bigorre.

Baréges (ancient VALLETRIA), a watering place in the south of France, department of the Hautes-Pyrénées, 22 miles south from Tarbes, and celebrated for its thermal springs. It is situated in a valley between two perpendicular chains of mountains, along with numerous other villages. From June to September it is crowded with patients, and the bath establishment is a spacious marble building. A military hospital and an ecclesiastical charity hospital are also prominent local institutions.

Bareilly, bä-rā'le, a town of Hindustan in the northwest provinces, capital of a district of the same name, 131 miles east-southeast from Delhi. It has a pleasant and elevated site, and contains one well-built street, an old and a new fort, and cantonments in the environs. The principal manufactures are ornamental furniture, sword-cutlery, gold and silver lace, and perfumery. On the outbreak of the Indian mutiny the native garrison mutinied and took possession of the place. It was retaken by Lord Clyde in May, 1858. Pop. (1901) 117,400.

Barentz, William, Dutch navigator: b. about 1560, who discovered Nova Zembla in 1594. While on a third expedition to the same region, in 1596, he discovered Spitzbergen, but had to spend the winter of 1596–7 in Nova Zembla. He and his companions suffered great hardships which led to his death on the homeward journey. Relics of his expedition were discovered undisturbed in 1871.

Barère de Vieuzac, bä-rār-dĕ-vyē-zak, **Bertrand,** French revolutionist and agitator: b. Tarbes, 10 Sept. 1755; d. 14 Jan. 1841. An advocate of Toulouse, he acted as a deputy in the National Assembly, and was sent by the department of the Hautes-Pyrénées to the National Convention in 1792. He soon became active as a journalist, and attached himself to the *Mountain,* supporting it with eloquence of such a flowery and poetical style as afterward earned him the name of the "Anacreon of the guillotine." He was president of the convention when the sentence was passed upon Louis XVI. He rejected the appeal to the people, and gave his vote with these words: "The law is for death, and I am here only as the organ of the law." Though a supporter of Robespierre, he concurred in his downfall, yet this did not save him from being impeached and sentenced to transportation. His sentence was not carried into effect, and he shared in the general amnesty of the 18th Brumaire. Elected a deputy during the Hundred Days, he was banished after the second restoration. He went to Brussels, where he devoted himself to literary work till the revolution of July permitted his return.

Baretti, bä-rĕt'te, **Giuseppe Marc' Antonio,** Italian writer: b. Turin 25 April 1716; d. 5 May 1789. In 1753 he published a 'Defence of the Poetry of Italy against the Censures of M. Voltaire.' About this time he was introduced to Johnson, then engaged in the compilation of his 'Dictionary,' of which Baretti availed himself to compile an Italian and English dictionary in 1760, much more complete than any which had hitherto appeared. In this year he revisited his native country, and published at Venice a critical journal, the 'Frusta Literaria,' which was soon suppressed. He therefore returned to England, and in 1768 published an 'Account of the Manners and Customs of Italy.' While defending himself in a street brawl he mortally wounded one of his assailants, and was tried for murder at the Old Bailey, but acquitted. On this occasion Johnson, Burke, Goldsmith, Garrick, Reynolds, and Beauclerk gave testimony to his good character. In 1770 he published his 'Journey from London to Genoa through England, Portugal, Spain, and France,' and continued to publish introductory works for students in the Italian and other modern languages, and superintended an edition of Machiavelli's works. His 'Opere Scritte in Lingua Italiana' appeared at Milan in 6 volumes in 1813–18. Baron Pietri Custodi published his 'Scritti Scelti, Inediti, o Rari' (1822).

Barfleur, bär-flĕr, a seaport of France, in the department of La Manche, about 15 miles east of Cherbourg. It was at one time the best port on the coast of Normandy, but in the year 1346 was taken and pillaged by Edward III., king of England, and the harbor destroyed.

William the Conqueror fitted out at Barfleur the expedition which effected the conquest of England. Pop. (1897) 1,189.

Barge, a term commonly applied to flat-bottomed boats such as are used on rivers and canals, the name including various craft, many of them carrying sails and being rigged in several ways. Formerly the name was given to a boat of state or pleasure used chiefly for ornamental purposes, and to the boat of the commanding officer of a ship of war. In eastern New England the name is also given to a kind of open omnibus much used at railway stations and seaside resorts.

Bar'ham, Richard Harris, English humorous writer: b. Canterbury, 6 Dec. 1788; d. 17 June 1845. Having been ordained a clergyman, he became in 1821 one of the minor canons of St. Paul's Cathedral. In 1824 he was appointed a priest in ordinary of the chapel-royal, and was shortly afterward presented to the rectory of the united parishes of St. Mary Magdalene and St.-Gregory-by-St. Paul, London. In 1837, on the starting of Bentley's 'Miscellany,' under the editorship of Charles Dickens, he laid the foundation of his literary fame by the publication in that periodical of the 'Ingoldsby Legends'—a series of humorous tales in verse which achieved an immense success, having in a collective form, from 1840 onward, been published over and over again in various editions, with many "legends" added to the original number. Though a brilliant member of society, and ranking with the most distinguished wits of the day, including his intimate friends, Sydney Smith and Theodore Hook, Mr. Barham never neglected his more serious duties as a clergyman. His life has been written by his son.

Bari, a negro people of Africa, dwelling on both sides of the White Nile. Gondokoro is their chief town. They practise agriculture and cattle-raising. Their country was conquered by Baker Pasha in 1871 for Egypt.

Bari, bä're (ancient BARIUM), an important seaport of southern Italy, in Apulia, capital of the province Terra di Bari, and situated on a promontory of the Adriatic, 69 miles northwest of Brindisi. It was a place of some importance under the Romans, passed from them to the Saracens, and was afterward selected as the seat of government by the Northmen who conquered Apulia. It has been thrice destroyed and rebuilt on the same site. The present town, surrounded by walls, and defended by a castle, consists of a poorly-built old town with a better part of more recent date. It is the see of an archbishop, and possesses a cathedral with a tower 260 feet high, dating from the early half of the 11th century, but largely spoiled by recent alterations. The church of San Nicola dates from 1087; and there is also a royal lyceum. Bari manufactures cotton and linen goods, organs, pianos, hats, soap, glass, and liquors, and has a trade in wine, grain, almonds, oil, etc. It has regular steamboat communication with Venice, Ancona, Trieste, Brindisi, Genoa, and Marseilles. A United States consul is stationed here. Pop. (1901) 77,478.

Bariatinski, Alexander Ivanovich, Prince, bär-yä-tēn'skē, Russian field-marshal: b. 1814; d. Geneva, 9 March 1879. He was educated with the future czar, Alexander II., and while a young officer in the hussars was transferred to the Caucasus, where his successes against the famous Shamyl secured him, in 1852, the rank of lieutenant-general. On the accession of Alexander II. he returned to St. Petersburg, and in 1856 was appointed to the command of the army of the Caucasus. Three successful campaigns were closed by the storming of Ghunib, and the capture of Shamyl. For these services he was made a field-marshal. His health, however, had broken down, and the remainder of his life was passed chiefly abroad.

Barili, bä-rē'lę, Philippines, a town in the province of Cebu, 52 miles from Cebu, its capital. Pop. (1898) 20,914.

Barilla (Spanish, "impure soda"), the commercial name of a crude variety of soda obtained by burning certain fleshy plants that grow near the ocean and in other salty places. The *Salsola soda* was largely used for this purpose, and was cultivated in Spain, Sicily, Sardinia, and other places on account of the considerable yield of barilla that it furnished. The plants were cut in September, dried for about a month, and then burned on an iron grating, beneath which was a pit into which the fused ashes fell. The burning was continued until a ton or two of the ash had accumulated in the pit, after which the product was allowed to cool, and was then broken up and shipped to market. Barilla contains about 20 per cent of soda, the remainder consisting chiefly of chlorides and sulphates of sodium, calcium, and aluminum. It was formerly much used in the manufacture of soap, but has now been almost entirely replaced by purer grades of soda, obtained by chemical means from common salt. See KELP.

Bar'ing, the family name of one of the most influential financial establishments in the world, the well-known house of Baring Brothers & Company. John Baring, the father of the founders, was a German cloth maker who engaged in business in a small way at Larkbear, Devonshire, England, in the earlier half of the 18th century. His sons, Francis and John, established the firm of Baring Brothers in London, in 1770. Since 1890 the house has been reorganized as a limited banking company.

Baring, Alexander. See ASHBURTON, ALEXANDER BARING, LORD.

Baring, **Sir Evelyn** (VISCOUNT CROMER), an English colonial civil servant: b. Norfolk, Eng., 26 Feb. 1841. He served in the Royal Artillery, became secretary to his cousin, the Earl of Northbrook, one of the controllers-general of Egyptian finance (1879), finance minister of India (1880), and agent and consul-general in Egypt from 1883 till April 1907. He was created a peer in 1892, viscount in 1899, and is author of 'Staff College Essays'; 'The War Game.'

Baring, Sir Francis, English banker: b. Larkbear, England, 1740; d. 1810. He obtained a commercial training, founded a large and successful business, became a director of the East India Company, and was created a baronet in 1793. He took an active part in the discussions relative to the bank restriction act of 1797, and at the time of his death was reckoned the first merchant in Europe.

Baring, Sir Francis Thornhill, English banker, son of Sir Thomas: b. 1796; d. 1866. Under successive Whig governments, he was a

lord of the treasury, secretary to the treasury, chancellor of the exchequer, and first lord of the admiralty. He was created Baron Northbrook in 1866.

Baring, Sir Thomas, English banker: b. 1772; d. April 1848. He was the eldest son of Sir Francis, whom he succeeded in the baronetcy. He was chiefly remarkable as an admirer and encourager of art. His magnificent collection of paintings was dispersed by public sale after his death. His fourth son, Charles Thomas (1807–79), was bishop of Durham.

Baring, Thomas, English banker and politician, brother of the first Lord Northbrook: b. 1799; d. 1873. He devoted himself early to commercial pursuits, and also to politics, in which he was a Conservative, thus taking the opposite side to his brother. He entered Parliament in 1835, representing the borough of Huntingdon from 1844 till his death.

Baring, Thomas George, second Earl of Northbrook: b. 1826; d. London, Eng., 15 Nov. 1904. He was successively a lord of the admiralty, under secretary of state for India, under secretary of war, governor-general of India (1872–6), and first lord of the admiralty (1880–5), and was created an earl in 1876. He has published 'The Teachings of Christ in His Own Words.'

Baring-Gould, Sabine, English clergyman and novelist: b. Exeter, 28 Jan. 1834; d. Port Elizabeth, South Africa, 4 June 1906. He graduated from Cambridge in 1856, and since 1881 has been rector of Lew-Trenchard in Devon. Among his numerous works are: 'Iceland: Its Scenes and Sagas' (1864); 'The Book of Werewolves' (1865); 'Curious Myths of the Middle Ages' (1866–7); 'Lives of the Saints' (1872–9); 'Yorkshire Oddities' (1874); 'Germany, Past and Present' (1879). Prominent among his novels and other later books are: 'Mehalah: a Story of the Salt Marshes' (1880); 'John Herring' (1883); 'Red Spider' (1887); 'Grettis the Outlaw' (1890); 'The Broom Squire' (1896); 'Guavas the Tinner' (1897); 'Bladys (1897); 'Domitia' (1898); 'Pabo the Priest' (1899); 'A Book of the West' (1899); 'Furze-Bloom' (1899); 'The Crock of Gold' (1899); 'Winefred' (1900); 'A Book of Dartmoor' (1900); 'In a Quiet Village' (1900); 'Virgin Saints and Martyrs' (1900); 'The Frobishers'; 'A Book of Brittany' (1901); 'Royal Georgie' (1901); 'Miss Quillet'; 'Nebo the Nailer' (1902).

Baring Island, an island in the Arctic Archipelago. The name is also given to a bay and strait. They were named for Sir Francis Baring, who was first lord of the admiralty at the time of their discovery.

Baringo, a lake in East Africa, northeast of the Victoria Nyanza, about 20 miles long, 200 square miles in area, and between 3,000 and 4,000 feet above sea-level. Though fed by many streams, it has no visible outlet. It contains several small islands and was discovered by Thomson in 1883.

Barite, ba'rīt (Greek, "heavy," in allusion to its high specific gravity), a mineral having the formula $BaSO_4$, and crystallizing in the orthorhombic system, but also occurring massive, and in granular, earthy, and stalactitic forms. It is usually white or nearly so, and has a hardness of from 2.5 to 3.5. Its specific gravity ranges from 4.3 to 4.6, and from this circumstance the mineral is often called "heavy-spar." Barite was first examined (in 1602) by Casciorolus, a shoemaker of Bologna, who discovered that it becomes phosphorescent when heated with combustible matter, and gave it the name *lapis solis,* or "sun stone." Barite occurs in many parts of the world, and in large quantities. In the United States it is found abundantly in many States, notably in Virginia, North Carolina, and Missouri, and in the Lake Superior region. It constitutes an important source of barium compounds, and was mined in the United States to the extent of about 61,000 tons in 1902. See also BARIUM.

Baritone, or **Barytone,** a male voice, whose compass partakes of those of the common bass and the tenor, but does not extend so far downward as the one nor to an equal height with the other. Its best tones are from the lower A of the bass clef to the lower E or F in the treble; yet we find Verdi and Meyerbeer exacting G and even A flat from it. This name is also given to the smaller bass saxhorn in B flat or C, used in reed and brass bands.

Ba'rium, a metallic element, strongly resembling calcium in its chemical properties. The mineral barite (q.v.) was the first compound of barium to be examined. In 1750 Marggraf showed that barite contains sulphuric acid, and the subsequent labors of Scheele and Gahn proved that it also contains a previously unrecognized earth, which Bergmann called *terra ponderosum,* or "heavy earth." In 1779 Guyton de Morveau proposed the name "barote" (Greek, "heavy") for this earth, and Lavoisier modified the word to "baryta," in which form it still survives. Subsequently baryta was found to be the oxid of a new metal, which was isolated by electrolysis in 1808 by Berzelius and Pontin, and afterward by Davy, and named "barium." The properties of metallic barium are not yet satisfactorily ascertained, for it is probable that the metal has never been obtained in a state of even approximate purity. Thus, Davy says it is a silver white metal; Clarke ascribes to it the color and lustre of iron; Bunsen and Matthiessen describe it as golden yellow; and Donath states that its true color is that of bronze. It oxidizes rapidly in the air, and decomposes water readily. It is ductile and somewhat malleable. Its atomic weight is 137.4 (O = 16), and its chemical symbol is Ba. It melts at about the same temperature as cast iron, and its specific gravity appears to be between 3.75 and 4.00. The most common sources of barium compounds are the carbonate and sulphate, which occur native as Witherite and Barite (qq.v.), respectively. The nitrate is prepared by acting upon the native carbonate with nitric acid. It is a soluble salt, with the formula $Ba(NO_3)_2$. The nitrate decomposes upon being strongly heated, the nitric acid being expelled, while barium monoxid (or baryta), BaO, is left behind as a gray, porous mass, strongly caustic and alkaline. When gently heated in air, barium monoxid takes up another molecule of oxygen and forms the dioxid, BaO_2; and on being more strongly heated, the dioxid gives up the extra atom of oxygen again, and returns to the monoxid. It was long ago proposed to make use of

this curious property for isolating pure oxygen from the air, by alternately heating the dioxid at a high temperature, and collecting the oxygen given off as it returns to the monoxid, and then submitting it, at a lower temperature, to the action of a current of air until it has again passed into the state of dioxid. It was found, however, that the process would work only for a short time, after which a fresh supply of baryta was required. Recent investigations have gone far toward discovering the cause of this loss of activity, and it is now likely that oxygen will soon be made on a commercial scale by this most ingenious process. Baryta absorbs water with considerable evolution of heat and the formation of a hydrate, $Ba(OH)_2$, which crystallizes with eight molecules of water. Barium hydrate is also made, in large quantities and at a low price, at Niagara Falls, by the electrolysis of soluble salts of barium. The hydrate is used in refining sugar, being much superior to lime for this purpose. With cane sugar it forms an insoluble compound from which the sugar may afterward be set free by a current of carbon dioxid gas. The hydrate is also likely to be of great use, in the near future, for preventing the formation of boiler scale, by precipitating the carbonates and sulphates in the feed water, in the form of insoluble barium compounds. The value of barium hydrate for this purpose has long been known, but until the development of the electrolytic method of manufacturing it, the expense involved was prohibitive. Barium sulphate (barite) is thrown down as a precipitate whenever a soluble barium compound is added to a solution of any sulphate; and for this reason soluble barium salts are much used by the chemist in testing for sulphuric acid and sulphates. The chloride ($BaCl_2$) is the salt most commonly employed as a reagent for this purpose. Barium sulphate is one of the most insoluble salts known. The native sulphate, when ground up, is used to adulterate white lead. The artificial sulphate is also used for this purpose, and is itself used as a paint, under the name of «permanent white,» or *blanc fixe*. The artificial sulphate is said to be superior to the natural mineral for use as a paint, as it has more «body.» When barium sulphate is heated with coal it loses its oxygen, and becomes reduced to the sulphid, BaS, a salt which is highly phosphorescent, and is known as Bologna phosphorus. After exposure to sunlight or to a strong artificial light, barium sulphid shines for hours with a bright, orange color. Barium is readily recognized by the spectroscope, by a number of characteristic green lines. Its volatile salts communicate a green color to non-luminous flames, and are used (especially the nitrate) in pyrotechny.

In poisoning by the barium salts the symptoms resemble those seen in poisoning by other metals. In the acute forms there is pain and burning in the mouth and stomach, nausea, vomiting, and chills. These are followed by diarrhœa, dizziness, and chilly feelings. The pulse is slowed, at first large and full, later small and scarcely recognizable. Muscle paralysis supervenes with dyspnœa, loss of consciousness, convulsions, and death. In the treatment prompt washing of the stomach with a solution of Glauber's salts is advisable. This forms an insoluble barium sulphate.

Bark, the more or less easily separable layers of tissue surrounding the woody cylinder of trees and shrubs, also, by extension, the analogous part (cortex) of textile plants such as hemp, jute, ramie, flax, etc., and other annual stems. The layers are divided into three groups which may be readily seen in a yearling stem: (1) The phloëm, bast, the inner food-conducting tissue annually thickened from the cambium (q.v.) layer which separates it from the wood; (2) the green zone which generally does not increase in thickness but which in young twigs assists in food elaboration (see PHOTOSYNTHESIS); (3) the epidermis or external layer with contiguous cork cells which increase from the phellogen, or cork cambium, a layer of epidermal or cortical cells. These cork cells which develop mainly at right angles to the direction of the stem, die and become more or less weather-beaten and seamed from cracking and give the characteristic appearance to tree trunks. Many trees can be identified by their bark alone.

The bark of many trees and shrubs is of economic use mainly in tanning, dyeing, medicine, and cookery. In tanning (q.v.) such barks as are rich in tannic acid are most in demand; oak, hemlock, and chestnut (qq.v.) are general favorites in America and Europe; eucalyptus and acacia in Australia. Larch and willow bark are used for special work. To obtain these barks the trees are felled after the sap has started to flow in the spring, the rough exterior layers removed, the bark of the trunk and main limbs peeled off in lengths of about two feet with specially made tools; the bark of the smaller branches, in equal lengths, is loosened with mallets and slipped off. After removal the bark is loosely piled in open sheds to dry or stacked on end in the open air, the larger pieces being placed on the outside to protect the smaller inner ones from rain and sun, which together with mildew are the important agencies that may injure the quality of the product. The barks used in medicine, cookery, etc., are treated under individual titles. See CASCARILLA, CINCHONA, and CINNAMON; also CORK.

Bark, or **Barque,** a three-masted vessel whose foremast and mainmast are square-rigged, but whose mizzenmast has fore-and-aft sails only. The distinction between a bark and a barkentine is that the latter has but one mast square-rigged, the main and mizzen being both rigged fore-and-aft.

Bark-beetles, members of the family *Scolytidæ,* and allied to the weevils. They are of an elongate cylindrical form, truncated before and behind. They mine under the bark of trees, running their winding galleries in every direction, but rarely attack living healthy trees. They are usually brown or black in color. The rounded head does not end in a snout and is deeply sunken in the thorax; the clavate antennæ are somewhat elbowed, while the palpi are very short; the elytra are often hollowed at the end, and the short stout legs are toothed on the under side of the femora, and the tarsi are slender and narrow. The eggs are laid in the bark, whence the larvæ on being hatched bore straight into the sap wood, or mine between the bark and the sap wood. They are fleshy, cylindrical, footless larvæ, wrinkled on the back.

When fully grown in the autumn they gnaw an exit for the beetle, taking care to leave a little space closed in front of their burrow to conceal the pupa. The various species of Scolytus, Tomicus, and Xyloterus give rise to a disease similar to fireblight, by their ravages beneath the twigs of fruit trees, causing the bark to shrivel and peal off as if a fire had run through the orchard. *Xyloterus fuscatus* has been found to bore into empty wine casks and spoil them for use. The spruce forests of Maine and other parts of northern New England have, since 1818, been devastated by *Dendrocotonus piceaperda* of Hopkins. It attacks and kills vigorous trees in perfect health, the largest and best stands of timber suffering most from its ravages. The estimated number of adults which under favorable conditions may emerge from an average-sized tree is from 5,000 to 7,000. Hopkins estimates that an average of three pairs of beetles to the square foot of bark on 10 to 15 feet of the trunk of an average-sized tree are sufficient to kill it, and that 6,000 beetles breeding in one tree may be sufficient to kill from 20 to 25 more trees. Two other beetles (*Polygraphus sufipennis* and *Tetropium cinnamopterum*) also aid the Deudrocotonus in killing the spruce. Consult: Packard, 'Report on the Insects Injurious to Forest and Shade Trees' (1890); Hopkins, 'Insect Enemies of the Spruce in the Northeast' (Bull. No. 28, Division of Entomology, U. S. Dept. Agriculture, 1891).

Bark-louse, a hemipterous insect of the scale family (*Coccidæ*). The bark-lice are very small insects, whose females are wingless, their bodies resembling scales. The females sting the bark of trees with a long slender beak, sucking in the sap, and, when very numerous, injure or kill the tree. The males have two wings but no beak, and take no food. The apple bark-louse (*Mytilaspis pomorum*) is destructive to young apple-trees, while in Florida *M. gloveri* is a pest of the orange, as is also the San José scale-insect (q.v.). The cochineal, the mealy-bug of hot-houses, and various other coccid insects, belong to this group. See SCALE-INSECTS, and the names of various species.

Bark, Peruvian. A bark obtained from several trees belonging to the genus *Cinchona,* which grow spontaneously in many parts of South America, but more particularly of Peru. The trees somewhat resemble a cherry-tree in appearance, and have white or pink flowers. This valuable medicine was formerly called Jesuit's Bark, from having been introduced into Europe by the members of that Order settled in South America. They were instructed in its use by the natives of Peru, and it continued for many years a source of profit to the Order. Its bontanical name was derived from that of the Countess del Chinchon, the lady of a Spanish viceroy, who had been cured by it. The tree from which it is obtained grows abundantly in the forests of Quito and Peru, and the bark is cut by the natives in the months of September, October, and November, during which alone the weather is free from rain. The bark is of three kinds — red, yellow, and pale, of which the yellow and pale barks are the stronger in their febrifuge properties. The crown-bark, as the highest-priced is termed, is of a pale yellowish-red. The pale is the original Peruvian cinchona, and is produced by several varieties of the *Cinchona officinalis.* The red is obtained from the *C. succirubra,* which grows chiefly in the forests of Ecuador around Chimborazo. The yellow sort is produced by the *C. calisaya,* and grows in Bolivia and Peru.

The uses of the bark in medicine are too well known to need description; but the chemical discoveries in relation to it are deserving of more particular mention. Its medicinal properties were found to depend upon the presence of a substance called quinine. This exists, more or less, in all kinds of Peruvian bark, but in quantities very unequal in the various kinds. See QUININE.

Barkal, or **Jebel Barkal,** an isolated sandstone rock, 400 feet high, in Nubia, near the Fourth Cataract of the Nile. It is nearly perpendicular on all sides, but fully so on the side nearest the Nile. There are some remarkable ruins in the vicinity. Excavations here have revealed inscriptions and archæological remains of great interest and value, an account of which may be found in Lepsius's 'Denkmäler,' Vol. V.

Bark'entine. See BARK or BARQUE.

Barker, Albert Smith, American naval officer: b. Massachusetts, March 1843. He was graduated at the United States Naval Academy in 1859; served on the frigate Mississippi in the operations to open the Mississippi River in 1861–3, taking part in the bombardment and passage of forts Jackson and St. Philip and the Chalmette batteries, the capture of New Orleans, and the attempted passage of Port Hudson, where his vessel was destroyed. He became captain 5 May 1892; commanded the cruiser Newark during the war with Spain; subsequently succeeded to the command of the battleship Oregon, which he took to Manila; became a rear-admiral, and was placed in command of the Norfolk Navy Yard in 1899; and in July 1900 succeeded the late Rear-Admiral Philip as commandant of the Brooklyn Navy Yard.

Barker, Edmund Henry, English philologist: b. Hollym, Yorkshire, December 1788; d. London, 21 March 1839. He undertook the labor of reprinting the 'Thesaurus Græcus' of H. Stephens, upon which was expended an immense amount of time and money, but owing to severe adverse criticisms, the work did not appear in the form which was originally intended, or under his name. His first work, 'Classical Recreations,' appeared in London, 1812; one volume only was published. He also wrote several dissertations, essays, etc., for reviews; a work upon the claims of Sir Philip Francis to the authorship of the Junius letters; a Greek and English dictionary, etc. In the latter part of his life he became so reduced that he was at one time confined in a debtors' prison, and finally died in an obscure lodging-house in extreme want.

Barker, Fordyce, American physician: b. Wilton, Franklin County, Me., 2 May 1819; d. 30 May 1891. He entered upon the practice of his profession in Norwich, Conn., in 1845, and made a specialty of obstetrics and diseases of women. After serving as professor of midwifery at Bowdoin, he removed to New York in 1850. He was an incorporator of the New York Medical College and obstetrical

surgeon to Bellevue Hospital, besides acting as consulting physician in leading hospitals. He wrote 'Puerperal Diseases' (1872); and 'On Seasickness.'

Barker, George Frederick, American physicist: b. Charlestown, Mass., 14 July 1835. He was graduated from Sheffield Scientific School, 1858, and Albany Medical College, 1863, and from 1859 to 1872 taught at Harvard, Yale, Wheaton College (Ill.), and Western University of Pennsylvania. Since 1873 he has been professor of physics in the University of Pennsylvania. He was a United States commissioner at the International Electrical Exhibition at Paris, 1881, where he received the Legion of Honor decoration, with rank of commander. He has frequently served as an expert in patent and other cases, notably as a government expert in the suit against the American Bell Telephone Company, and in the Lydia Sherman poisoning case in 1872. His publications have chiefly appeared in the 'American Journal of Science,' 'American Chemist,' and 'Proceedings of the American Philosophical Society.' Others are, besides text-books on chemistry: 'Nitrous-Oxide' (1866); 'Correlation of Vital and Physical Forces' (1871); 'Progress in Physics.' For several years he contributed to the Smithsonian reports.

Barker, Jacob, American financier: b. Swan Island, Me., 7 Dec. 1779; d. Philadelphia, 26 Dec. 1871. He early developed remarkable business ability, settled in New York, and before he was 21 owned five trading vessels and controlled a large credit. In 1801 he met with heavy reverses, but obtaining a government contract for supplying oil, made up his losses, and at the outbreak of the War of 1812, undertook the raising of a loan of $5,000,000 for the government. He was a founder of Tammany Hall, and a State senator, and established a bank in Wall Street in 1815 which failed in 1819. His financial methods aroused intense opposition and he was once indicted for fraud and convicted, but a new trial quashed the indictment. Removing to New Orleans in 1834, he was admitted to the bar and accumulated a large fortune that was mostly lost during the Civil War. During the latter part of his life he lived in Philadelphia with his son, Wharton Barker. See 'Incidents in the Life of Jacob Barker, 1800-1855' (1855).

Barker, James Nelson, American author: b. Philadelphia, 17 June 1784; d. Washington, March 1858. He served with distinction in the War of 1812, but subsequently entered civil life, becoming mayor of his native city in 1820. He was collector of customs at Philadelphia 1829–38 and during the ensuing 20 years was comptroller of the United States Treasury. His dramatic works, especially 'Marmion,' 'The Indian Princess,' and 'Smiles and Tears,' were popular.

Barker, Lewellys Franklin, Canadian-American anatomist: b. Norwich, Ont., 1867. He was a professor of anatomy at Johns Hopkins University 1894–1900, and from 1900 has been at the head of the department of anatomy in the Rush Medical College of University of Chicago. He is author of 'The Nervous System and Its Constituent Neurones' (1899).

Barker, Matthew Henry, English novelist: b. Deptford, 1790; d. London, 29 June 1846. He followed the sea, and under the name of «The Old Sailor,» wrote spirited sea tales, very popular in their day. They include 'Land and Sea Tales' (1836); 'Life of Nelson' (1836); 'Topsailsheet Blocks' (1838; new ed. 1881); and 'The Victory, or the Wardroom Mess' (1844).

Barker's Mill, a form of waterwheel devised by Dr. Barker, some 300 years ago. It turns about a vertical axis, down which the water that is to operate it flows. At the lower extremity of the vertical axis two or more hollow arms project horizontally, like the spokes of a wheel. Water is discharged tangentially from the ends of these hollow arms, and by its reaction causes the wheel to rotate. Barker's mill is now used only as a toy, although a modification of it, invented by Whitelaw, is still used, to some extent, as a source of power in Great Britain, where it is known as the Scotch turbine. See TURBINE.

Barking, England, a town in Essex, on the left bank of the Roding, about two miles above its junction with the Thames, and seven miles northeast from London. The houses are mostly of brick and generally well built. It has a parish church, a handsome structure, with a lofty tower, and some fine public buildings. There are also the ruins of Barking Abbey, at one time among the wealthiest nunneries of England. There are several important industrial works, the largest being a gas works employing many hands. Pop. (1901) 21,500. Consult 'Barking Town' (1897).

Barking Wolf, a name in early American books for the prairie wolf or coyote, on account of the greater resemblance in its voice to the barking of a dog than to the howl of the wolf. See COYOTE.

Bar'kis, a rustic figure in Dickens' 'David Copperfield.' He proposes to David's nurse, Peggotty, in the since famous phrase «Barkis is willin'.»

Barks'dale, William, American statesman and military officer: b. Rutherford County, Tenn., 21 Aug. 1821; d. 2 July 1863. He was admitted to the bar when under 21, and rapidly achieved eminence in law and politics, editing the Columbus *Democrat,* and serving in the Mexican war. He entered Congress in 1853, but resigned his seat when his State seceded, and took command of a regiment of Mississippi volunteers. He was made a Confederate brigadier-general after a campaign in Virginia, and was killed at Gettysburg.

Barlaam, bär'la-äm, Italian theologian: b. Seminaria, Calabria; d. about 1348. He was a monk of St. Basil, noted for his learning, and particularly for his thorough knowledge of the Greek language. In 1327 he visited Constantinople, and in 1331 he was appointed abbot of the convent of St. Salvator. In 1339 the kings of France and Sicily sent Barlaam in vain to Pope Benedict XII. at Avignon, for the purpose of obtaining assistance against the Mohammedans, and of arranging a union between the Greek and Latin Churches. Henceforth he was engaged in various religious controversies, and was defeated in them all. He finally en-

tered the Roman Catholic Church, and through the influence of his friend, Petrarch, received from Pope Clement VI. the bishopric of Geraci.

Barlaam and Josaphat, one of the most popular of early mediæval romances, supposed to have been written by St. John of Damascus, — or Damascenus, as he is sometimes called,— a Syrian monk born about the end of the 7th century. The name of Barlaam and Josaphat appear in both the Greek and Roman lists of saints. According to the narrative of Damascenus, Josaphat was the son of a king of India brought up in magnificent seclusion, to the end that he might know nothing of human misery. Despite his father's care, the knowledge of sickness, poverty, and death cannot be hidden from him: he is oppressed by the mystery of existence. A Christian hermit, Barlaam, finds his way to him at the risk of life, and succeeds in converting him to Christianity. The prince uses his influence to promote the new faith among his people. When he has raised his kingdom to high prosperity, he leaves it to spend the remainder of his days as a holy hermit. Professor Max Müller traces a very close connection between the legend of Barlaam and Josaphat, and the Indian legends of the Buddha as related in the Sanskrit of the Lalita Vistara. This connection was first noticed, according to Prof. Müller, by M. Laboulaye in the 'Journal des Débats' (July 1859). A year later, Dr. Felix Liebrecht made an elaborate treatment of the subject. The compilers of the 'Gesta Romanorum,' Boccaccio, Gower, and Shakespeare have all drawn materials from this romance.

Barlæus, bär-lē'ŭs, or **Bærle, Kaspar van,** Dutch historian and learned writer: b. Antwerp, 12 Feb. 1584; d. Amsterdam, 14 Jan. 1648. His 'Poems,' mostly Latin, are not forcible, but his 'History of Brazil under Maurice of Nassau' is decidedly so; and he composed also numerous fine orations, the influence he exercised upon contemporary thought being very considerable.

Barletta, bär-lĕt'ta, **Gabriello,** Italian monk: b. perhaps at Barletta, in the kingdom of Naples, in the 15th century. He became celebrated at Naples on account of his sermons, in which he mixed sarcasm and the ludicrous with the sacred; quoting, now Virgil, now Moses; placing David at the side of Hercules; and commencing a sentence in Italian to continue it in Latin, and end it in Greek. Sometimes he forgot himself so far as to use expressions of which he had not considered the signification, as when he asked by what signs the Samaritan knew Jesus was a Jew. Very serious authors, Niceron and others, have given the response of the preacher; but it cannot be reproduced here. There is under his name a collection of Latin sermons, which have gone through more than 20 editions.

Barletta, Italy, a seaport town on the west shore of the Adriatic, 33 miles northwest of Bari. In the market-place is a colossal bronze statue, about 18 feet high, supposed to represent the Emperor Heraclius. A statue of the statesman Massimo d' Azeglio, who died in 1866, adorns another square. The cathedral is a fine Byzantine edifice, the nave of which is supported by antique granite columns. There are several other churches, convents for both sexes, an orphan institution, a college founded by Ferdinand IV., and a theatre. The harbor is formed by a mole running out from the shore. It admits of small vessels only, but good anchorage-ground is found in the roadstead. Barletta has a considerable trade in grain, wine, almonds, and the other productions of the country, which are exported to the different ports of the Adriatic. Pop. (1901) 42,022.

Barley (*A. S. bærlic,* from *bere,* barley + *leac,* a leek, plant); genus *Hordeum;* our fourth most important cereal. It belongs to the natural order *Gramineæ* or grass family, and is one of the oldest of the cultivated members of this family. It was cultivated in ancient Egypt (Exod. ix. 31), by the Greeks and Romans. Pliny regarded it as the most ancient food of mankind. It has been found in the lake dwellings of Switzerland in deposits belonging to the Stone Age. Ears of barley are represented plaited in the hair of the goddess Ceres, and are also shown on ancient coins. One of the sacred books of the Chinese claims that it was grown in China 2000 B.C. It grows wild in western Asia, and some authorities regard this as its original home. It is adapted to both warm and cold climates, has a wider range of distribution than any other cereal, being grown all over the region embraced in the temperate zones, from Alaska, Iceland, and Norway in the north to Algeria, Egypt, India, and other sub-tropical countries. The Nepaul or Himalaya barley is very hardy, producing good crops at an elevation of 14,000 feet above the sea. In Chile and Switzerland it thrives at 5,000 feet, but on the plateaus of Peru it rarely ripens.

This species is divided into several types, of which the following are recognized: Two-rowed barley, *Hordeum distichon;* four-rowed barley, *H. vulgare,* the common barley, bere or bigg; six-rowed barley, *H. hexastichon;* naked barley, *H. distichon nudum,* the flowering glume and pale not adhering to the grain as in other types; fan, spratt, or Battledore barley, *H. zeocriton,* two-rowed with wide-spreading awns; this is valued in Germany and is sometimes called German rice. These types are further subdivided into varieties, the most popular for malting belonging to the two-rowed type. The best known is the Chevalier, which originated in Suffolk, England, in 1819. This variety and selections from it constitute the high-priced barley of California. In Europe the two-rowed type predominates. In this country the six-rowed is more common. The four-rowed varieties were formerly used for malting; they are hardy and productive but coarse, and are being replaced by the two-rowed. In northern latitudes well-drained and fertile medium or rather light soils, particularly those of a calcareous nature are best. Strong loams, heavy clays, and soils rich in humus, produce heavy crops, but of inferior quality. In southern latitudes medium to heavy loams are best. Climate and season are of more importance than soil in determining whether the barley will be a good malting variety or not. A rather dry climate suits well. The climate of eastern and southeastern England produces the best malting barley. It may be sown broadcast or drilled, but the latter method is more satisfactory. Fall-sown varieties are handled like fall-sown wheat, but it is generally sown in the spring after

spring-wheat sowing is over. The amount sown varies from two to three bushels per acre. It germinates quickly, and late spring frosts may injure it. Fertilizers when applied must be evenly distributed or an uneven growth will result. It ripens before spring wheat, and should be fully ripe before it is cut. The color and value of the grain is easily injured by damp weather. From 30 to 40 bushels of grain and 1,500 to 2,200 pounds of straw is a good yield. Sometimes this yield of grain is doubled. A good malting variety must have quick, high, and even germinating power; the grains must be plump, heavy, thin-husked, and uniform in size; of good bright color, not "steely" or bleached, indicating immaturity when cut, nor musty; must contain a high percentage of starch, mealy not flinty, showing that the starch can be readily transformed during malting. Barley is sometimes attacked by rust and smut, but less so than wheat. (See RUSTS; WHEAT.) Wireworms are sometimes troublesome. The production of barley in the United States is increasing. In 1866, 7,916,342 bushels were grown on 492,532 acres. In 1905, 136,651,020 bushels on 5,095,528 acres. The four leading States in 1904 were Minnesota, 32,123,041 bushels; California, 28,091,999 bushels; North Dakota, 17,518,074; Wisconsin, 14,941,290 bushels. The average yield for the 10 years 1895–1904 was 25.02 bushels per acre. The average farm value 40.48c per bushel. In 1904 only Russia grew more barley than the United States.

Feeding Value and Uses.—The average percentage composition of barley is, water, 10.9; proteids, 12.4; nitrogen-free extract, chiefly starch, 69.8; ether extract, 1.8; crude fibre, 2.7; ash, 2.4. Digestion experiments with pigs showed that 80 per cent of the dry matter, 81 per cent of the protein, 87 per cent of the nitrogen-free extract, and 57 per cent of the ether extract were digestible. Barley is chiefly used for malting, for the preparation of spirits, beer, and malted foods. It is also employed in domestic cookery as "pot or hulled barley" in which only the husks are removed; "pearl barley" is the grain deprived of husk and pellicle, then ground to a round form and polished; "patent barley" is flour obtained by grinding pearl barley. It is used in soups, for making demulcent and emollient drinks for invalids and other purposes. Barley bread is darker in color and less nutritious than that from wheat flour; it does not contain gluten, but is fairly rich in other proteids.

Barley, or decoctions of it, are used to modify cows' milk for feeding to infants. Barley meal and the by-products, barley bean, barley feed (from pearled barley) screenings, malt combs, and brewers' grains are used as stock feeds. Its use for horse feed in the United States is confined to the Pacific coast. For other stock its use is more general. It may be fed alone or with other grain. Barley hay is grown, the crop being cut before the grain is mature. As a forage crop or pasture it may be grown alone or with peas, vetches, or other quick-growing legumes. Barley straw is usually considered as not worth feeding, but may be used as bedding. See MALT.

Barley Break, a game once common, and often mentioned by old English writers. It was played by six young people, three of either sex, formed into couples, a young man and a young woman in each, it being decided by lot which individuals were to be paired together. A piece of ground was then divided into three spaces, of which the central one was profanely termed hell. This was assigned to a couple as their appropriate place. The couples who occupied the other spaces then advanced as near as they dared to the central one to tempt the doomed pair, who, with one of their hands locked in that of their partner, endeavored with the other to grasp them and draw them into the central space. If they succeeded, they were then allowed themselves to emerge from it, the couple caught taking their places. That the game might not be too speedily finished, leave was given to the couple in danger of being taken to break hands and individually try to escape, while no such liberty was accorded to those attempting to seize them.

Bar'leycorn, John, a personification of the spirit of barley, or malt liquor. It is commonly used jocularly, and in humorous verse. Dr. Murray's 'Dictionary' quotes a title in the Pepysian Library, about 1620, "A pleasant new ballad . . . of the bloody murther of Sir John Barleycorn." Burns' ballad on John Barleycorn, 'There was Three Kings into the East,' is well known.

Barlow, Francis Channing, American military officer: b. Brooklyn, N. Y., 9 Oct. 1834; d. 11 Jan. 1896. He studied law in New York, and practised there, but in 1861 enlisted as a private in the 12th Regiment, New York State National Guard, which was among the first troops at the front. He was promoted lieutenant after three months of service; colonel during the siege of Yorktown; distinguished himself in the battle of Fair Oaks, or Seven Pines, for which he was promoted brigadier-general, and fought in almost every subsequent battle of the Army of the Potomac. He was severely wounded at Chancellorsville and at Gettysburg, and was mustered out of the service with the rank of major-general of volunteers. In 1866–8 he was secretary of State of New York; in 1871 became attorney-general; and in 1873 resumed law practice in New York.

Barlow, James William, Irish historian: b. 21 Oct. 1826. He was professor of modern history in Trinity College, Dublin, from 1861, and has published 'Lectures on Mediæval Italy'; 'The Normans in Italy'; 'Eternal Punishment or Eternal Death'; 'The Ultimatum of Pessimism.'

Barlow, Jane, popular Irish novelist: b. Clontarf, Ireland, 17 Oct. 1860. The literary quality is a marked characteristic of all her writing. Her published works include 'Bogland Studies,' verse (1892); 'Irish Idylls' (1892); 'Kerrigan's Quality' (1893); 'The End of Elfintown' (1894); 'The Battle of the Frogs and Mice' (1894); 'Maureen's Fairing' (1895); 'Strangers at Lisconnel' (1895); 'Mrs. Martin's Company' (1896); 'Creel of Irish Stories' (1897); 'From the East Unto the West' (1898); 'From the Land of the Shamrock' (1900); 'Ghost-bereft and Other Stories' (1902); 'The Founding of Fortunes' (1902).

Barlow, Joel, American poet and diplomatist: b. Redding, Conn., 24 March 1754; d. near Cracow, Poland, 24 Dec. 1812. In 1774 he was placed at Dartmouth College, New Hampshire,

and after a short residence entered Yale College, New Haven, where he displayed a talent for versification, which gained him the friendship of Dr. Dwight, then a tutor there. Barlow, more than once during the vacations of the college, served as a volunteer in the army of the Revolution. In 1778 he applied himself to the study of the law, but soon after accepted the position of chaplain in the army, which he held till the close of the war (1783). During this period his songs and addresses were said to have animated and encouraged the soldiers; at this time, too, he planned and partly composed his 'Vision of Columbus.' He went to Hartford, where he started a weekly newspaper, continuing at same time the preparation of his poem for the press. It was published in 1787, and some months after in London. To promote the sale of his poem, and that of a new edition of the Psalms adapted by him, Barlow gave up the newspaper and became a bookseller. In 1788 we find him in France as agent for a number of speculators in land, called the Ohio Company. The Revolution was then in progress, and Barlow went about lecturing and organizing societies in its favor. He went to England in 1791, and was deputed in the following year by the London Constitutional Society to present an address to the French Convention. In 1795 he was appointed American consul at Algiers, a post he only held for two years. Returning to Paris he made some successful commercial speculations and acquired a considerable fortune. He returned, after an absence of 17 years, to his native country (1805). In 1811 he was appointed minister-plenipotentiary to France. In the following year, owing to the fatigues and privations of a journey to Wilna to hold a conference with Napoleon, he died at an obscure village near Cracow. His principal poem, the 'Columbiad,' has never been popular; it is defective in plan and execution, overloaded with philosophical discussions and political tirades; and disfigured by pedantic and uncouth words of his own coinage. His prose writings bear the stamp of an active and energetic intellect, but want that ripeness of judgment required by the complex nature of the subjects he examines. See Todd, 'Life and Letters of Joel Barlow' (1886).

Barlow, Peter, English physicist and mathematician: b. Norwich, October 1776; d. 1 March 1862. He was professor of mathematics in the Royal Military Academy at Woolwich for a period of 40 years. His greatest work is the 'Mathematical and Philosophical Dictionary.' He was also the author of an elaborate work on the 'Machinery and Manufactures of Great Britain' (1837); of a treatise on the 'Force and Rapidity of Locomotives' (1838); and of an 'Essay on Magnetic Attraction,' one of the first works in which the phenomena of magnetism were distinctly enunciated. He invented the Barlow lens.

Barlow, William Henry, English engineer: b. 10 May 1812; d. 14 Nov. 1902. He was educated for the engineering profession, and among his most notable achievements are the St. Pancras terminal station in London and the Tay Bridge, constructed 1880–7. In 1876 he visited the United States as one of the judges of the Centennial Commission. He published 'Illumination of Lighthouses'; 'Diurnal Electric Tides and Storms'; 'The Resistance of Flexure in Beams'; 'The Logograph.'

Barlowe, Arthur, English navigator: b. about 1550; d. about 1620. In 1584 he was sent with Philip Amidas to select a suitable location for Raleigh's proposed American colony. They explored the coast of North Carolina and on their return to England Barlowe wrote an enthusiastic description of the attractions of the land they had visited.

Barlows Disease. See Scurvy.

Barm. See Yeast.

Bar'mecides, a celebrated Persian family, whose virtues and splendor form a favorite subject for Mohammedan poets and historians. Two eminent members were Khaledben-Barmek, prime minister of Caliph Abul Abbas Al-Saffah, and tutor of the celebrated Haroun al-Raschid, and his son Yahya, grand vizier of Haroun. The expression Barmecides' Feast, meaning a visionary banquet or make-believe entertainment, originates from a story in the Arabian Nights' Entertainments, of a wealthy Barmecide, to whom a poor man, Schacabac, had applied for charity. On the latter informing him that he was starving, the Barmecide invited him to dinner; and calling for a succession of the most sumptuous viands, although none were provided, urged his guest to fall to and enjoy himself, praising the merits of each dish as it was pretended to arrive on the table. Schacabac, though suffering all the pangs of hunger, entered into the eccentric humor of his host, declared his infinite enjoyment of everything set before him, and by his patience so won the heart of his eccentric entertainer, that the latter not only provided for him immediately an actual and plenteous repast, but likewise took him into his house and intrusted him with the management of his affairs.

Barmecides' Feast. See Barmecides.

Bar'men, a city on the Wupper, in Rhenish Prussia. The town of Barmen is formed by the union of seven villages contained in the valley of Barmen, from which it takes its name, and its western border adjoins the city of Elberfeld. It is the seat of the Rhenish Missionary Society, which has here a large seminary. The valley is remarkable for natural beauty. The United States has a resident consul. Barmen contains the principal ribbon manufactories on the Continent, and its ribbons are sent into all parts of the world. Next to ribbons the most important textile manufactures are zanellas or Indian cloths, satin for lining, and lace. Barmen also possesses numerous large dye-works, besides manufactures of chemicals, plated and other metal wares, buttons, yarns, iron, machines, pianos, organs, soap, etc. The city has six railway stations, and one of its remarkable features is the electric swinging railway over and along the line of the Wupper between Barmen and Sonnborn. Pop. (1900) 142,000.

Bar'mote Court (from *berg,* hill, and *mote,* meeting), a name given to local courts held in the lead-mining portions of Derbyshire, England. Their purpose is the definition of the ancient rights of the inhabitants, and the settlement of disputes connected therewith. They are of ancient origin, but their scope has been much restricted during the Victorian period.

See Bainbridge, 'The Law of Mines and Minerals' (5th ed. 1900).

Barn (Saxon, *berern*, from *bere*, barley, and *ern*, a close place or repository). The word seems originally to have denoted a building for the storing of grain. In modern times it has a wider signification — all structures of any capacity used on a farm for storing crops and sheltering stock being known as barns. In the changeable climate of the United States, with its severe winters, protection to cattle becomes an important item in the operations of husbandry, and as our agriculture becomes more highly developed we construct more expensive, convenient, and useful barns. A well-built barn, embracing all the conveniences needed for the easy and safe storing of crops, and the comfort and well-being of farm stock, will always be one of the safest and best investments a farmer can make. At one time the barns on many estates were capacious enough to contain all the grain raised on them, but recently the practice of stacking grain has gained ground, and it is now considered the better plan — building the grain barn of sufficient size to contain one or two ricks of grain at a time, and all the necessary appurtenances for threshing. The stacked grain is kept in better condition from having a freer circulation of air, and being so disposed as to be free from the attacks of vermin. A regular yard is set apart for stacks, elevated platforms are provided on which the stacks are built, and they are so arranged as to prevent vermin from climbing to them from the ground, and so far separated as to leave each stack isolated. Many such conveniences are known to the American farmer. The skeleton barn, a building but partially enclosed, spaces being left between the boards for the free ingress of air, with a durable roof and projecting eaves, is most used for grain, and for the storing of hay loosely trussed for market. The sheep and stock barns on the continent of Europe are generally of an inferior character, and usually serve also as a residence for the family of the servant or foreman of the farm. The sheep and stock barns of the United States are generally commodious structures, with wide sheds on each side, in which the animals find shelter and receive their provender, or, when built on a side hill, the cellar is appropriated to this purpose. Sheds also surround the whole yard in many instances, while stacks of the poorer quality of hay and threshed straw occupy the centre of the yard, their contents being freely used as bedding and partial food for cattle, the greater bulk finding its way into the manure heap. These are both comfortable quarters for the animals, and profitable for the farmer. Modifications of this general plan are made by each farmer according to his means and peculiar ideas. As a general rule, stock barns are found most profitable when they afford the most ample accommodations. The greater the comfort of his animals, the more uniform the profit of the farmer. Great care should be used in the selection of a place for the farm buildings. The barns should be easily reached, and so arranged as to admit of the economical disposition of both crops and manures. The soil should be dry and porous, or should be thoroughly drained. Ample provision should be made for the saving of manures. Side-hill barns afford cellars in which these may be kept without waste, their bulk augmented, and those changes produced upon them which are so essential to their highest efficacy. If no good springs, streams, or wells can be obtained, cisterns for rain water should be provided. Barns are usually built of wood, some of stone, a few of brick, and of concrete or gravel wall. The gravel wall can be made cheaper than stone walls, and can be built on farms affording only gravel and small stones of a quality too poor to build ordinary stone walls. Barn doors are usually of wood; and when intended for the threshing or handling of grain should be tight and smooth, and kept clean. Oak, beech, and yellow pine form excellent floors. The threshing floors described by Columella were formed by wetting the earth with the lees of oil, mixing in some chaff, and ramming the whole down firmly; chaff was then trodden on the top, and the whole left to dry in the sun. The lees of oil were said to check vegetation, and drive away vermin. The preparation of corrugated iron, at a comparatively cheap rate of cost, suggests that material as one of the best for a well-built barn. The roof deserves more attention than it usually receives at the hands of the farmer who wishes to be truly economical in his expenditure for buildings. Finally, let all farmers remember that ventilation is one of the most important things to be secured, especially in stock barns.

Barn Owl, a widespread but rather uncommon owl (*Strix flammea*) which seems to be known in all parts of the world, and is everywhere recognizable among other owls by the heart-shaped form of the facial disks, which meet in a point below the beak. These give a very quaint expression, which has led to the soubriquet «monkey-faced» in the southern States. It is about 17 inches in length, and its plumage is yellowish-red, irregularly marked with lighter and darker tints. The eyes are small and black and surrounded by cream-colored disks, bordered with rust-red. The legs are long and bear short feathers only. It is more numerous in the southern part of the United States than in the northerly portion, and is rarely seen even where many exist, since it is more completely nocturnal in its habits than are most owls. It makes its nest in hollow trees or a niche in some rocky cliff or earthen bank, and occasionally nests in belfries or old walls, as is a common habit in Europe. The nest is composed of straw and feathers and the eggs are white. H. K. Fisher, author of 'The Hawks and Owls of the United States' (1893), regards this owl as probably the most beneficial of its tribe to the agriculturist, because in America, at least, it subsists almost entirely upon the small rodents so injurious to crops. This is especially true in the South, where it subsists on the cotton rat and the many harmful mice; while in the West, it catches gophers, ground-squirrels, and rabbits, so that it is entitled to gratitude and protection. The same beneficent service is reported for it in other parts of the world. The American is regarded by many ornithologists as a separate species, *Strix pratincola*.

Barn Swallow, one of the most familiar and wide spread of North American swallows (*Chelidon erythrogaster*). Its plumage is lustrous blue, the forehead, chin, and throat dull

chestnut, bounded by a collar-like band of blue across the chest, below which the plumage is pale reddish-brown. By its deeply forked tail it is readily distinguished from the square-tailed cliff-swallow (q.v.), which also throngs about barns, and often is wrongly termed barn swallow; but the latter invariably puts its flask-shaped nests under the eaves outside of the structure, while the true barn swallow invariably nests inside the building. These birds have remarkable wing power, flying for many miles at a time at the rate of more than a mile a minute, with consummate grace and ease; and catching in the air all their food, which consists of winged insects, many of which are injurious or annoying to man, so that their presence is of decided benefit, as well as a pleasant accompaniment of rural life. Before the country was densely populated the swallows made their homes in caves, or in niches of rocks, or hollow trees, but ever since the civilization of the country began, these trustful birds have built their nests close to man's habitation, everywhere frequenting barns and outhouses. Their nest is composed of layers of mud, about an inch thick, plentifully mixed with straw, and lined with feathers. They usually rear two broods a season: the first in May, and the second in July. The eggs are four to six in number, white, with red and purple spots and splashes nearly covering the larger end. When the second brood of young are capable of using their wings, the swallows congregate in flocks of thousands, and migrate southward, traveling by daylight, instead of at night, as is the custom of most migratory birds. In the northeastern part of the country, the barn swallows have been nearly exterminated by the English sparrow, who seize their nest for their own breeding purposes and destroy their eggs and young in a ruthless way, often, apparently, in a spirit of malicious mischief.

Bar'nabas, the surname given by the apostles to Joses, or Joseph, a fellow-laborer of Paul, and, like him, ranked as an apostle. He is said to have founded at Antioch the first Christian community, to have been first bishop of Milan, and to have suffered martyrdom at Cyprus. His festival is held on 11 June. There is an epistle in 21 chapters ascribed to Barnabas by Tertullian and other early Christian writers, but without any support of internal evidence. It was probably written between 119 and 126 B.C. by some one who was not a Jew, and under the influence of Alexandrian Judaistic thought.

Barnabas, Cape, a headland of Alaska, which the navigator, Capt. Cook, discovered on St. Barnabas Day.

Bar'nabites, a religious order, properly called "Regular Clerks of the Congregation of St. Paul," and deriving the name of Barnabites from their church, dedicated to St. Barnabas, at Milan. Their origin is uncertain, but is supposed to date from the pontificate of Gregory XI. (1370–8). A younger branch was founded during the 16th century, for the purpose of preaching and administering the sacraments among the populace of Milan, who had become much corrupted by the continual presence of a multitude of German soldiers in the city, and who were also much afflicted by pestilence. In 1579 their constitutions and rules were fully revised and established under the direction of St. Charles Borromeo. They were expelled from France in 1880 and as an order have greatly declined.

Barnaby, Sir Nathaniel, English naval architect: b. Chatham, 1829. From 1855 to 1885 he was engaged in the designing office of the admiralty in the construction of nearly all the British naval vessels. He brought about the substitution of steel for iron in shipbuilding, and the subsidizing of merchant vessels for use in war. He was made a K. C. B. in 1885.

Barnaby Rudge, a novel by Charles Dickens, published in 1841. The plot is extremely intricate. Some of the most whimsical and amusing of Dickens' character-studies appear in the pages of this novel; while the whole episode of the gathering and march of the mob, and the storming of Newgate is surpassed in dramatic intensity by no passage in modern fiction, unless by Dickens' own treatment of the French Revolution in the 'Tale of Two Cities.' Among the important characters, many of whom are the authors of sayings now proverbial, are Gabriel Varden, the cheerful and incorruptible old locksmith, father of Dolly Varden; Mrs. Varden, a type of the narrow-minded zealot, devoted to the Protestant manual; Miss Miggs, their servant, mean, treacherous, and self-seeking; Sim Tappertit, an apprentice, an admirable portrait of the half-fool, half-knave, so often found in the English servile classes half a century ago; Hugh, the hostler, and Dennis, the hangman; and Grip, the raven, who fills an important part in the story, and for whom Dickens himself named a favorite raven.

Barnacle, Lord Decimus Tite, the name of the nobleman whom Dickens in his 'Little Dorrit' places in charge of the circumlocution office.

Barnacle, a degenerate crustacean, living attached to rocks and the bottoms of ships. The barnacles would at first glance hardly be regarded as Crustacea at all, and were considered to be mollusca, until in 1836, Thompson found that the young barnacle was like the larvæ of other low Crustacea (*Copepoda*). The young barnacle is, as in the common sessile form, a shell-like animal; the shell composed of several pieces or valves with a multivalve, conical, movable lid, having an opening through which several pairs of long, many jointed, hairy appendages are thrust, thus creating a current which sets in toward the mouth. The common barnacle (*Balanus balanoides*) abounds on every rocky shore from extreme high-water mark to deep water, and the student can, by putting a group of them in sea water, observe the opening and shutting of the valves and the movements of the appendages. The structure of the barnacle may best be observed in dissecting a goose-barnacle (*Lepas fascicularis*). This barnacle consists of a body (capitulum) and leathery peduncle. There are six pairs of jointed feet, representing the feet of the cyclops. The mouth, with the upper lip, mandibles, and two pairs of maxillæ, will be found in the middle of the shell. A short œsophagus leads to a pouch-like stomach and tubular intestine. This form, like most barnacles, is hermaphroditic, the ovary lying at the bottom of the shell, or,

in the pedunculated forms, in the base of the peduncle, while the male gland is either close to or some distance from the ovary. There is also at the base of the shell, or in the peduncle when developed, a cement-gland, the secretion of which is for the purpose of attaching the barnacle when in the "cypris" stage to some rock or weed.

While the sexes are generally united in the same individual, in the gerera *Ibla* and *Scalpellum,* besides the normal hermaphroditic form, there are females, and also males called "complementary males," which are attached parasitically both to the females and the hermaphroditic forms, living just within the valves or fastened to the membranes of the body. These complemental males are degraded, imperfect forms, with sometimes no mouth or digestive canal. The apparent design in nature of their different sexual forms is to effect cross-fertilization. The eggs pass from the ovaries into the body-cavity, where they are fertilized, and remain for some time. They pass through a morula condition, a suppressed gastrula or two-layered state, and hatch in a form called a "Nauplius," from the fact that the free-swimming larva of the Entomostraca was at first thought to be an adult Crustacean, and described under the name of Nauplius. The Nauplius of the genuine barnacles has three pairs of legs ending in long bristles, with a single eye and a pair of antennæ, the body ending in front in two horns, and posteriorly in a long caudal spine. After swimming about for a while, the Nauplius attaches itself to some object by its antennæ, and a strange transformation results. The body is enclosed by two sets of valves, appearing as if bivalved, like a cypris; the peduncle grows out, concealing the rudimentary antennæ, and the feet become smaller, and eventually the barnacle shape is attained. The common barnacle (*Balanus balanoides*) attains its full size after becoming fixed, in one season; that is, between April and November.

Barnacle-eater. See FILE-FISH.

Barnacle Goose. See BERNACLE GOOSE.

Barnard, Lady Anne, Scottish poet, author of 'Auld Robin Gray': b. 1750; d. 26 May 1825. She was the eldest daughter of James Lindsay, fifth Earl of Balcarres, and in 1793 married Andrew Barnard, a son of the bishop of Limerick, and colonial secretary to Lord Macartney at the Cape of Good Hope. There Lady Anne lived till 1807, when, losing her husband, she returned to London, her residence till her death. Her famous lyric was written as early as 1772 to sing to an ancient melody; but she first acknowledged its authorship in 1823 to Sir Walter Scott, who two years later edited it for the Bannatyne Club, with two continuations. Her 'Letters' were published in 1901.

Barnard, Charles, American dramatist: b. Boston, Mass., 13 Feb. 1838. He is a journalist and dramatist. His most popular play is 'The County Fair' (1888). Author of 'The Tone-Masters' (New York 1871); 'Knights of To-Day' (1881); 'The Whistling Buoy' (1887); dramas, and books on gardening and electricity.

Barnard, Mrs. Charlotte Arlington, "CLARIBEL," English composer of songs and ballads: b. 1830; d. 1869. She wrote nearly 100 ballads between 1858 and 1860 under the pseudonym of Claribel, many of them becoming very popular, "Won't You Tell Me Why, Robin?" and "Come Back to Erin," being especially well known. In most cases she wrote the words for her songs, and she was also the author of a volume of 'Thoughts, Verses, and Songs.'

Barnard, Daniel Dewey, American lawyer: b. Sheffield, Mass., 16 July 1797; d. Albany, N. Y., 24 April 1861. He was admitted to the bar and began practice at Rochester, N. Y., 1821. He was a representative in Congress, 1827–9, and 1839–45, serving as chairman of the Judiciary Committee. From 1850 to 1853 he was minister to Russia. He gave much time to literary pursuits, publishing several addresses and speeches.

Barnard, Edward Emerson, American astronomer: b. Nashville, Tenn., 16 Dec. 1857. He was astronomer in Lick Observatory, California, in 1887–95, and then became professor of astronomy in Chicago University. His principal discoveries are the fifth satellite of Jupiter in 1892, and 16 comets. He has made photographs of the Milky Way, the comets, nebulæ, etc. The French Academy of Sciences awarded him the Lalande gold medal in 1892, and the Arago gold medal in 1893, and the Royal Astronomical Society of Great Britain gave him a gold medal in 1897. He is a member of many American and foreign societies, and a contributor to astronomical journals.

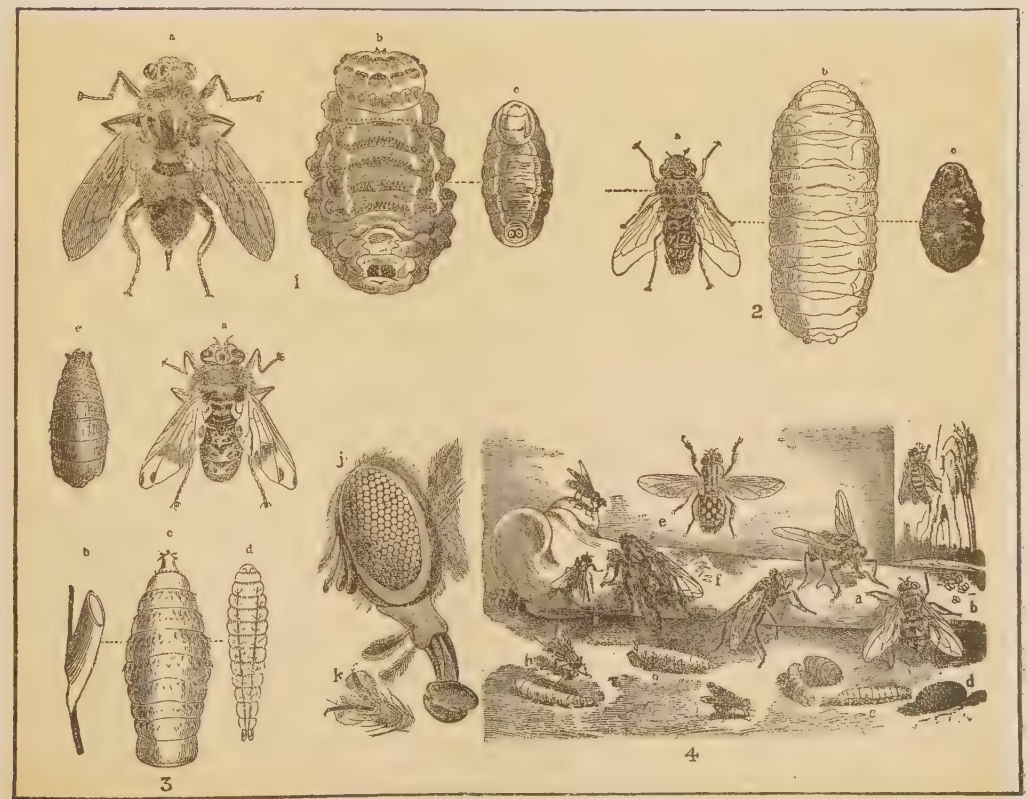
Barnard, Frederick Augustus Porter, American educator: b. Sheffield, Mass., 5 May 1809; d. 27 April 1889. He was graduated at Yale College in 1828; instructor there in 1830; professor of mathematics and natural philosophy in the University of Alabama, 1837–48, and afterward of chemistry and natural history till 1854; professor of mathematics and astronomy in the University of Mississippi, 1854–61; its president in 1856–8; and its chancellor in 1858–61. He was president of Columbia College, New York, in 1864–88. In 1860, he was appointed a member of the expedition to observe the eclipse of the sun in Labrador; was engaged in 1862 in reducing observations of the stars in the southern hemisphere; had charge of the publication of charts and maps of the United States Coast Survey in 1863; was named one of the original incorporators of the National Academy of Sciences in 1863; was one of the United States commissioners to the Paris Exposition in 1867; member of the American Philosophical Society, corresponding member of the Royal Society of Liege, and member of many other scientific and literary associations. Among his publications are: 'Letters on College Government' (1854); 'Report on Collegiate Education' (1854); 'Art Culture' (1854); 'History of the American Coast Survey' (1857); 'University Education' (1858); 'Undulatory Theory of Light' (1862); 'Machinery and Processes of the Industrial Arts, and Apparatus of Exact Science' (1868); 'Metric System of Weights and Measures' (1871); 'Recent Progress of Science'; etc. Barnard College, affiliated with Columbia University, was named in his honor.

Barnard, George Grey, American sculptor of eminence: b. Bellefonte, Pa., 24 May 1863. He studied at the Chicago Art Institute and the École Nationale des Beaux Arts, Paris, 1884–7. He first exhibited at the salon of 1894. In 1900

BARNACLE, BALANOGLOSSUS, ETC.

1. Common Barnacle (Balanus)
2. Larva of Lepas.
3. Mussel (Lepas anatifera).
4. Megalasma striatum.
5. Balanoglossus clavigerus, young specimen.

BOT FLIES AND BLOW FLIES.



1. Cattle Bot Fly. a, Adult; b, Larva; c. Pupa, all enlarged.
2. Sheep Bot Fly. a, Adult; b, Larva, from above; c, Pupa.
3. Horse Bot Fly. a, Adult; b, Egg, attached to a hair.

he received a gold medal at the Paris Exposition. His chief works, largely symbolical in character, are: 'Brotherly Love,' 'The Two Natures' (in the Metropolitan Museum), 'The God Pan' (Central Park), and 'The Hewer.' His studio is in New York.

Barnard, Henry, American educator: b. Hartford, Conn., 24 Jan. 1811; d. 5 July 1900. He was president of the University of Wisconsin (1856–9), and St. John's College, Annapolis, Md. (1865–6); founded the 'American Journal of Education' (1855); was the first United States commissioner of education (1867–70). Among his numerous writings are: 'Hints and Methods for Teachers' (1857); 'Pestalozzi and Pestalozzianism' (1861); 'German Educational Reformers' (1862); etc. In 1886 he began to publish the 'American Library of Schools and Education,' a collection of 800 of his own writings, reports, etc.

Barnard, John, American Congregational clergyman: b. Boston, 6 Nov. 1681; d. 24 Jan. 1770. He was one of the earliest New England dissenters from Calvinism. Ordained colleague minister of Marblehead (1716); he took great interest in the local fisheries and commerce. He wrote 'History of the Strange Adventures of Philip Ashton' (1725), etc.

Barnard, John Gross, American military engineer: b. Sheffield, Mass., 19 May 1815; d. 14 May 1882; brother of F. A. P. Barnard (q.v.). He was graduated at the United States Military Academy in 1833; served from 1835 to 1852 on the coast of the Gulf of Mexico; and was brevetted major in the Mexican war. He subsequently had charge of the fortifications of San Francisco and New York harbors.

Barnard, Joseph Folger, American jurist: b. Poughkeepsie, N. Y., 1823; d. there 6 Jan. 1904. He was graduated from Yale University in 1841; admitted to the New York bar 1844; was elected justice of the State supreme court in 1862, and was re-elected, holding the office until his death.

Barnard College, an educational institution for women in New York, affiliated with Columbia University (q.v.), and founded in 1889. The admission of women to Columbia on the same terms as men had been warmly urged for some years by President F. A. P. Barnard (q.v.), when in 1882 the trustees consented to allow their attendance at the lectures, but declined to grant matriculation or examination. This being found contrary to the statutes of Columbia, on 8 June 1883 a collegiate course duplicating that for the men was opened to women outside the college, but taught by the same instructors, with the same examinations, and rewarded with a degree. The plan was abandoned after five years' trial, and in March 1888 a proposal was made to establish a woman's annex, to be separately financed, but managed under the approval of the trustees of Columbia; the women to pursue the same courses under the same instructors, in such wise as not to interfere with the men's classes, Columbia to appoint the examiners and confer the degrees. This was accepted, and in 1889 the institution was opened under the name of Barnard College, with seven students. Later the rule of common instructors was so far relaxed that the professors in Barnard were only required to have the approval of Columbia, and since then the deans and some professors have been women; still later, each institution assumed the support of three professorships in the other. After a time certain classes of the senior year and many post-graduate classes were opened to women, subject in all cases to the consent of each professor. The growth of Barnard College rendered these provisional arrangements unsatisfactory, and they were modified by making Barnard formally a part of the Columbia system, 19 Jan. 1900. At present the president of Columbia is *ex officio* president and a trustee of Barnard, while the dean of Barnard controls its internal management and has a vote in the council of Columbia. Barnard, however, remains a distinct institution, separately financed, with its own trustees, and supports a complete undergraduate course. Columbia grants all Barnard degrees as its own, and the Columbia library is free to Barnard students, and certain post-graduate courses are open to members of both institutions. Barnard College received 32 new students during its first year, had doubled the number three years later, and 16 years from its foundation, in 1905, had 57 professors and 366 students, and had graduated 455 in all. The productive funds are $28,333 and income $119,157. Barnard was started without further resources than a few four-years subscriptions, but speedily attracted donations and endowments which have enabled it to keep pace with its rapidly growing demands. Up to March 1902, it had an endowment of $250,000; in that month an equal amount was added by John D. Rockefeller, and another $250,000 was the result of lesser gifts. In March 1903, a gift of $1,000,000 was made to the college by Mrs. Elizabeth Milbank Anderson, who had previously given Milbank Hall to the institution. Among its buildings are Brinkerhoff Hall, chiefly built from gifts by Mrs. Van Wyck Brinkerhoff; Fiske Hall, given by Mrs. Josiah M. Fiske; and Milbank Hall, given by Mrs. Abram A. Anderson. The first dean of Barnard was Miss Emily James Smith (who subsequently became the wife of George Haven Putnam, the New York publisher), and in 1901 she was succeeded by Miss Laura Drake Gill.

Barnar'do, Thomas John, English philanthropist: b. Ireland, 1845; d. London, Eng., 19 Sept. 1905. He founded the Barnardo Homes for homeless children, his attention being turned in this direction by the condition of a boy in a ragged school in east London in 1866. Following up the subject, he began to rescue children who had found their only shelter at night under archways, or in courts and alleys. These were introduced to his homes, where they received an industrial training, were saved from a possible career of crime, and enabled to achieve an honorable position in life. In 1899 over 36,000 boys and girls had passed through the homes; at the same time Dr. Barnardo had under his direction in the United Kingdom and the colonies 24 mission branches and 86 distinct homes dealing with every age and class of needy and destitute childhood, including an immigration depot in Ontario, an industrial farm in Manitoba, a home for babies, and a hospital for sick children. Up to 1899 the number of trained and tested boys and girls who had been placed in colonial situations exceeded 10,000.

Barna'to, Barney, or Barnett, South African speculator, whose real name is believed to have been Bernard Isaac: b. London, England, about 1845, of Hebrew parents; d. 14 June 1897. He began business as a dealer in diamonds, and in five years earned enough to buy shares in the Kimberley diamond mines. He established a partnership with Cecil Rhodes, and, when, in 1886, gold was discovered, secured possession of the greater part of the region. He committed suicide by jumping from the deck of the steamer Scot, bound from Cape Town to Southampton. See Isaac's 'Life of Barnett Barnato' (1897).

Barnaul, bär-nowl', a mining town of Siberia, in the government of Tomsk, and 230 miles southwest of the town of that name, on the Barnaulski, near its junction with the Obi. It is well built, and the streets are regular and spacious. The chief edifices are of wood. There is a mining-school, an observatory, a public library, a museum, etc. Lead is smelted from the mines in the neighborhood; there are lime and brick kilns, a mint for copper coins, and manufactories. Pop. (1897) 29,408.

Barnave, bär-nav, **Antoine Pierre Joseph Marie,** French orator: b. Grenoble, 1761; d. Paris, 29 Nov. 1793. He was chosen a deputy of the *tiers état* to the assembly of the states-general, and showed himself an open enemy to the court. The Constituent Assembly appointed him their president in January 1791. After the flight of the king he defended Lafayette against the charge of being privy to this step, and, upon the arrest of the royal family, was sent, with Petion and Latour-Maubourg, to meet them, and to conduct them to Paris. When the correspondence of the court fell into the hands of the victorious party, 10 Aug. 1792, they pretended to have found documents which showed him to have been secretly connected with it, and he was guillotined. See Salvandy, 'Life of Barnave'; Lamartine, 'History of the Girondists.'

Barnburners, a nickname for the progressive section of the New York State Democracy from about 1844 to 1852, which retaliated by calling the other party "Hunkers." They were essentially the same party which from 1835 onward had favored extension of the canal system, while their opponents were the same who wished it restricted to immediately profitable canals; but under these names the division was on the slavery question (see FREE-SOIL PARTY), in which the Barnburners were the Van Buren or Free-Soil wing. They also stood for the local control by the "Albany Regency," as against the Polk "machine" which the new administration was trying to build up in New York, and which favored the extension of slavery into the Territories. About 1852 the nicknames changed into "Softs" and "Hards," corresponding with new issues to the later "Half-breeds" and "Stalwarts." The origin of the name is usually derived from the familiar campaign story of the man who burned his barn to free it from rats.

Barnby, Joseph, Sir, English composer and organist: b. York, 12 Aug. 1838; d. London, 28 Jan. 1896. He was chorister in York Minster; organist St. Andrew's, Wells Street, London, 1863–71; precentor and choir-master St. Ann's, Soho, 1871; precentor and director of musical instruction in Eton College, 1875, and head of the Guildhall School of Music in London from 1892. His cantatas of "Rebekah," a sacred idyll, and "The Lord Is King"; numerous highly interesting services and anthems (such as "King All Glorious"), for the Church, as well as several secular choruses and songs, rendered him famous both in England and the United States. He was knighted in 1892.

Bar'negat Bay, a bay on the east coast of New Jersey, about 25 miles in length, and separated from the ocean by Squan and Island beaches. Barnegat Inlet connects it with the Atlantic. On the south side of the inlet is a lighthouse 150 feet high.

Barnes, Albert, American theologian: b. Rome, 1 Dec. 1798; d. Philadelphia, 24 Dec. 1870. Until the age of 17 he was employed by his father, who was a tanner, in his own occupation. At the age of 22 he graduated at Hamilton College, and after studying theology at Princeton was licensed to preach in 1824, and ordained pastor to the Presbyterian Church of Morristown, N. J., in February 1825. In 1830 he was removed to the pastoral charge of the First Presbyterian Church in Philadelphia, where he remained till his death. He is chiefly known by his 'Notes on the New Testament,' published in 11 volumes between 1832 and 1848; and his 'Notes on the Old Testament,' completed in 1870, which are favorite works with Sunday-school teachers and others engaged in biblical tuition. Other works of his are: 'The Church and Slavery' (1857); 'The Atonement in Its Relations to Law and Moral Government' (1859); 'Evidences of Christianity' (1868); 'Life at Threescore and Ten' (1869). He was tried for heresy on account of his belief in unlimited atonement, and though acquitted, the eventual result of the trial was to divide the Presbyterian body in the United States into the Old and New School branches in 1837.

Barnes, Alfred Smith, American publisher: b. New Haven, Conn., 28 Jan. 1817; d. Brooklyn, N. Y., 17 Feb. 1888. He began his career in the book store of D. F. Robinson & Company in Hartford, Conn., removing to New York with the firm. At the age of 21 he formed a connection with Prof. Charles F. Davies and began publishing the latter's mathematical works, personally canvassing for them every State in the country. In 1840 he removed his business to Philadelphia, but returned to New York in 1855. He confined his publications almost exclusively to school text-books. Retiring from active management in 1880 he left five sons to continue the business. At his death he left large bequests to charities and educational institutions.

Barnes, Barnabe, English poet: b. Yorkshire, about 1569; d. Durham, England, December 1609. He was the son of a bishop of Durham; was educated at Oxford; and went to Normandy in 1591 with the Earl of Essex. His fame rests on a collection of sonnets, madrigals, and odes, called 'Parthenophil and Parthenope' (about 1593). Other books of his are: 'A Divine Century of Spiritual Sonnets' (1595); and 'The Devil's Charter,' a tragedy (1607).

Barnes, Charles Reid, American botanist: b. Madison, Ind., 7 Sept. 1858. He was educated at Hanover (Ind.) College, 1877, and pursued graduate studies at Harvard. He held professorships in Purdue University and the University of Wisconsin, 1880–98, and since 1898 has been professor of plant physiology in the University of Chicago. He is the author of

'Outlines of Plant Life' (1900); joint author of 'Plant Dissection'; and 'Keys to the Genera and Species of North American Mosses' (1890). He has contributed many papers to the 'Botanical Gazette,' of which he has been an editor since 1883.

Barnes, Dame Juliana. See BERNERS, DAME JULIANA.

Barnes, James, American soldier: b. Boston, Mass. 1806; d. Springfield, Mass., 12 Feb. 1869. Appointed to West Point from Massachusetts, he graduated there in 1829, standing fifth in a class which included R. E. Lee, J. E. Johnston, and a number of others who afterward became distinguished. Resigning from the army after seven years' service, he became a railroad engineer and built, either wholly or in part, the Rome & W., Sacketts' H. & E., the Buffalo, C. & N. Y., the Terre Haute, A. & St. L., and the Potsdam & W. R.R.'s, between 1848 and 1857. During the Civil War he was colonel of the 18th Massachusetts Volunteers 1861–2, and brigadier-general of United States Volunteers 1862–5. He was present at the battles of Antietam, Fredericksburg, Chancellorsville, and Gettysburg, where he was severely wounded. Exposure and wounds so impaired his constitution that he was unable to engage actively in his profession after the War.

Barnes, James, American author: b. Annapolis, Md., 19 Sept. 1866. He was graduated from Princeton University in 1891, and has been connected in an editorial capacity with 'Scribner's Magazine' and 'Harpers' Weekly.' During the Boer war he acted as a correspondent in the field for the 'Outlook.' His books are: 'Naval Actions of 1812'; 'For King or Country'; 'Yankee Ships and Yankee Sailors'; 'A Loyal Traitor'; 'The Hero of Erie' (1898); 'A Princetonian'; 'David G. Farragut' (1899); 'Drake and His Yeomen' (1899); 'Great War Trek with the British Army on the Veldt' (1901); 'With the Flag in the Channel' (1902).

Barnes, Joseph K., American surgeon: b. Philadelphia, 21 July 1817; d. Washington, D. C., 5 April 1883. He was educated in the medical department of the University of Pennsylvania; became assistant surgeon in the army in 1840, and served at various posts through the Mexican war. At the beginning of the Civil War he was summoned from Oregon and assigned to duty in the office of the surgeon-general. In 1863 he was appointed a medical inspector, with the rank of colonel, and in September of the same year was promoted to brigadier-general. In 1865 he was brevetted major-general, United States Army. He was surgeon-general of the army from 1864 till 1882, when he was retired.

Barnes, William, English dialect poet and philologist: b. Rushay, Dorsetshire, in 1800; d. 7 Oct. 1886. Of humble birth, he first entered a solicitor's office, then taught a school in Dorchester, and having taken orders became rector of Winterbourne Came in his native county, and died there. He acquired a knowledge of many languages, and published 'An Anglo-Saxon Delectus'; 'A Philological Grammar,' grounded upon English; 'Grammar and Glossary of the Dorset Dialect,' etc., but is best known by his 'Poems of Rural Life,' in the Dorset dialect, and 'Rural Poems,' in common English.

Barnesville, Ohio, town in Belmont County, on the B. & O. R.R., 32 miles west of Wheeling. It is the centre of an extensive tobacco and fruit region and has numerous manufactories. It has a national bank, schools, churches and several newspapers. Pop. (1900) 3,721.

Bar'net, or **High Barnet,** a town of England, in Herts, 11 miles from London. Pop. (1901) 7,900.

Barneveldt, bär'nĕ-vĕlt, **John van Olden,** Dutch statesman: b. 1549; d. 13 May 1619. He early showed himself zealous for the independence of the United Provinces, and as advocate-general of the province of Holland displayed profound views and great skill in business. He preserved his country against the ambition of Leicester; penetrated the secret plans of Maurice of Nassau, whom his fellow-citizens had elevated to the post of stadtholder; and his marked distrust of this prince placed him at the head of the Republican party, which aimed to make the stadtholder subordinate to the legislative power. Spain at that time made proposals for peace through the archduke, governor of the Netherlands. Barneveldt was appointed plenipotentiary on this occasion, and evinced alike the skill of a statesman and the firmness of a republican. Maurice of Nassau, whose interest led him to prefer war, labored to prevent the establishment of peace; and Barneveldt was induced only by the most urgent solicitations of the states to retain the office which had been assigned to him, concluding in 1609 an armistice with Spain for the term of 12 years, in which the independence of Holland was acknowledged. His influence now became still greater, and he was more and more an object of jealousy to the house of Nassau. The hostile spirit of the opposite parties in the state was further increased by theological difficulties. In order to prevent a civil war Barneveldt proposed an ecclesiastical council, which resolved upon a general toleration in respect to the points in question. The states acceded at first to this wise measure, but at a later period the Nassau party persuaded them to adopt other views. This party represented the Arminians as secret friends of Spain. Maurice insisted upon a general synod, with a view, as he pretended, of putting an end to all religious quarrels; but Barneveldt persuaded the states to oppose this measure. Troops were now levied, without the consent of Maurice, to re-establish order in the cities where the Gomarists had excited disturbances. On the other side, the Nassau party redoubled its attacks upon Barneveldt, who, in answer to them, published that celebrated memorial in which he warns the United Provinces of the danger which threatened them from the other party. Maurice, however, procured the assembling of a synod at Dort, in 1618, to which almost all the Calvinistic churches of Europe sent deputies. They condemned the Arminians with the most unjust severity, and Maurice was encouraged by their sentence to adopt violent measures. He caused Barneveldt and other leading men of the Arminians to be arrested; and 26 bribed judges condemned to death as a traitor the man to whom his country owed its political existence. The old man of 72 ascended the scaffold, and

suffered death with the same firmness which he had evinced under all the circumstances of his life. His two sons formed a conspiracy against the tyrant; William escaped, but Reinier was taken and executed. His mother, after his condemnation, threw herself at the feet of Maurice to beg for mercy, and to his question why she humbled herself thus for the sake of her son when she had not done it for her husband, made the memorable reply: "I did not ask pardon for my husband, because he was innocent; I ask it for my son, because he is guilty." See Motley, 'John of Barneveldt' (1874).

Barney, Joshua, American naval officer: b. Baltimore, Md., 6 July 1759; d. 1 Dec. 1818. He was captured by the British in March 1778, but exchanged in August of the same year; was captured again and held a prisoner till he escaped in 1781. In April 1782, he took the British ship General Monk, off Cape May; in November 1782, he carried dispatches to Dr. Franklin in France, and brought back a sum of money lent by the French government. In 1794 he went with Monroe to France, and for six years served in the French navy. In 1814 he commanded the fleet stationed in Chesapeake Bay.

Barnfield, Richard, English poet: b. Norbury, Shropshire, 1574; d. 1627. His lyrics, 'As It Fell Upon a Day' and 'If Music and Sweet Poetry Agree,' were long ascribed to Shakespeare and were included in 'The Passionate Pilgrim' (1599). Barnfield's works include: 'The Affectionate Shepherd' (1594); 'Cynthia, with Certain Sonnets and the Legend of Cassandra' (1595); 'The Encomion of Lady Pecunia' (1598).

Barni, bär-nē, **Jules Romain,** French scholar and critic: b. Lille, 1 June 1818; d. Mers, 4 July 1878. His efforts to propagate the Kantian philosophy through the medium of 'Observations on the Sense of the Sublime and Beautiful' (1836); 'Foundations of Ethical Metaphysic' (1848), and 'Kantian Philosophy' (1850), earned him distinction; as did also, in another, but contiguous field, a 'History of Moral and Political Ideas in France in the Eighteenth Century' (1866).

Barns'ley, England, a town in the west riding of Yorkshire, 23 miles south by east of Leeds. It occupies the summits and slopes of two hills and is well built. Among the chief buildings are the public hall, built at a cost of over £26,000, and furnishing accommodations for various societies; the offices of the miners' association, the Beckett Hospital, the county court, the offices of the Barnsley Banking Company, the parish church, St. George's Church, the Congregational Church, a beautiful edifice, and several other places of worship. Its staple industry is the manufacture of linen in a variety of forms, which is carried on to a great extent, both handlooms and power-looms being used; linens are also printed here in a style similar to the cottons of Lancashire. There are numerous collieries in the neighborhood, among which the Oaks Colliery has been made memorable by several disastrous explosions. The town possesses a beautiful public park containing several monuments. A United States consul is stationed here. Pop. (1901) 41,000.

Barn'stable, Mass., a town, port of entry, and county-seat of Barnstable County, 72 miles southeast of Boston. Within its corporate limits are 12 villages, several of which, such as Hyannis, Osterville, and Cotuit, are well-known summer resorts. The town has several public libraries and a State normal school. Farming, fishing, and cranberry culture are the principal industries. Pop. (1900) 4,364.

Barnstaple, England, a town in Devonshire, 34 miles northwest from Exeter, on the right bank of the Taw, here crossed by a handsome bridge of 16 arches. It is locally styled Barum, and among its public edifices are a large 14th century church, a guildhall, and market buildings, the bridge buildings, Albert clock-tower, etc. Its manufactures consist chiefly of pottery, known as "Barum ware," lace, paper, furniture, toys, leather, gloves, and collars; and ships and boats are built. The trade chiefly depends on the surrounding district. Previous to 1885 the town returned two members to Parliament. Pop. (1901) 14,000.

Barnum, Frances Courtenay (Baylor), American novelist: b. Fayetteville, Ark., 1848. She has written 'On Both Sides,' an international novel (1886); 'Behind the Blue Ridge,' 'Juan and Juanita,' a story for boys and girls; 'Claudia Hyde' (1894); 'The Ladder of Fortune' (1899). She has also been a frequent contributor to magazines, and a writer of short stories. Since her marriage she has lived in Savannah, Ga.

Barnum, Phineas Taylor, American showman: b. Bethel, Conn., 5 July 1810; d. Bridgeport 7 April 1891. He was the son of a tavern-keeper and in his boyhood displayed a remarkable propensity for practical jokes upon his father's customers, as well as a decided turn for trade. Having accumulated a small sum of money he opened a small miscellaneous store. Here he was very successful, and taking advantage of the mania for lotteries which then prevailed throughout the country, he visited New York, and obtained some insight into their management. Returning to his store, he immediately entered into this business upon a large scale, established agencies in various cities and towns, and realized considerable sums from the immense sales of tickets which he was thus enabled to make. The predominating trait in his character would not, however, permit him to settle down as a country store-keeper, and we soon hear of him as the editor of the *Herald of Freedom*, published in Danbury, Conn. In this undertaking he was also very successful in a pecuniary point of view, but his freedom of speech and the boldness of his opinions soon gained him many enemies, and he was several times sued for libel, and once confined in prison for 60 days. In 1834 he removed with his family to New York, having become much reduced in circumstances. Here he tried many ways to obtain a livelihood, but without much success, until 1835, when hearing of Joice Heth, a colored woman, the reputed nurse of George Washington, he visited her owners, and becoming satisfied that here was an opportunity of retrieving his broken fortunes, he became her purchaser for the sum of $1,000, which he had obtained from various friends. By widely advertising this curiosity, considerable excitement was created, and the receipts soon amounted to $1,500 per week. This was Mr. Barnum's first attempt as a public showman, and finding the business

profitable, he collected a small company and traveled through the country, realizing large sums wherever he halted. In 1836 Joice Heth died, and a post-mortem examination proved her to have been but 75 or 80 years old, instead of 161, which was her reputed age. From 1836 until 1839 Mr. Barnum continued in the exhibiting business, but was then obliged to return to New York, again reduced to poverty. He now barely subsisted by writing occasional articles for Sunday papers, and by petty jobs. In 1841, the establishment known as Scudder's American Museum was announced for sale, and with a boldness almost unparalleled in mercantile transactions, Mr. Barnum negotiated for its purchase; without owning a dollar he made satisfactory arrangements with its holders and took possession. Here his fortune turned; at the end of a year he was able to pay all the obligations which he had entered into on account of the museum. In 1848 he had added to it two other extensive and valuable collections, beside several minor ones, and single curiosities without number. It now became the most popular place of amusement in the United States. In 1842 he heard of Charles S. Stratton, of Bridgeport, then 5 years old, less than 2 feet high, and weighing only 16 pounds. The boy became known to the world as Gen. Tom Thumb, and was exhibited in the United States with astonishing success until 1844, when Mr. Barnum sailed with him for England. Throughout Great Britain he was received with a popularity surpassing even that of America, and for four months the receipts averaged $500 per day. Tom Thumb was presented to the royal families of England, France, and Belgium, courted and caressed by the nobility, and presented with costly gifts. In Coventry Barnum purchased the "Happy Family" of birds and animals, for which he paid $2,500. In 1847 he returned to America, where the "General" was again exhibited for a year with increased success, the receipts in the United States and Havana amounting to $150,000. Barnum conceived the idea of inducing Mlle. Jenny Lind to visit America, and entered into an agreement with her, by which he engaged her to sing in America for 150 nights at $1,000 per night, the expenses of herself and troupe to be defrayed by him. Jenny Lind arrived in New York 1 Sept. 1850. The excitement upon this occasion has perhaps never been equaled in America. She gave her first concert at Castle Garden, and from that time until June 1851, gave 93 concerts, which were a succession of triumphs, the gross receipts for the whole amounting to over $700,000. The tickets were generally sold at auction, the highest price paid for one ticket being in Providence, R. I., namely, $650. He continued before the public with varying success until 1855, when having built himself an extensive villa at Bridgeport, Conn., he retired from business and published his life, giving a full account of the various enterprises in which he had been engaged. He also devoted much of his time to farming, and made many improvements in Bridgeport. Two museums of his were burned, in 1865 and 1868, and in 1871 he established "The Greatest Show on Earth," a combination of traveling circus and menageries. He was defeated for Congress in 1866, but was four times a member of the Connecticut legislature. Besides his 'Autobiography' (1854), he published 'The Humbugs of the World' (1865), and 'Struggles and Triumphs' (1869).

Barnum, William H., American politician: b. Boston Corners, N. Y., 17 Sept. 1818; d. 30 April 1889. He received a public school education and amassed large wealth in manufacturing; was a member of Congress from Connecticut in 1866–76, when he was elected United States Senator to complete the term of Orris Ferry (deceased). In 1880 and 1884 he was chairman of the Democratic National Committee.

Barn'well, Robert Woodward, American statesman: b. Beaufort, S. C., 10 Aug. 1801; d. 25 Nov. 1882. He was graduated from Harvard University in 1821; became a lawyer; was a member of Congress from South Carolina in 1829–33; a United States senator from that State, 1850–1; commissioner from South Carolina to confer with the Federal government regarding the proposed secession of the State in 1860; member of the Provisional Confederate Congress, 1861–2; a Confederate senator in 1862–6; and then president of the University of South Carolina (an office he had held in 1835–41) till 1873.

Barnwell, Robert Woodward, American bishop of the Episcopal Church: b. Beaufort, S. C., 27 Dec. 1849; d. Selma, Ala., 24 July 1902. He prepared for the Episcopal ministry at the General Theological Seminary in New York, and was rector of Trinity Church, Demopolis, Ala., 1876–80; and of St. Paul's, Selma, Ala., 1890–1900. In 1900 he was consecrated Bishop of Alabama.

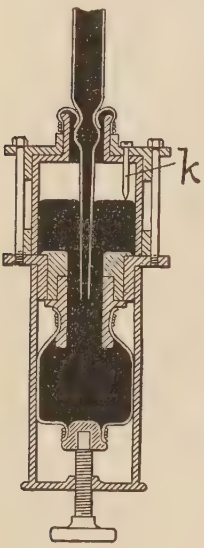
Baroccio, bä-rōch'ō, or **Barocci, Fiori Federigo,** Italian painter: b. Urbino, 1528; d. there 31 Sept. 1612. In his youth he studied the works of Titian, and, in 1560 he was entrusted by Pius IV. with the decoration of the Belvedere palace. Some of the Roman painters, envious of his genius, invited him to a banquet, where they gave him poison. For four years he was not able to touch his pencil, and afterward could only work two hours a day. His later pictures are in the style of Correggio. His 'Last Supper,' 'Descent from the Cross,' 'St. Francis Stigmatized,' 'Christ and Magdalen,' and 'Annunciation,' are among his best productions.

Baroche, bä-rōsh, **Pierre Jules,** French statesman: b. Paris, 1802; d. Jersey, 1870. In 1847 he was elected member of the Chamber of Deputies for the department of Charente-Inférieure, where he steadily opposed the ministry of Guizot. He signed the *Acte d' Accusation,* drawn up by Odillon Barrot 23 Feb. 1848, in which they were accused of violating the rights of citizens, and of systematic corruption. On 2 Dec. 1851, Baroche was nominated president of the Council of State; an office in which he exhibited much ability and tact, and subsequently filled the offices of minister of foreign affairs (1860), and minister of justice (1863). He was made a senator in 1864.

Baro'da, a city of Hindustan, in the province of Gujerat, capital of the native state of Baroda, 240 miles north of Bombay, on the left bank of the Viswamitra, here spanned by four stone bridges. The city proper is surrounded by a wall, outside of which are large suburbs. The houses in general are very mean, but there are several palaces, some handsome houses belonging to the wealthy inhabitants, government offices,

a high school, and numerous temples. It is a place of considerable trade, and the seat of a British resident. Pop. (1901) 103,800. The state of Baroda, which has been tributary to Great Britain from 1802, has an area of 8,100 square miles and a population (1901) of 1,953,000.

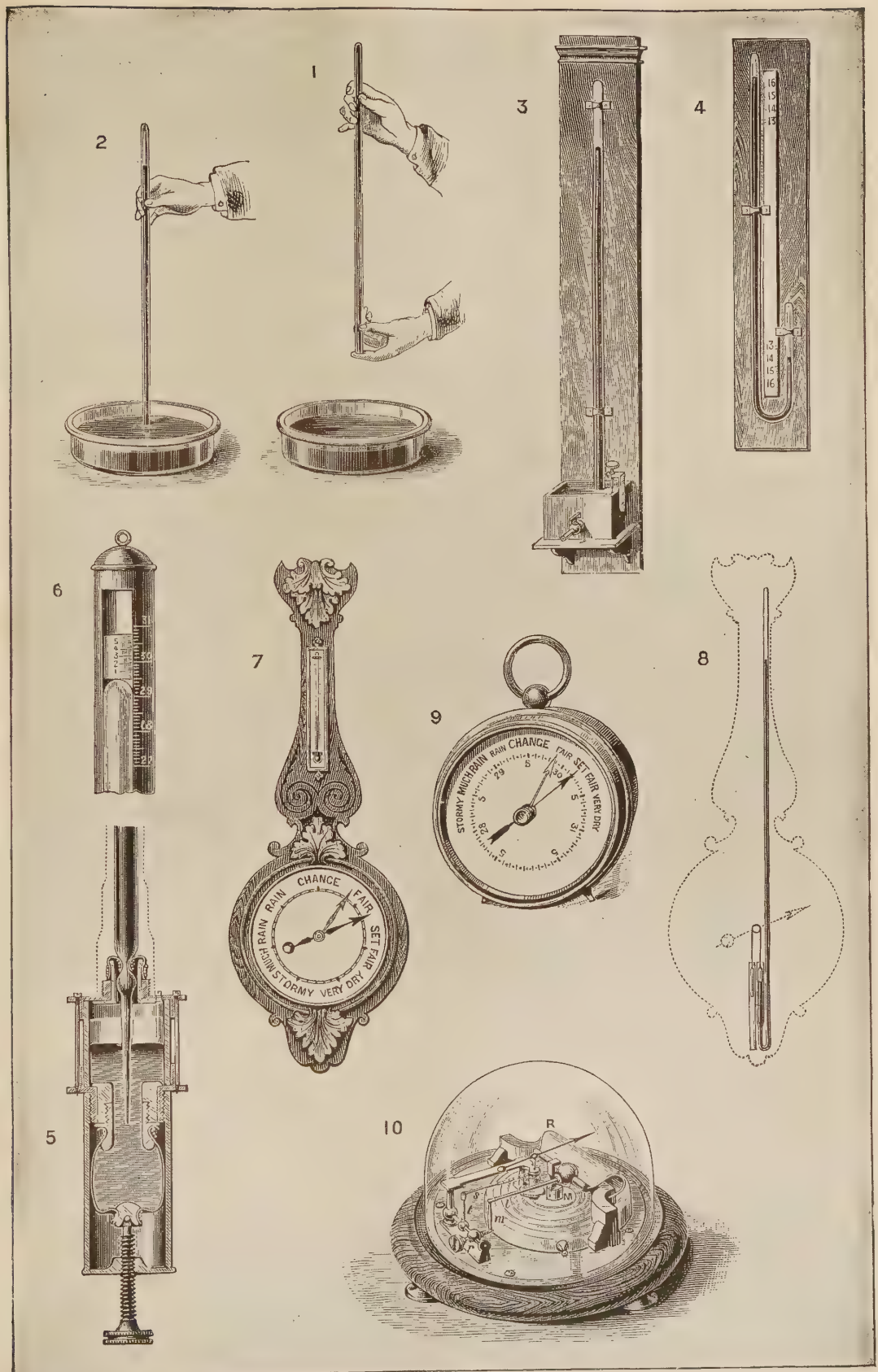
Barometer (Greek, "weight-measure"), an instrument invented by the Italian physicist Torricelli, and used for determining the pressure of the atmosphere. (For an account of its early history see ATMOSPHERE.) In its simplest form the mercurial barometer consists essentially of a vertical glass tube about a yard in length, closed at the top and open at the bottom, and partially filled with mercury, into a vessel of which its lower end also dips. In preparing the instrument for use, the tube is first completely filled with mercury; but as soon as it is free to do so the column of mercury in the tube sinks (leaving a vacuous space at the top of the tube) until it stands at a height (usually about 30 inches) such that the pressure of the column exactly balances that of the atmosphere. A graduated scale of metal or glass is provided, by means of which the difference in level between the top of the column and the surface of the mercury in the open vessel (called the "cistern") at the bottom can be measured with precision. In the Fortin instrument (the design commonly adopted for all but the most refined work) the cistern is closed below by a piece of flexible leather, which can be raised or lowered by means of a screw, in order to bring the surface of the mercury in the cistern to a certain fixed level, before the reading is taken. A pointed index, *k*, preferably of ivory, projects downward into the cistern from the upper cover, the position of its tip, with respect to the scale on the barometer tube above, being known. The mercury in the cistern being first brought accurately into contact with the extremity of *k*, the position of the upper end of the barometric column is read from the scale. The "apparent" height of the barometer is then known; but in order to deduce the "true" height, certain corrections must be applied. The most important of these is the correction for temperature. The scale from which the height of the column is read is longer when the temperature is high than when the temperature is low; and the mercury in the column is also less dense at higher temperatures than at lower ones. These two sources of error partially compensate each other; for at a high temperature the reduced density of the mercury tends to make the column stand too high, while the greater length of the scale at such a temperature tends to make the reading too small. The compensation is not perfect, however, and when the coefficient of expansion of the scale is known, a table of temperature



corrections must be calculated, to reduce the direct reading to what it would have been if it had been taken at some fixed standard temperature. The temperature of melting ice is adopted, by universal consent, as the standard to which the "apparent" reading is to be reduced. Another important correction must be applied in order to allow for the variations of gravity with the latitude and elevation of the place of observation. Where gravity is relatively weak, a longer column of mercury will be required to balance a given atmospheric pressure than would be required to balance the same pressure in a region where gravity is stronger. All the barometric readings taken at the International Bureau of Weights and Measures, near Paris, are reduced to the values they would have if made at the level of the sea, in latitude 45°; and this practice is growing in favor among physicists generally. To reduce a barometric reading to sea-level and to latitude 45°, it is merely necessary to multiply the observed height of the column (after applying the correction for temperature) by the expression $(1 - .00259 \cos L)(1 - .00000006 H)$, where L is the latitude of the place of observation, and H is its height above the sea, in feet. Several secondary corrections have also to be considered, when great refinement is desired. Prominent among these is the correction for "capillarity," which is made necessary by the fact that the mercury does not stand as high in a small barometric tube as it does in a larger one, on account of the surface tension (q.v.) of the liquid. No simple formula for this correction can be given, and it varies somewhat according as the barometer is rising or falling at the time of the observation. Tables for finding the capillary correction are given in Guyot's meteorological and physical tables, published under the direction of the Smithsonian Institution at Washington. An excellent table is also given in Guillaume's 'Thermométrie de Précision,' where the elaborate precautions taken in filling the modern precision barometer are also described.

The barometer is a simple instrument, and of the greatest use in all kinds of scientific work. The greatest fault of the mercurial instrument is the difficulty of transporting it without breakage and without destroying the vacuum in the upper part of the tube by the admission of air bubbles. Instruments like the Fortin type may be transported by screwing up the leather bottom until both the cistern and the tube are completely filled with mercury, then reversing the barometer, and carrying it to its destination bottom side up. The "aneroid" barometer, although not nearly so accurate as the mercurial instrument, possesses the advantage of portability, since, as its name signifies, it does not contain any liquid; and it is therefore used to a considerable extent in the determination of the heights of places above the sea. (See HYPSOMETRY.) Various forms of the aneroid exist. One of these consists of a cylindrical metal box, exhausted of air, and having a lid of thin, corrugated metal. The lid, which is highly elastic, yields to every change of atmospheric pressure, and delicate multiplying levers transmit its motions to an index that moves over a graduated scale, whose divisions are marked on the dial empirically, by comparison with a mercurial barometer. For further information concerning the barometer and its

BAROMETER.



1, 2 Torricelli's Experiment with tube full of Mercury. tube and scale. Glass.
3 Barometer in its simplest form.
4 Barometer with bent
5, 6 Fortin's portable Barometer—structural details.
7 Common Wheel-Barometer or Weather-
8 Internal structure of same.
9 Aneroid Barometer.
10 Internal Mechanism of Aneroid.

use, consult Stewart and Gee, 'Elementary Practical Physics'; Glazebrook and Shaw, 'Practical Physics'; Abbe, 'Meteorological Apparatus and Methods'; Guillaume, 'Thermométrie de Précision.' See also METEOROLOGY.

Barometric Light, a name sometimes given to the faint glow (first observed by Jean Picard in 1675) produced in the vacuous space of a mercurial barometer when the instrument is agitated. The light is given off by the mercurial vapor (or other highly attenuated gas) that is present, under the influence of the electricity generated by the friction of the mercury against the glass. Advantage has been taken of this phenomenon in the construction of "self-acting" Geissler tubes, the electricity required to excite them being generated, when they are inverted or shaken, by the friction of a small quantity of mercury introduced before the exhaustion. No very brilliant results can be obtained in this way, however.

Baron, bä-rôñ, **Michel,** or **Boyron,** French comedian: b. 1653, and long attached to Molière's company. For nearly 30 years he played with great success, and retired from the stage in 1691 without any apparent reason. In 1720, however, he again returned, and was received with immense enthusiasm, playing, with great success, even the most youthful parts. In 1729 he was taken ill while on the boards, and died shortly after.

Baron. In the feudal system of the Middle Ages, at first, the immediate tenant of any superior was called his Baron. In old records the citizens of London are so styled, and the members of the House of Commons, elected by the Cinque-Ports, were called barons. This title was introduced into England by William the Conqueror to signify an immediate vassal of the Crown, who had a seat and vote in the royal court and tribunals, and subsequently in the House of Peers. It was the second rank of nobility, until dukes and marquises were introduced and placed above the earls, and viscounts also set above the barons. It is now the lowest rank of the peerage, and is held by prescription, patent, or tenure. The barons were anciently divided into greater barons, or such as held their lands of the king *in capite;* and lesser barons, such as held their lands of the greater barons by military service. In Germany the ancient barons of the empire were the immediate vassals of the Crown. They appeared in the imperial court and diet, and belonged to the high nobility. But these ancient feudatories were early elevated to the rank of counts or princes. A baron has the title of "right honorable lord," etc., and should be addressed as "my lord" or "your lordship." His wife claims also the title of "right honorable," and may be addressed as "madam," or "your ladyship." The coronation robes of a baron differ from those of the other peers in having but two rows of spots on the mantle; and the parliamentary robes, in having but two guards of white fur, with rows of gold lace. The right of wearing a coronet was first conferred on barons by Charles II. It is adorned with six pearls, set at equal distances, of which four are usually shown. In England, the four puisne judges of the court of exchequer bear the title of baron, and the chief judge that of Lord Chief Baron of the Exchequer. They are addressed as My Lord, but have no seat in the House of Lords, unless by being previously made a member of the peerage. See also PEER.

Baronet, a hereditary dignity in Great Britain and Ireland next in rank to the peerage, originally instituted by James I., 22 May 1611. The first person to receive the honor was Sir Nicholas Bacon of Redgrave, whose successors in the title have ever since held the rank of premier baronet of the kingdom. Baronets are created by letters-patent, under the great seal, and the honor is generally given to the grantee and the heirs male of his body lawfully begotten, though sometimes it is entailed on collaterals. The order was created nominally to assist in the plantation of Ulster, but really in order to raise money for the king, and each baronet, on his creation, was obliged to pay into the treasury a sum amounting to a little less than $5,500. According to the terms of its foundation the dignity could be conferred only on those who had the right by inheritance from at least a grandfather to wear coat-armor, and whose income from lands was not less than $5,000 per annum. In 1622 there were 200 baronets in England, this being the number to which the order was originally limited. Charles I. and subsequent sovereigns disregarded altogether the original limitation of the number. Precedence is given to baronets before all knights, except those of the Garter, bannerets created on the field, and privy-councilors. An order of Baronets of Ireland was also instituted by James I., for the same purpose and with the same privileges as the baronets of England. Since the union, in 1801, none have been created otherwise than as baronets of the United Kingdom. Charles I. instituted an order of Baronets of Scotland and Nova Scotia in 1625, for the purpose of advancing the plantation of Nova Scotia, in which the king granted a certain portion of land to each member of the order. Since the union the power of the Crown to create new baronets specially connected with Scotland is held to have ceased.

Baro'nius, Cæsar, Italian ecclesiastical historian: b. Sora, 1538; d. 30 June 1607. He was educated at Naples; in 1557 went to Rome; was one of the first pupils of St. Philip of Neri, and member of the oratory founded by him; afterward cardinal and librarian of the Vatican Library. He owed these dignities to the services which he rendered the Church by his edition of the Roman Martyrology, 'Ecclesiastical Annals,' in reply to the Protestant 'Magdeburg Centuries,' comprising valuable documents from the papal archives, on which he labored from the year 1580 until his death. They were continued, though with less power, by other writers, of whom Raynaldus takes the first rank.

Barons' War, the war carried on for several years by Simon de Montfort and other barons of Henry III. against the king, beginning in 1263. See also MONTFORT, SIMON DE.

Barony, the lordship or fee of a baron, either temporal or spiritual. Originally every peer of superior rank had also a barony annexed to his other titles. But now the rule is not universal. Baronies in their first creation emanated from the king. Baronies appertain also to bishops, as formerly to abbots. William the Conqueror having changed the

spiritual tenure of frank-almoyn, or free alms, by which they held their lands under the Saxon government, to the Norman or feudal tenure by barony. It was in virtue of this that they obtained seats in the House of Lords. The word is commonly applied in Ireland to a subdivision of a county.

Barotse, bä-rŏt'sę, a South African people inhabiting a region in the west of Rhodesia, extending from the Chobe River northward to the Kabompo. They are a branch of the Bechuanas who have migrated northward, and it would appear that they were long subject to a Basuto tribe called the Makololo. About 1860, however, they threw off the yoke of their oppressors and almost exterminated them, but they still speak the language of the Makololos. Their country is a treeless, alluvial plain, over 150,000 square miles in extent. From 1890 King Lawanika acknowledged the virtual supremacy of Great Britain, and in 1898 the British South African Company obtained complete administrative powers.

Barou'che, a four-wheeled carriage with a falling top. There are usually two inside seats in which four persons can sit.

Barquesimeto, bär-kę-sę-mā-tō, a city of Venezuela, capital of the state of Lara; is situated in a high plain, on the Barquesimeto River. It was founded by the Spaniards in 1552. The soil of the neighborhood is very fertile. Coffee of excellent quality is grown here. The town is well built, and has wide streets, and among its prominent buildings are the government palace, barracks, market and Cathedral. Pop. (1899) about 40,000. Previous to the earthquake of 1812 it contained 15,000 persons, but that calamity destroyed 1,500 lives, and left scarcely a house standing.

Barr, Amelia Edith, (Huddleston), Anglo-American novelist: b. Ulverstone, Lancashire, England, 29 March 1831. She was the daughter of the Rev. William Huddleston, and in 1850 married Robert Barr. She came to the United States in 1854, and lived for some years in Texas; but after her husband's death (1867) removed to New York, where her first book, 'Romance and Reality,' was published in 1872. She is a prolific writer, and her more than 30 novels are very popular. Among them are 'Jan Vedder's Wife' (1885); 'A Daughter of Fife' (1885); 'A Bow of Orange Ribbon' (1886); 'A Border Shepherdess' (1887); 'Friend Olivia' (1890); 'A Sister to Esau' (1891); 'Remember the Alamo'; 'Prisoners of Conscience' (1897); 'I, Thou, and the Other One' (1899); 'Trinity Bells' (1899); 'The Maid of Maiden Lane' (1900); 'The Lion's Whelp' (1901); 'Souls of Passage' (1901).

Barr, James, Canadian author: b. Wallacetown, Ontario, 1862. He engaged in journalism in that province, the United States, and in London; and under the pen-name of Angus Evan Abbott has contributed much to magazine literature. Among his separate publications are 'American Humorous Verse' (1891), and the American volume in the 'International Humorous Series' (1893), the last containing a biographical index of nearly 200 American and Canadian humorists. He is a brother of Robert Barr (q.v.).

Barr, Robert, Scottish novelist: b. Glasgow, 16 Sept. 1850. He spent his childhood in Canada, drifted into journalism, and in 1876 joined the staff of Detroit *Free Press,* and wrote under the name of Luke Sharp. He went to London in 1881 and in 1892 founded *The Idler* with Jerome K. Jerome, but retired in 1895 to devote himself to fiction. He is author of 'In a Steamer Chair' (1892); 'In the Midst of Alarms' (1894); 'The Face and the Mask' (1895); 'One Day's Courtship' (1896); 'A Woman Intervenes' (1896); 'Countess Tekla' (1899); 'The Unchanging East' (1900); 'The Victors' (1901); 'A Prince of Good Fellows' (1902).

Barra, a small Mandingo kingdom of western Africa, near the mouth of the Gambia, with an estimated population of 200,000, its men being remarkable for their fine proportions. The surface, which is fertile, but rather marshy, is well cultivated. The territory about the mouth of the river belongs to the British, who have built the port of Albreda on the south bank, from which considerable trade is carried on. The chief town is Barrinding, where the so-called king resides.

Bar'ra, a Scottish island, forming part of the Outer Hebrides, eight miles long and from two to five wide, and almost entirely composed of gneiss, which on the west coast forms huge rocky barriers. On these the Atlantic, beating with all its force, has hollowed out vast caves and fissures. In the interior not merely the hollows and valleys, but many of the loftiest hills are clothed with fine pasture, on which large herds of cattle and flocks of sheep are reared. The coasts abound with fish, and the island forms a fishing centre of some importance. There are many standing stones and other antiquities. Pop. (1891) 2,131.

Bar'racan, strictly, a thick, strong fabric made in Persia and Armenia, of camel's hair, but the name has been applied to various wool, flax, and cotton stuffs.

Barracand, bă-ra-cŏn, **Leon Henri,** French poet and novelist: b. Romans, Drôme, 2 May 1844. He gave up the law when a very young man in order to write verses; but he was not much known as a poet until 'Dananiel' (1886) appeared, under the pseudonym of Leon Grandet, followed by a sequel, 'Doctor Gal' (1870). He had already, however, attracted attention by some fictions, and has steadily risen in importance as a novelist — 'Yolande' (1867); 'Hilaire Gervais' (1885); 'The Second Lieutenant's Manuscript' (1887); and 'The Cousin' (1888), being perhaps best known. His 'Lamartine and the Muse' (1883) was crowned by the French Academy.

Barrack Room Ballads, a book of verse by Rudyard Kipling, published in 1892. It deals with the various experiences of Tommy Atkins, the British private, and no such vivid portraiture of the common soldier with his dullness, his unhesitating obedience, and his matter-of-fact heroisms has appeared elsewhere.

Barrackpur, bă-răk-poor', a town and cantonment in Hindustan, on the Hooghly, 15 miles north of Calcutta. In the vicinity is the suburban residence of the Viceroy of India, within a park four miles in circuit. A sepoy mutiny, the prelude to the great outbreak at

Meerut in May, took place here in February 1857. A mutiny had previously taken place in 1824. Barrackpur is also known as North Barrackpur to distinguish it from South Barrackpur or Agarpara, midway between it and Calcutta. Pop. 18,000.

Barracks, a name originally given to temporary accommodation for troops, but now designating permanent and commodious erections, in which troops are lodged in fortified towns or other places. The introduction of barracks into England was opposed as dangerous to liberty, by estranging the soldier from the citizen, and fitting him to become a tool of despotism; but the billeting of soldiers upon citizens had grown to be so burdensome to communities that after the close of the 18th century extensive barracks were built at convenient stations all over the United Kingdom. Much improvement has been effected in the construction and arrangement of English barracks during the last half-century; and separate quarters are now provided for married soldiers. The construction and repair of barracks is part of the duty of the royal engineers; their equipment and allotment is intrusted to a barracks section of the Army Service Corps. In the United States the term is officially used to designate important military posts, such as the Columbus Barracks, San Diego Barracks, Washington Barracks, and others.

Barracoon, a negro barrack or slave depot, formerly plentiful on the coasts of Africa, Cuba, and Brazil.

Barracuda, băr-ra-koo'da, an oceanic fish of the family *Sphyrænidæ,* of which about 20 species inhabit the warm seas of the whole world. All are elongate, pike-like fishes, with long, pointed jaws filled with sharp teeth. They are often of large size, are powerful swimmers, active and voracious, and, like the bluefish, prey upon schools of smaller fishes. Several species occur on the American coasts. The great barracuda "picuda," or "becuna" (*Sphyræna picuda*), is common throughout the West Indies and northward to South Carolina, and reaches a length of six feet. It is the largest and most voracious of the genus, is as fierce as a shark, and is sometimes dangerous to bathers. Other West Indian species are those called guaguanche, and picudilla. These are smaller, as is a third species also, which is common along the Atlantic coast of the United States. Two or three species are found on the Pacific coast from California southward. One of these (*S. argentea*) is a long and slender species, known as the California "barracouta," and highly valued for food. It closely resembles the typical European barracuda (*S. sphyræna*), locally known as "spet" and "sennet," and one of the important food-fishes of the Mediterranean.

Barramunda, băr-ra-mŭn'da, or **Burnett Salmon,** names in Australia for a mud-fish (*Ceratodus*), remarkable as a survival of the very ancient group Dipnoi. See Lung-Fish.

Barrande, ba-räńd, **Joachim,** French geologist: b. Sangues in the department of Haute Loire, 11 Aug. 1799; d. Vienna, 5 Oct. 1883. His specialty was the Silurian formations in Bohemia, his writings including 'Système Silurien du Centre de la Bohême' (1852 and 1887); 'Colonie dans le Bassin Silurien de la Bohême' (1860); 'Documents sur la Faune Primordiale et la Système Taconique en Amérique' (1861); 'Representation de Colonies de la Bohême dans le Bassin Silurien du nordouest de la France' (1853); 'Céphalapodes, Etudes Générales.'

Barran'dite, a mineral occurring in rounded concretions exhibiting a concentric structure as well as indistinct radial fibres. It is gray, usually with tinges of color, and has a hardness of 4.5 and a specific gravity of 2.58. Its composition is $(Al,Fe)PO_4 + 2H_2O$, the iron and aluminum being present in the ratio of about 4 to 3. It is found mainly at Cerhovic in Bohemia.

Barranquilla, bär-ran-kē'lya, the chief commercial centre of Colombia, some 15 miles from the mouth of the Magdalena. The bar at the mouth of the river has been improved so as to enable sea-going vessels to pass up to Barranquilla, which possesses excellent wharfage accommodation. The inland traffic by river steamers is important. The trade is mainly in the hands of Germans. It is the seat of a United States consulate. Pop. about 40,000.

Barrantes y Moreno, bär-ran'tā-se-mō-rā'-nō, **Vicente,** Spanish writer: b. Badajoz, 24 March 1829. He first studied theology, but in 1848 settled in Madrid to pursue literature; held responsible government offices; became a member of the Academy in 1872. Among his works are the stories 'Always Late' (1851); 'Juan de Padilla,' 'The Widow of Padilla,' and a series of historical studies, dealing with strictly local Philippine and Estremaduran topics. His 'Tales and Legends' are well chosen and well written; but a work on 'The Defects and Dangers of Universal Suffrage,' partly fiction and partly satire, is ineffective.

Barras, bä-räs, **Paul François Jean Nicolas, Comte de,** French statesman: b. Fox-Amphoux (Var), 30 June 1755; d. January 1829. When the Revolution broke out he immediately showed himself an opponent of the court, and had a seat in the *tiers-état,* while his brother was sitting among the nobility. He took part in the attacks upon the Bastile and the Tuileries, was elected a juryman at the tribunal of Orleans, and in September a member of the national convention, where he voted for the death of Louis XVI. Although he had established his reputation as a patriot, yet he displeased Robespierre, who resolved to involve him in the great proscription which he then meditated. Barras therefore joined those determined to overthrow Robespierre, and took an important part in the events of the 9th Thermidor (27 July 1794). He was entrusted with the chief command of the forces of his party, repelled the troops of Henriot, and made himself master of Robespierre. On 4 Feb. 1795 he was elected president of the convention. The 13th Vendémiaire (5 Oct. 1795), when the troops of the sections which favored the royal cause approached the convention, Barras for a second time received the chief command of the troops of the convention, and the battalion of the patriots, who hastened to their assistance. On this occasion he employed Gen. Bonaparte. In his report he attributed the victory to this young general, and procured for him the chief command of the army of the interior. His important services promoted him to the Directory.

Barras soon perceived that Bonaparte would give a decisive superiority to him who should obtain an influence over him; and therefore he displaced Carnot from the War Department and took possession of it himself. This separated them, and Carnot for some time took part with the council, where a party had been formed to restrain the power of the Directory, and particularly that of Barras. The rupture could only terminate with the ruin of one of the parties: that of the council fell by the events of the 18th Fructidor (4 Sept. 1797), in which Barras took a leading part. From this period he governed absolutely until 13 June 1799, when Siéyès entered the Directory. Nevertheless Barras succeeded in preserving his seat, but he became a victim of the 18th Brumaire (9 Nov. 1799). In a letter which he sent to St. Cloud he resigned his office, and received a passport to his estate. He afterward retired to Brussels, where he lived for several years; but finally received permission to repair to the south of France. His memoirs were published in French and English (1895-6).

Barrass, Edward, Canadian clergyman: b. Durham, England, 22 July 1821. He entered the ministry in 1840, and removed to Toronto in 1853. He became the assistant editor of the *Christian Guardian,* and published, among other works, 'A Gallery of Deceased Ministers' (1853); 'Class Meetings: Their Origin and Advantages' (1865); 'A Gallery of Distinguished Men' (1870); and 'Smiles and Tears: or, Sketches from Real Life' (1879).

Bar'ratry, a law term applied to (1) the offense committed by the master of a vessel of embezzling or injuring goods committed to his charge for a voyage. Barratry has also been defined to be an unlawful or fraudulent act, or very gross or culpable negligence, of the master or mariners of a vessel in violation of their duty as such, and directly prejudicial to the owner, and without his consent; (2) the offense of frequently exciting and stirring up law suits or quarrels among one's neighbors or in society generally. An indictment for this offense must charge the offender with being a common barrator, and the proof must show at least three instances of offending. An attorney is not liable to indictment for maintaining another in a groundless action. In New York, and some other States, barratry is defined to be the practice of exciting groundless judicial proceedings, and is a misdemeanor.

Barre, bär, **Antoine le Fèvre de la,** French naval officer: b. about 1600; d. 4 May 1688. He was appointed governor of Guiana in 1663, and re-took Cayenne from the Dutch. In 1667 he defeated the English in the Antilles, forcing them to raise the blockade of St. Christopher. In 1682 he was appointed to the governorship of Canada, taking the place of the Count de Frontenac. He was, however, recalled in 1684, for having by his irresolution caused the failure of the expedition to treat with the savages.

Barré, Isaac, British officer: b. Dublin, 1726; d. London, 20 July 1802. He was wounded at Quebec, was beside Wolfe when he fell, and figures in West's picture of 'The Death of Wolfe.' He entered parliament in 1761, and held office successively under Lord Butte, Pitt, Rockingham, and Lord Shelburne. In Pitt's second administration he exposed the corruptions of the ministry, was a strong opponent of Lord North's ministry, and opposed the taxation of America. The town of Barre, Mass., was named in his honor.

Barre, bär'rā, a group of Arawakan tribes dwelling along the Upper Rio Negro in northwestern Brazil and the adjoining districts of Venezuela. They are extremely aggressive, and their language is extending rapidly throughout that region.

Barre, băr'rę, Mass, a town in Worcester County, on the Ware River, 21 miles northwest of Worcester. An institute for feebleminded children is established here, and there are cotton, woolen, and straw factories. It was named for Col. Isaac Barre (q.v.). Pop. (1900) 2,059.

Barre, Vt., a city in Washington County, on the Central V., the Barre, and the Montpelier & W. R. R.R.'s; six miles southeast of Montpelier. Barre received a city charter in 1894; and has a reputation as one of the most important seats of the granite industry in the United States. It contains, besides granite quarries, several industrial plants connected therewith; a national and two savings banks; a public library; opera house, Goddard Seminary; a home school for young men and women, with four courses of study; Spaulding High School; daily and weekly newspapers; an assessed property valuation exceeding $2,500,000, and a total debt of about $150,000. It was incorporated in 1894. Pop. (1900) 8,448.

Barreiro, bą-rā'e-rō, **Juan Baptista Hernandez,** Cuban lawyer: b. Havana, about 1842. He acquired a liberal education, and amassed large wealth in the practice of his profession. He was professor of Roman law in the University of Havana for 30 years; and more recently was dean of the law faculty in the university. In February 1900, while acting as first assistant mayor of Havana, he was appointed a member of the new Cuban Civil Cabinet, and given the portfolio of public education.

Barrel, a hollow vessel made of staves, set on end, arranged around a circle, and bound together with hoops. By each stave being made wider in the middle and tapering a little toward the ends, the barrel is of larger diameter, or bulges, in the middle. The bevelled edges of the staves cause them to fit closely together, making a tight joint along their length. The ends are closed by circular heads, the edges made thin to fit into a groove cut to receive them near the ends of the staves, in which they are held fast by driving the hoops upon the swell of the barrel. The construction of the barrel is ingeniously adapted for combining great strength with lightness. It resists pressure from without by the arched arrangement of the staves; and the hoops secure it from the expansive force of gases often generated in its contents. Its form is the most convenient for transportation, admitting of the vessel being rolled or rapidly swung by hooks placed under the chine or ends of the staves. In the form of kegs, firkins, liquor casks, butts, hogsheads, etc., they are met with everywhere. Yet the Chinese, with all their ingenuity, it is said, have never made a barrel. Formerly barrels were constructed entirely by hand, the cooper shaving the staves with the draw knife, and shaping them

by clamps. But machines are now applied to this purpose, by which the work is done much more expeditiously. See COOPERAGE.

As a measure of capacity, the barrel is of variable dimensions, differing in size with the materials it is designed to hold. In wine measure the barrel must contain 31½ gallons. A barrel of beer in England is equal to 36½ imperial gallons. In the United States a barrel of flour must contain 196 pounds; and a barrel of beef or pork, 200 pounds. The measure of capacity called barrel bulk is five cubic feet. Barrel is also used to express any thing long and hollow, as a gun-barrel. It is also applied to the cylinder in a watch, about which the spring is coiled; and in anatomy, to the «cavity of the tympanum» of the ear.

Barren Grounds, the name given to a large tract in the Northwest Territories of Canada, extending northward to the Arctic Ocean between Great Bear and Great Slave lakes and Hudson Bay. It consists largely of swamps, lakes, and bare rock, and a comparatively small part of it is yet well known. The vegetation chiefly consists of dwarf birches and willows, mosses and lichens. The animals include the reindeer, musk-ox, beaver, polar bear, wolves, foxes, etc.

Barren Island, a volcanic island in the Andaman Sea, about lat. 12° 15′ N.; lon. 93° 54′ E. Its diameter is about two miles, with submarine slopes plunging rapidly to a depth of more than 800 fathoms. There is an ancient crater over a mile in diameter, from the centre of which a newer cone rises to a height of 1,015 feet. The volcano was active in 1789 and 1803, but is now dormant. A small island near Coney Island, New York, is also known as Barren Island.

Barren Measures, the name given to certain groups of strata associated with the coal measures, but which contain no workable deposits. In the United States there are two so-called barren stages, a lower intervening between the lower productive and the upper productive measures, and an upper lying at the base of the Permian System.

Barrès, bą-rĕs, **Maurice,** French novelist: b. Charms-sur-Moselle, 1862. His earlier writing as exemplified in his 'Sous l'œil des Barbares' (1888); 'Un Homme Libre' (1889); and 'Le Jardin de Bérénice' (1891), is more or less decadent in character, but his later work is much more forceful, and inculcates a healthful spirit of nationalism. 'Les Déracines' (1897) is among the best of his latest writings.

Barrett, Benjamin Fisk, American Swedenborgian clergyman: b. Dresden, Me., 1808; d. Germantown, Pa., 6 Aug. 1892. He was graduated from Bowdoin College in 1832, and held Swedenborgian pastorates in New York, Cincinnati, and Philadelphia. He was a voluminous writer and industrious editor of books and periodicals relating to Swedenborgianism. Chief among them are: 'Life of Swedenborg' (1841); 'Letters on the Divine Trinity' (1860; 4th ed. 1873); 'Catholicity of the New Church' (1863); 'Episcopalianism' (1871); 'New View of Hell' (1870; 5th ed. 1886); 'Swedenborg and Channing' (1878); 'Heaven Revealed' (1885).

Barrett, George Hooker, American actor: b. Exeter, England, 9 June 1794; d. 5 Sept. 1860. He left England with his mother, an actress of some celebrity, and arrived at Boston in October 1796; he made his first appearance the same year in the part of Cora's child, in 'Pizarro,' at the age of two years. He commenced playing in New York in 1806, at the Park Theatre, in the part of 'Young Norval,' and became manager of the Bowery Theatre, New York, in 1826, in company with E. Gilbert. He afterward visited England, and in 1837 performed at Drury Lane Theatre, London, under the management of Alfred Bunn. He was also manager of the Tremont Theatre, Boston, and in 1847 opened the Broadway Theatre, New York, but he did not retire from the stage. His favorite characters were in genteel comedy, but he also acted in farce and low comedy with great success. From his elegance and stateliness he was known by the sobriquet of «Gentleman George.»

Barrett, John, American diplomatist: b. Grafton, Vt., 28 Nov. 1866. He was graduated at Dartmouth College in 1889, and the same year went to the Pacific coast and engaged in journalism till 1894. During 1894–8 he was United States minister-resident and consul-general at Bangkok, Siam, and, afterward represented several American newspapers in Manila, Philippine Islands. After the American victory in Manila Bay he made a special study of conditions in the Philippines, and, returning by way of London, addressed a joint assembly of members of the House of Commons and the London Chamber of Commerce, on the condition of trade in the Far East. He returned to the United States in the summer of 1899, and did much in support of the action of the Federal government in the Philippines.

Barrett, John Kelly, Canadian official: b. Hamilton, Ontario, 5 June 1860. He was graduated at Holy Cross College, Worcester, Mass., in 1872, and after serving as principal of St. Mary's Model School in Hamilton entered the public service, principally in the line of education. He became conspicuous in 1890, when the authorities of Manitoba abolished the Roman Catholic schools and the official use of French in that province, by defending the claims of the Roman Catholic minority and by bringing suit against the city of Winnipeg to test the constitutional power of the Provincial Government in passing the School Act of 1890.

Barrett, Lawrence, American actor: b. Paterson, N. J., 4 April 1838; d. 21 March 1891. His first appearance on the stage was in 1853, in 'The French Spy.' In 1856 he appeared as Sir Thomas Clifford in 'The Hunchback' at Chambers Street Theatre, New York, and in 1857 he supported Burton, Charlotte Cushman, Edwin Booth, and other eminent actors. He served as a captain in the 28th Massachusetts Infantry in the early part of the Civil War. Later he acted at Philadelphia, Washington, and at Winter Garden, in New York, where he was engaged by Mr. Booth to play Othello to his Iago. After this he became an associate manager of the Varieties Theatre in New Orleans, where for the first time he played the parts of Richelieu, Hamlet, and Shylock. In 1864 he secured 'Rosedale' from Lester Wallack, and after appearing in its leading character at New

Orleans, began his first tour as a star actor. In 1867 he played at Maguire's Opera House in San Francisco, and was then manager of the California Theatre till 1870. Late in 1870 he went with Mr. Booth, playing in alternate characters in Booth's Theatre. In 1871–2 he was manager of the New Varieties Theatre in New Orleans, and in December 1872 acted Cassius to Booth's Brutus in New York. During 1873–4 he made tours through the United States. In 1875 he appeared as Cassius in 'Julius Cæsar,' in Booth's Theatre, and later as King Lear. He was the first actor to appear as Daniel Druce in the United States in Mr. Gilbert's play. In 1882 he brought out 'Francesca di Rimini,' at the Chestnut Street Theatre in Philadelphia. In 1883 this play ran for nine weeks at the Star Theatre, in New York. In 1887 he began his first joint engagement with Edwin Booth in Buffalo. Mr. Barrett's last production of a new play was 'Guido Ferranti' by Oscar Wilde, brought out in 1890, at the Broadway Theatre, New York. His last appearance was on 18 March 1891, in the character of Adrian du Mauprat to the Richelieu of Mr. Booth. He wrote 'Life of Edwin Forrest.'

Barrett, William Alexander, English journalist and musician: b. London, 15 Oct. 1834; d. 17 Oct. 1891. He was musical critic of the London *Morning Post* from 1867 till his death, and edited several musical journals. He published a 'Life of Balfe'; 'The Choristers' Guide'; 'English Church Composers'; 'English Folk Songs, Glees, and Madrigals,' and a 'Dictionary of Musical Terms' (with Stainer.)

Barrett, William Fletcher, English scientist: b. Jamaica, West Indies, 10 Feb. 1844. He assisted Prof. Tyndall at the Royal Institution, London, 1862–6, and in 1873 became professor of experimental physics in the Royal College of Science, Dublin. He was one of the founders of the Society for Psychical Research, and is widely known for his original researches in magnetism and radiant heat. He has published 'Lessons in Science' (1880); 'Early Chapters in Science' (1899); 'A Monograph on the So-called Divining Rod' (1897–1900).

Barrett, Wilson, English dramatist and actor: b. Essex, 18 Feb. 1846; d. London, 22 July, 1904. He went upon the state in 1863. In 1874 he became manager of the Amphitheatre in Leeds, and later lessee of the Grand Theatre in Leeds; in 1879 manager of the Court Theatre, London; and in 1881, of Princess' Theatre, London. He visited the United States in 1886, and, returning to England in 1887, became manager of the Globe Theatre; revisited the United States in 1888, and again in 1889; in 1896 became manager of the Lyric Theatre, London; and in 1899, of the Lyceum. His dramas include 'The Sign of the Cross'; 'Pharaoh'; 'Now-a-days'; 'The Daughters of Babylon'; 'In Old New York'; etc.; and he adapted for stage purposes such well-known novels as 'The Deemster'; 'The Bondman'; 'The Manxman'; and 'Quo Vadis.'

Barr'head, a manufacturing town of Scotland, seven miles southwest of Glasgow. The chief industries are the printing of cottons, the spinning of cotton yarn, dyeing, bleaching, iron and brass founding, and the making of machinery and sanitary appliances. Pop. (1901) 9,900.

Barrias, ba-re-as, **Felix Joseph,** French painter: b. Paris, 13 Sept. 1822; a pupil of Leon Cogniet. His most successful works are 'Cincinnatus' (1844); 'Sappho' (1847); and 'Death of Chopin' (1885). He was awarded the Grand Prix de Rome, 1844; Legion of Honor, 1859; first medal at the Paris Exposition, 1889.

Barrias, Louis Ernest, French sculptor: b. Paris, 1841; d. 4 Feb. 1905. His first success was the 'Spartains' for the Tuileries in 1871. Among his latest works are the Carnot Memorial for the city of Bordeaux (1896), and the bronze statue of Laboisier for Paris (1900).

Barricade, an obstruction hastily improvised to defend a narrow passage (for instance, a street, a bridge, etc.), serving to retard an enemy and afford an opportunity of firing upon them with effect. Carriages, casks, chests, furniture, beams — in short, everything which is at hand is used for this purpose; and if it is necessary that the enemy, when consisting principally of cavalry, should be checked in the pursuit, though it be but for a moment, the baggage wagons may be employed with effect. Barricades, constructed of the first materials that came to hand, were used in popular insurrections during the Middle Ages, and Paris has obtained notoriety as the city in which they have been most frequently employed. In 1358 its streets were barricaded against the Dauphin. The first "Battle of the Barricades" took place on the entry of the Duke of Guise into Paris, 12 May 1588. It was followed, during the War of the Fronde, by another contest of a somewhat similar character, 26 Aug. 1648, when Anne of Austria ordered the arrest of three popular members of the parliament. In July 1830, the elder branch of the Bourbons, and in February 1848, the Orleans branch of the same family, were driven from the French throne, after a struggle at the barricades. Gen. Cavaignac, in defense of the provisional government, waged a fearful contest with the insurgents, who had erected barricades, 23–26 June 1848, in which he was at length victorious. The killed and wounded amounted to 15,000, and about 8,000 of the rebels were taken prisoners.

Napoleon III. widened and macadamized many of the principal streets of Paris, partly with the express purpose of rendering the successful erection of barricades next to impossible; but nevertheless in the second siege of Paris (1871), the Communists threw up numbers of strong barricades. There was a remarkable barricade erection in London in 1821. The ministry desired that the body of Queen Caroline should be conveyed out of the country to Germany, for interment without the populace having the opportunity of making any demonstration. On the matter becoming known, a vast barricade was erected at the point where the Hampstead Road joins the New Road; and as nothing but the use of artillery could have forced the way, the officer in charge of the funeral changed his course. In 1848 and 1849 barricades were successfully carried in Paris, Berlin, Vienna, and Dresden, by taking the defenders in the rear.

Barricades, The Days of the, a phrase employed to denote popular Parisian revolts. See also BARRICADE.

Barrie, James Matthew, popular Scottish author: b. Kurriemuir, Forfarshire, 9 May 1860. He graduated from Edinburgh Univer-

sity in 1882, and went to London in 1885, to engage in journalism. His peculiar talent for depicting Scottish village life and rustic characters with fidelity, pathos, humor, and poetic charm, has brought him fame. 'Better Dead' (1887) and 'When a Man's Single' (1888) were followed by 'Auld Licht Idylls' (1888) and a Window in Thrums' (1889), which first made him widely known; 'An Edinburgh Eleven' (1890); 'My Lady Nicotine,' humorous essays on smoking (1890); 'The Little Minister' (1891); 'Sentimental Tommy' (1896); 'Margaret Ogilvy' (1896), a biography of his mother; 'Tommy and Grizel' (1900); 'The Little White Bird' (1902), etc. He has also written numerous short sketches, and the following dramatic works: 'Walker, London' (1892); 'Jane Annie' (1893); and 'The Professor's Love Story' (1895). 'The Little Minister' was dramatized in 1897, and was played with success in the United States. See Hammerton, 'James Matthew Barrie and His Books' (1900).

Barrie, Canada, town and county-seat of Simcoe County, Ontario; on the Grand Trunk Railway, at the western extremity of Lake Simcoe; 64 miles north-northwest of Toronto. Barrie was founded in 1832 and incorporated in 1871. It is a popular and beautiful summer resort, and the starting point of the Lake Simcoe steamers. The chief industrial establishments are planing and grist mills, carriage works, breweries, brick-yards, engine and boiler works, and wicker works. The waterworks and electric light plant are owned by the corporation. There are 10 churches, a collegiate institute and business college. In 1896 Allandale, a railway centre, was annexed to the town, and the Grand Trunk Railway has here a large roundhouse, machine shops, etc. A United States consular agent is stationed here. Pop. (1901) 5,949.

Barrier Reef, The Great, a coral reef or line of reefs extending for 1,260 miles off the northeast coast of Australia, at a mean distance from land of 30 miles. It rises precipitously from a great depth, no bottom having been found at some places with a line of 285 fathoms.

Barrier Treaty. When, by the Peace of Utrecht, the Spanish Netherlands were ceded to Austria, 1715, this cession was agreed to by the Dutch, who had conquered these provinces in alliance with England, only on condition that they should have the right (in order to secure their borders and give them a barrier against their powerful neighbor, France) to garrison several fortresses of the country, and that Austria should engage to pay yearly to Holland 350,000 dollars for the support of these garrisons. The treaty which was concluded between Austria, England, and Holland was called the Barrier Treaty. In 1781 the Emperor Joseph II. declared it void.

Barrière, bȧ-ryăr, **Jean François,** French historical writer: b. Paris, 12 May 1786; d. there, 22 Aug. 1868. His energies were first directed to periodical literature; but he subsequently produced 'The Court and the City Under Louis XIV., Louis XV., and Louis XVI.,' besides editing a numerous series of memoirs of personages connected with the Grand Monarch.

Barrière, Théodore, French dramatist: b. Paris, 1823; d. there, 16 Oct. 1877. In collaboration with others he supplied the French stage with a great number of dramas and comedies, some of which met with much favor, especially 'Bohemian Life' (1848, with Murger); 'The Maids of Marble' (1853, with Thiboust), a counterpart to Dumas' 'The Camelia Lady,' and 'The Spurious Men of Honor' (1856, with Capendu), a scathing satire, and his masterpiece.

Barriers, Battle of The, an engagement between the French and the Allies in front of Paris, March 1814, in which the former were defeated. Its immediate result was the abdication of Napoleon.

Barrili, bär-rē'lę, **Antonio Giulio,** Italian novelist: b. Savona, 14 Dec. 1836. Engaging in journalism when only 18, he assumed the management of *Il Movimento* in 1860, and became proprietor and editor of *Il Caffaro* in Genoa in 1872. He had taken part in the campaigns of 1859 and 1866 (with Garibaldi in Tyrol) and in the Roman expedition of 1867, and sat in the Chamber of Deputies in 1876–9. He is one of the most prolific writers of modern Italy, and among his numerous stories are 'Elm Tree and Ivy' (1868); 'The Vale of Olives' (1871); 'As in a Dream,' 'The Devil's Portrait' (1882); 'The Eleventh Commandment,' 'A Whimsical Wooing.' He has published several volumes of criticism, among which may be named: 'Ilrinnovamento Letterario Italiano' (1890).

Barring-out, a practice once common in some English schools and rendered familiar to many from forming the subject of one of the tales in Miss Edgeworth's 'Parent's Assistant.' It generally took place a few days before the holidays, when the boys barred the doors of the school and defied the masters from the windows. It was commonly understood that the pupils might dictate terms as to holidays for the ensuing year if they could prevent the masters' entrance for three successive days. The origin of the practice is not known; but its observance is enjoined in the statutes of Witton School, Cheshire, founded in 1588, by Sir John Deane.

Bar'ringer, Daniel Moreau, American statesman: b. in the county of Cabarrus, N. C., 1807; d. White Sulphur Springs, Va., 1 Sept. 1873. He graduated at the University of North Carolina in 1826, established himself in the practice of law in 1829, and, after gaining distinction as a lawyer, was, in 1843, elected a representative to the National Congress. He was twice re-elected, and was minister to Spain, 1849–53. He was a delegate to the National Union Convention in Philadelphia in 1866.

Barringer, Rufus, American lawyer and soldier: b. Cabarrus County, N. C., 2 Dec. 1821; d. Charlotte, N. C., 3 Feb. 1895. He graduated from the University of North Carolina, 1842, and settled in the practice of law at Concord. Though a strong Union man he followed his State into the Confederacy, raised a company of cavalry, and by June 1864, had risen to the rank of brigadier-general. He was in 76 actions, and was severely wounded on several occasions. At the close of the war he returned to the practice of law, advocated the acceptance of the reconstruction acts, and took a prominent part in State politics until his retirement in 1884.

Bar'rington, Daines, English lawyer, antiquary, and naturalist: b. 1727; d. March 1800. After preparatory studies at Oxford and the

Inner Temple, he was called to the bar, and held several offices previous to his being appointed a Welsh judge in 1757. He was subsequently second justice of Chester till 1785, when he resigned that post, and thenceforward lived in retirement, chiefly at his chambers in the Inner Temple, where he died. His publications were numerous, but his name is now best known as a correspondent of White of Selborne, whose famous letters on natural history he is said to have suggested. He was an eager, curious antiquary, uncritical and the subject of many hoaxes.

Barrington, George, Irishman, noted author and notorious thief: b. 1755; d. about 1840. His most notable act of thieving was the robbing of a Russian prince in Covent Garden Theatre. He took from him a gold snuff-box said to be worth $150,000; but, as the prince refused to prosecute, he was dismissed from trial. In 1790 he was sentenced to seven years' penal servitude at Botany Bay; but having given information of an intended mutiny of the other convicts on the voyage, at the end of two years he was discharged, on the first warrant of emancipation ever issued. He was made superintendent of convicts, and later high constable at Paramatta. He was a wit, and of some literary genius: one couplet in a prologue he wrote for Young's play 'Revenge,' produced by the convicts on the opening of the Sydney Theatre, remains an enduring classic:

> "True patriots we; for be it understood,
> We left our country for our country's good."

He wrote also 'Voyage to Botany Bay' (1801), 'History of New South Wales' (1802), 'History of New Holland,' i. e. Australia (1808).

Barrington, John Shute, English lawyer and theologian: b. London, 1678; d. Becket, Berkshire, 14 Dec. 1734. He was created first Viscount Barrington in 1720. He was a disciple and friend of Locke, a friendship which is thought to have been brought about by the publication of his (Barrington's) work, 'The Interest of England,' etc. He was devoted to theology and wrote extensively in that science. His chief works have been collected under the title 'The Theological Works of the First Viscount Barrington.'

Barrington, Sir Jonah, Irish jurist: b. County Queens in 1760; d. Versailles, France, 3 April 1834. He became judge in the Court of Admiralty, and was a steady opponent of the Act of Union in 1800. As the result of several peculations, upon petition of both Parliamentary houses, he was deprived of his office, and in 1830 left England. He was the author of 'Personal Sketches' (1827); 'Historic Memoirs of Ireland' (1832); 'The Rise and Fall of the Irish Nation' (1833), etc.

Barrington, William Wildman, English statesman, second Viscount Barrington: b. 15 Jan. 1717; d. 1 Feb. 1793. He was sworn a member of the privy council in 1755, and in the same year accepted the office of secretary of war. In 1761 he was appointed chancellor of the exchequer, but in 1765 reassumed the post of secretary of war, which he held till 1778, when, in consideration of long public and personal services, he was retired.

Barrington, Can., a seaport of Nova Scotia in Shelburne County, 173 miles west of Halifax by rail. Its industries are ship-building, fishing, and the shipping trade. A United States consul resides here. Barrington Passage is a small fishing suburb. Pop. 1,900.

Barrios, bär'rę-ōs, **Gerardo,** Central American statesman: b. about 1810; d. 1865. He became president of Salvador in 1860. During his administration, education, commerce, and public works progressed remarkably, his presidential management being unusually liberal. He was deposed by Duenas as the outcome of the war with Guatemala, and, while endeavoring to bring about a revolution in order to become president again, was captured and executed.

Barrios, Justo Rufino, Guatemalan statesman, of Spanish-Indian blood: b. San Lorenzo, Guatemala, 17 July 1835; d. Chalchuapa, 2 April 1885. He was educated for the law, but the political punishment of his father led him to become a guerrilla revolutionist, and finally chief lieutenant of García Granados, who by his help ousted Vicente Cerna (the decisive battle being fought 29 June 1871) and became president, Barrios being commander-in-chief. The revolution was a democratic and anti-clerical one, and the new government began by expelling the Jesuits; to which Barrios added the suppression of religious orders during an acting presidency, and after he had, on 4 June 1873, succeeded Granados as president. There had been incessant revolts of the reactionists, which shortly after his accession he quelled once for all, establishing a system of terrorism and espionage which at least gave the country quiet and enabled him to carry out his wonderful reforms and improvements. He maintained internal peace, and supremacy in Central America, by a thorough system of militia drill for all but the pure-blooded Indians; keeping an army of some 30,000 men in constant reserve, with 3,000 to 4,000 in the capital, which he made one of the best ordered cities of Spanish America. He reorganized the postal and organized the telegraphic service also on the reports of men sent to examine the United States systems. He built the first telegraph and the first railroad in Guatemala, and started a line to the coast, compelling every citizen earning over $8 a month to hold stock in it; constructed street railway lines in the capital; improved the roads and built solid bridges. He remodeled the educational system, established collegiate institutes, normal and industrial schools, and made knowledge of French and English a condition of license to practise law or medicine. He built two modern penitentiaries. In a word, he transformed Guatemala into one of the most habitable and progressive countries south of the United States. But the foremost purpose of his life was to form Central America into one united state, for power and prosperity and the ending of the miserable wars that wasted its vitality. On 15 Jan. 1876 he assembled a diet from all the states in Guatemala city to frame a plan of consolidation; but as it could not agree upon one, he therefore determined to set up governments in the other states favorable to his plans. Honduras was racked by a civil war and offered no difficulties, Salvador was too small to resist the union of the two, and thenceforward till 1884 Barrios disposed of the resources of all three republics. On 1 March 1880, the first constitution of Guatemala went into operation, and Barrios was re-elected for a

six-year term. On 24 Feb. 1883 he issued a circular to the liberal party, pledging himself to effect the unification only by peaceful means and with the consent of all the republics. In March 1884 he called a meeting of five delegates from each republic, but Costa Rica and Nicaragua still held back. Finally, on 28 Feb. 1885, he with his assembly, issued a decree proclaiming the union of the five states, relying on Honduras and Salvador to help him put down resistance in the others. But the president of Salvador refused to employ force, and on Barrios persisting, joined Nicaragua and Costa Rica in a league to resist him, appealing to Mexico and the United States for help. President Diaz of Mexico remonstrated with Barrios, and the United States viewed the movement with disfavor; but on the Salvador troops, which expected Mexican help, invading Guatemala, Barrios drove them back into Salvador, and while entering Chalchuapa was struck down by a sharpshooter's bullet. His widow removed to New York, and his son became a cadet in the United States army.

Bar'rister, in England, an advocate or pleader, who has been admitted by one of the Inns of Court, namely, the Inner Temple, Middle Temple, Lincoln's Inn, or Gray's Inn, to plead at the bar. Before a student can be admitted to the bar he must have been a member of one of those societies, and have kept 12 terms there by dining sufficiently often in the hall of the society to which he belongs, and must also pass a public examination. The examinations, which had dwindled into mere forms, have in recent years been made more stringent. Barristers are sometimes called utter or outer barristers, to distinguish them from queen's (or king's) counsel, who sit within the bar in the courts, and are distinguished by a silk gown. Barristers are also spoken of as counsel, as in the phrase opinion of counsel, that is, a written opinion obtained from a barrister before whom the facts of a case have been laid. The duties of a barrister are honorary, and he can maintain no action for his fees. It is the barristers who speak before all the higher courts, being instructed in regard to the facts of the case they have in hand by means of the brief which they receive from the solicitor engaging their services. In the United States there is no distinct order of counsel corresponding to the English barrister, the same person performing the duties of attorney, solicitor, counsel, or advocate. See also ADVOCATE.

Barron, James, American naval officer: b. Virginia, 1769; d. 21 April 1851. He entered the navy in 1798, and commanded the Chesapeake in 1807, when it was attacked by the British ship Leopard as a result of his refusal to allow the Chesapeake to be searched for deserters. The Chesapeake, which was quite unprepared, discharged one gun previous to striking her colors. She was captured and three alleged deserters were found. Barron was court-martialed for neglect of duty, though only partially to blame for the surrender of his vessel, and suspended for five years. The court closed its finding on the subject of the personal conduct of the accused, in the following language: «No transposition of the specifications, or any other modification of the charges themselves, would alter the opinion of the court as to the firmness and courage of the accused; the evidence on this point is clear and satisfactory.» Such was the fate of Commodore Barron, but it is more than probable that under the state of public feeling, demanding a victim, those who were really responsible for the efficiency of the Chesapeake, escaped unpunished. Upon his restoration, as the outcome of a long correspondence with his personal enemy, Commodore Decatur, a duel was fought and Decatur was killed. Barron became senior officer in the navy in 1839, though never again in active service and never regained full public esteem. See CHESAPEAKE AND LEOPARD.

Barron, Samuel, American naval officer: b. Hampton, Va., 1763; d. 29 Oct. 1810. In 1805 he commanded a squadron of 10 vessels in the expedition against Tripoli. On his return to the United States he was appointed commandant of the Gosport Navy Yard, but died immediately afterward.

Barros, bär-rōs, **Arana Diego,** Chilean scholar and historian: b. Santiago, 16 Aug. 1830. Ill health obliging him to give up legal studies, he early devoted himself entirely to historical and literary pursuits, and soon became an authority on the history of his native country. The favor with which his historical sketch of the campaigns of 1818–21 was received encouraged him to begin an extensive 'History of Chilean Independence' (1854–8). He spent several years investigating the government archives and private libraries of South America and Europe in search of material bearing on the history of South America. His chief works in addition to the above are: 'Vida y Viajes de Hernando de Magallanes' (1864); 'Histoire de la Guerre du Pacifique' (1881), written by order of the government; and his monumental 'Historia General de Chile' (12 vols. 1884–93). In Simancas he discovered the manuscript of the 'Purén Indomito,' an historical poem on the Araucanian war, and published an edition of it at Leipsic in 1860.

Barros, João de, eminent Portuguese historian: b. Viseu, 1496; d. Pombal, 1570. His first work, an historical romance, entitled the 'Emperor Clarimond,' appeared in 1520. Barros presented it to the king, who urged him to undertake the history of the Portuguese in India, which was issued 1552–62. King John III. appointed Barros governor of the Portuguese settlements in Guinea, and afterward general agent for these colonies. In 1530 he presented Barros with the province of Maranham in Brazil for the purpose of colonization. Barros lost a great part of his fortune by the enterprise, and returned the province to the king, who indemnified him for his losses. His work 'L'Azia Portugueza,' is much admired for its style and erudition. He wrote besides a moral dialogue, 'Rhopicancuma,' in which he shows the pernicious consequences of accommodating principles to circumstances; but this work was prohibited by the Inquisition. He wrote also a dialogue on false modesty, and a Portuguese grammar, the first ever published.

Barro'sa, or **Borosa,** a village in Spain, near the southwest coast of Andalusia, 16 miles south-southeast of Cadiz. On a knoll to the east of it a battle was fought in 1811, in which the British under Gen. Graham, when abandoned by the Spaniards, defeated a superior

French force under Victor. No decisive results were obtained from the battle, however.

Barrot, bą-rō', **Camille Hyacinthe Odilon,** French statesman: b. Villefort, Lozère, 19 July 1791; d. Bougival, near Paris, 6 Aug. 1873. At 19 he pleaded before the ordinary tribunals, and at 23, by a special dispensation, before the Court of Cassation, Paris, and early acquired a high reputation for eloquence. In the political arena his oratory soon made him one of the most influential leaders of the liberal opposition. He became president of the "Aide-toi" Society in 1830, and at the July revolution in that year was one of three commissioners appointed to conduct the dethroned Charles X. to Cherbourg, on his way to England. Returning he was appointed prefect of the department of the Seine and member of the Council of State, but in a few months resigned his offices to lead the opposition to Casimir Périer and the reactionary ministers who followed him. He supported Thiers from his accession to office in March 1840, to his fall in October, when he resumed his opposition to the ministry of Guizot. He took a conspicuous part in the reform movement of 1847, and spoke eloquently at several of the provincial reform banquets which led to the revolution of February 1848. Made president by Thiers in his short-lived ministry, he advised the king to withdraw his troops and thus remove the last obstacle to the downfall of his throne. In the last sitting of the Chamber of Deputies he supported the claim of the Count de Paris to the throne and the regency of the Duchess of Orleans. The February revolution considerably abated his ardor for public liberty. He held office for some time under the presidency of Louis Napoleon, but retired from active political life after the *coup d'état,* 2 Dec. 1851, and accepted no office under the Second Empire. In July 1872 he was made a councilor of state and vice-president of the council, 6 Aug. 1873. His 'Mémoires Posthumes' appeared at Paris (1875-6).

Barrow, Frances Elizabeth, American author: b. Charleston, S. C., 22 Feb. 1822; d. 7 May 1894. She was educated in New York, where she was married to James Barrow. She wrote, under the name of Aunt Fanny, numerous books for children; among them 'Six Nightcaps,' which has been translated into French, German, and Swedish. Another, 'The Letter G' (1864), was widely known and very popular. She also wrote a novel, 'The Wife's Stratagem.'

Barrow, or **Borrowe, Henry,** English ecclesiastical reformer, often considered as one of the founders of Congregationalism: d. 1593. He was a member of Gray's Inn, London, in 1576 and there became interested in the writings of Thomas Browne, the founder of the Brownists. On account of his advocacy of Church reform he was imprisoned and with his co-reformer, Greenwood, was hanged at Tyburn. He was the author of 'Brief Discourse of the False Church' (1590). See Dexter, 'Congregationalism of the Last Three Hundred Years' (1880).

Barrow, Isaac, eminent English mathematician and theologian: b. London, 1630; d. May 1677. At the Charterhouse, where he was educated, he was chiefly remarkable for fighting and neglect of study, but being removed to a school at Felsted, in Essex, he began to show some earnest of his future great reputation. He was subsequently entered a pensioner of Trinity College, Cambridge, in 1645, of which he was chosen a scholar in 1647. The ejection of his uncle, the Bishop of St. Asaph, from his fellowship of Peterhouse, in consequence of his adherence to the royal party, and the great losses sustained by his father in the same cause, left him largely unprovided for. His good disposition and great attainments, however, so won upon his superiors that, although he refused to subscribe to the Covenant, he was very highly regarded. Finding that opinions in church and state opposite to his own now prevailed, he proceeded some length in the study of anatomy, botany, and chemistry, with a view to the medical profession. He, however, changed his mind, and to the study of divinity joined that of mathematics and astronomy. In 1652 he graduated M.A. at Oxford, and being disappointed in his endeavor to obtain the Greek professorship at Cambridge, engaged in a scheme of foreign travel. He set out in 1655, and during his absence his first work, an edition of Euclid's 'Elements,' was published at Cambridge. He visited France and Italy, where he embarked for Smyrna, and from Smyrna he proceeded to Constantinople, returning in 1659 by way of Germany and Holland, and was soon after episcopally ordained by Bishop Brownrigg. In 1660 he was elected Greek professor at the University of Cambridge, without a competitor. The following year he received the degree of B.D. He was in 1662 chosen professor of geometry in Gresham College, and in 1663 the Royal Society elected him a member of that body in the first choice after their incorporation. The same year he was appointed the first Lucasian professor of mathematics at Cambridge, on which occasion he delivered an excellent prefatory lecture on the utility of mathematical science. In 1669, on a conscientious principle of duty, he determined to give up mathematics and adhere exclusively to divinity. Accordingly, after publishing his celebrated 'Lectiones Opticæ,' he resigned his chair to the great Newton. In 1670 he was created D.D. by mandate, and in 1672 the king nominated him to the mastership of Trinity College, observing that he had bestowed it on the best scholar in England. He had before this refused a living, given him with a view to secure his services as a tutor to the son of the gentleman who had it to bestow, because he deemed such a contract simoniacal; and he now, with similar conscientiousness, had a clause in his patent of master allowing him to marry, erased, because incompatible with the intentions of the founder. In 1675 he was chosen vice-chancellor of the University of Cambridge; but the credit and utility expected from his labors were frustrated by his untimely death.

The works of Barrow, both mathematical and theological, are of the highest class. Of the former the following are the principal: 'Euclidis Elementa' (1655); 'Euclidis Data' (1657); 'Lectiones Opticæ' (1669); 'Lectiones Geometricæ' (1670); 'Archimedis Opera' (1675); 'Apollonii Conicorum, lib. iv.'; 'Theodosii Sphericorum, lib. iii., novo methodo illustrata et succincte demonstrata' (1675); 'Lectio in qua Theoremata Archimedis de Sphæra et

Cylindro per Methodum Indivisibilium Investigata, etc.' (1678); 'Mathematicæ Lectiones' (1683). All his English works are theological; they were left in manuscript, and published by Dr. Tillotson (1685). 'Isaaci Barrow Opuscula' appeared in 1697. As a mathematician, especially in the higher geometry, Barrow was deemed inferior only to Newton; as a divine he was singularly distinguished for depth and copiousness of thought. A fine specimen of his characteristic copiousness is quoted by Addison from his sermon on 'Vain and Idle Talking,' in which the various forms and guises of wit, —a faculty for which Dr. Barrow was himself celebrated,— are enumerated with a felicity of expression which it would be difficult to parallel.

Barrow, Sir John, eminent English traveler and geographer: b. near Ulverstone, Lancashire, 1764; d. 23 Nov. 1848. When 14 years old he entered an iron foundry in Liverpool as clerk and overlooker. Two years afterward he gave up this situation and made a voyage in a whaler to Greenland. He was subsequently employed as a teacher of mathematics in a school at Greenwich, and in that capacity attracted the attention of Sir George Staunton, who appointed him nominally comptroller of the household to Lord Macartney in his embassy to China in 1792, though his real employment was to take charge of the philosophical instruments carried out as presents to the Chinese emperor. Of this journey he afterward published an account under the title of 'Travels in China' (1804). On Lord Macartney being appointed governor of the Cape of Good Hope in 1797, he made Mr. Barrow his private secretary; and on quitting the Cape in 1798 left him auditor-general of public accounts. During his residence there he made several journeys into the interior of South Africa, and on his return to England published an account of them under the title of 'Travels in Southern Africa.' In 1804 Barrow was appointed second secretary to the admiralty. The duties of this post he discharged with the most exemplary industry and activity, and he took an ardent interest in promoting geographical and scientific discovery, and more especially the expeditions to the Arctic Seas. His leisure hours were employed in literary work, and the numerous volumes published by him attest the profitable use he made of his time. These include, in addition to the books of travel already mentioned, the 'Life of Earl Macartney' 'Life of Lord Anson'; 'Life of Lord Howe'; 'Voyages of Discovery and Research within the Arctic Regions'; Autobiographical Memoir' (1847) 'Sketches of the Royal Society.' In 1835 he was created a baronet, and in 1845 retired from his office at the admiralty. He originated the Royal Geographical Society in 1830 and was its vice-president at the time of his death. Barrow Strait, Cape Barrow, and Point Barrow, in the Arctic regions, were named in his honor.

Barrow, a navigable river of Ireland, province of Leinster. Its course is generally southward, and after about 900 miles it joins the Suir to form the estuary called Waterford Harbor. It is navigable for vessels of 200 tons to New Ross, 25 miles from the sea, and for barges to Athy in Kildare County, where it is joined by a branch of the Grand Canal.

Barrow, Cape or **Point,** a term applied to three prominent localities of the Arctic region, in honor of Sir John Barrow. (1) Point Barrow, on the north coast of Alaska, in lat. 71° 23′ N., and lon. 156° 31′ W., long considered as the most northerly spot on the American mainland. (2) Cape Barrow, on the coast of Canada, or Coronation Gulf, is in lat. 68° N., lon. 111° W. (3) Barrow Strait, the earliest of Parry's discoveries, leading to the west out of Lancaster Sound, which Parry's immediate predecessor, Captain, afterward Sir John Ross, had pronounced to be landlocked in that direction. Besides its main course to Melville Sound, Barrow Strait throws off Prince Regent's Inlet to the south and Wellington Channel to the north. The passage averages about 50 miles in breadth, extending nearly along the parallel of 74° N., from 85° to 100° W.

Barrow, an artificial mound or tumulus of stones or earth, piled up over the remains of the dead. Such erections were frequently made in ancient times in our own land, and they are met with also in many other countries both in the Old and New World. In Scotland they are called cairns. When opened they are often found to contain stone cysts, calcined bones, etc. Burial in barrows, commencing amid the mists of remote antiquity, seems to have been practised as late as the 8th century A.D. One of the finest barrows in the world is Silbury Hill, Wiltshire, near Marlborough. It is 170 feet in perpendicular height, 316 along the slope, and covers about five acres of ground. See also Mound Builders.

Barrow-in-Furness, an English seaport, and county borough, in the district of Furness, situated opposite to and including the island of Walney, Lancashire. In 1848 or 1849 it was but a hamlet with 100 inhabitants, whose chief support was fishing; in 1901 its population was 57,584. This extraordinary prosperity is due to the working of the rich mines of red hematite iron-ore which abounds in the district, and to the extension of the railway to Barrow, by which its excellent natural position and capabilities of development as a seaport have been taken advantage of. There are now four docks completed, and the depth of water is sufficient to admit the largest ships at present afloat. Much timber is imported from the north of Europe and from Canada and Norway, large numbers of cattle are brought from Belfast, and an extensive trade is done in grain and flour. Iron-ore and pig-iron are largely shipped from the port. There is a large passenger traffic with the Isle of Man and Belfast. The chief industrial occupations are the manufacture of iron and Bessemer steel, ship-building, iron-founding, and the making of ropes, sails, bricks, and large jute-works, paper-pulp works, and salt-works have been established. Barrow owes a great deal of its prosperity to the discovery of the Bessemer process of steel-making, and to the fact that the hematite ores of the district are specially adapted to this process. The yearly output of pig-iron is said to be 350,000 tons, with 200,000 tons of Bessemer and Siemens-Martin steel. Messrs. Vickers, Sons, and Maxim, Limited, employ some 8,000 persons, and have built some of the largest merchant and war-vessels afloat. They also manufacture ordnance. The **town** is laid out on a regular

plan, mostly in rectangles, is substantially built, and well drained and supplied with gas, water, and electricity. It contains churches, chapels, and schools for the various denominations, a free public library, workmen's institute, and a town-hall, built at a cost of over £60,000. The Redistribution Act of 1885 erected it into a parliamentary borough, returning one member. The interesting ruins of Furness Abbey, which was founded in 1127, lie within two miles of the town.

Barrows, Elijah Porter, American clergyman and educator: b. Mansfield, Conn., 1807; d. 1888. He was professor of sacred literature in Western Reserve College, Ohio, 1837–52, and of Hebrew in Andover Theological Seminary, 1853–66. In 1872 he became professor of Hebrew at Oberlin College, Ohio. Beside many contributions to the 'Bibliotheca Sacra,' he published 'Companion to the Bible' (1867); 'Sacred Geography and Antiquities' (1872); 'Manners and Customs of the Jews' (1884).

Barrows, John Henry, American educator: b. Medina, Mich., 11 July 1847; d. Oberlin, Ohio, 3 June 1902. He was graduated at Olivet College in 1867; subsequently studied in Yale College, Union and Andover Theological Seminaries, and at Göttingen; was pastor of the First Presbyterian Church, in Chicago, for 14 years; organized and was president of the World's Parliament of Religions, at the World's Columbian Exposition in Chicago, in 1893. He delivered a course of lectures on Christianity in the principal universities in India, under the patronage of the University of Chicago, 1896–7, and became president of Oberlin College in 1898. He published 'The Gospels are True Histories' (1891); 'Life of Henry Ward Beecher' (1893); 'Christianity the World Religion'; 'The World Pilgrimage'; 'History of the Parliament of Religions' (1893); 'The Christian Conquest of Asia,' (1899).

Barrows, Samuel June, American clergyman and author: b. New York, 26 May 1845. After a varied early career he became private secretary to William H. Seward in 1867, went to Utah in 1870 with Chaplain Newman of the United States Senate, and reported the debate with the Mormons. He was graduated at Harvard Divinity School in 1875, and while an undergraduate accompanied as correspondent of the New York *Tribune* Gen. Stanley's Yellowstone expedition in 1873, and Gen. Custer's Black Hills expedition in 1874, taking part in the battle of the Big Horn. He was pastor of the First Unitarian Church, Dorchester, Mass., 1876–81; editor of the *Christian Register* (1881–97); secretary of the United States delegation to the International Prison Congress, Paris, 1895; and United States representative on the International Prison Commission, 1896. In 1897 he was elected to Congress from the 10th Massachusetts district. He has written 'The Doom of the Majority of Mankind' (1883); 'Shaybacks in Camp'; 'Crimes and Misdemeanors in the United States'; 'A Baptist Meeting House'; 'Isles and Shrines of Greece' (1898).

Barrundia, bär-roon'dē-ą, **José Francisco,** Central American statesman: b. Guatemala, 1779; d. New York, 4 Aug. 1854. He was sentenced to death for treason in 1813, but escaped, and became leader of the Revolutionary Party, in 1819. In 1823–4, as a member of the Constitutional Convention of Central America, he brought forward the decree for the abolition of slavery. He became president of the Central American Republic in 1829; retaining office for over a year, and in 1852 was again elected president. He came to the United States in 1854, as minister from Honduras, to propose the annexation of that territory to the United States, but died suddenly before anything was accomplished.

Barry, Alfred, English prelate: b. London, 15 Jan. 1826. He was a son of the architect Sir Charles Barry, and was educated at Cambridge. He was headmaster of Leeds grammar-school, 1854–62; principal of Cheltenham College, 1862–8, and of King's College, London, 1868–83. He was canon of Worcester, 1871–81, of Westminster 1881–4. He became primate of Australia and bishop of Sydney in 1884, but resigned his see in 1889 and returning to England was rector of St. James, Piccadilly, London, 1895–1900. He has published 'Introduction to the Old Testament' (1850); 'Life of Sir C. Barry' (1867); 'Boyle Lectures' (1876–8); 'Christianity and Socialism' (1891); 'England's Mission to India' (1894); 'Hulsean Lectures' (1895).

Barry, Ann Spranger, English actress: b. Bath, 1734; d. London, 1801. She was several times married. Her first great success was in the character of Cordelia, at Drury Lane, London (1767). Her farewell was as Lady Randolph, at Covent Garden (1797). Equal to Mrs. Woffington and Mrs. Cibber in tragedy, she surpassed them both in comedy. As Desdemona she had, during her whole career, no competitor. She is buried in Westminster Abbey.

Barry, Sir Charles, distinguished English architect: b. London, 23 May 1795; d. May 1860. At a very early age he displayed a taste for drawing and design, and while a youth, exhibited at the Royal Academy. Having resolved to devote his energies to architecture, he employed the little property left him in visiting Italy, Greece, and the East. He left England in 1817, and remained abroad upward of three years. After his return he entered on his professional career. He executed numerous important buildings, such as the Traveler's and Reform Club-houses, London; St. Edward's School, Birmingham, etc.; and in 1836 was appointed architect of the new Houses of Parliament at Westminster. On this building his fame as an architect rests, and with its execution he was employed almost unintermittently to the day of his death, extending over a period of more than 24 years. In 1852 he received the honor of knighthood. He had been admitted a Royal Academician in 1841. As an architect he belonged to the eclectic school, and adopted indifferently the Gothic or classic styles according as he might be required or circumstances rendered it expedient.

Barry, Edward Middleton, English architect, son of Sir Charles Barry: b. 1830; d. 1880. He had already distinguished himself in his profession, and succeeding to his father's business, completed his great work the Houses of Parliament. He designed a large number of buildings, many of them of national magnitude and importance, such as the Covent Garden Theatre, the opera house at Malta, and the New

National Gallery in London. He was elected a Royal Academician in 1869, and in 1873 succeeded Sir G. G. Scott as professor of architecture to the Academy.

Barry, Elizabeth, English actress: b. 1658; d. London, 7 Nov. 1713. She was said to be the daughter of Col. Barry, a prominent royalist in the civil war. She made her debut on the stage under the patronage of the Earl of Rochester; and her first performance is said to have been witnessed by Charles II. and the Duke and Duchess of York. Her reputation was won chiefly in the line of tragedy, in the roles of Monimia and Belvidera. She was known as «the great Mrs. Barry»; and is said to have created over 100 roles. See Galt, 'Lives of the Players' (1831).

Barry, James, Irish painter and writer on his art: b. Cork, 11 Oct. 1741; d. 12 Feb. 1806. By one of his first paintings in oil, 'The Conversion of St. Patrick,' exhibited at Dublin, he attracted the attention of Burke, who carried him, in his 23d year, to London. The brothers Burke provided him with the means for visiting Paris and Rome, whence he went to Florence, Bologna, and Naples. He remained about four years in Italy, returning in 1770. Having exhibited some important pictures he was elected an associate of the Royal Academy in 1772, and a full academician the following year. In 1777–83 he executed his chief work, the paintings which adorn the great hall of the Society of Arts. In 1775 he published 'An Inquiry into the Real or Imaginary Obstructions to the Increase of the Arts in England.' He was appointed professor of painting to the Academy in 1782; but in 1799, after he had alienated the respect of his fellow-academicians by his peculiar manners, and by his savage attacks upon them, he was expelled on the occasion of a violent pamphlet issued by him under the title of a 'Letter to the Society of Dilettanti.' He was distinguished more by vigor of conception than by accuracy of execution, and his paintings have not maintained their reputation.

Barry, John, the first American commodore: b. Wexford, Ireland, 1745; d. Philadelphia, 13 Sept. 1803. He early displayed a great partiality for the sea, and at the age of 11 adopted America as his home, and made a number of voyages in merchant ships, until the commencement of the Revolution. He at once embraced the cause of the colonies, offered his services, and was one of the first officers commissioned by Congress in the naval service. After a successful cruise in the Lexington, he was transferred, in the latter part of 1776, to the Effingham, one of three large frigates built in Philadelphia. When the American vessels of war were lying near Whitehill, whither they had been sent when the city and the forts of the river had fallen into the power of the British, Commodore Barry conceived the daring plan of annoying the enemy by means of small boats, properly armed, which being stationed down the river and bay might intercept supplies, and in case of danger take refuge in the creeks. He accordingly manned the boats of the frigates, descended the river with muffled oars under cover of the night, and appeared unexpectedly before the city. He effected his object by intercepting a large stock of provisions, and capturing several vessels laden with military munitions and valuable stores for the British officers. He was afterward transferred to the Alliance, a frigate of 36 guns, which was placed under his orders. 25 December 1781 the Alliance sailed from Boston with the Marquis de la Fayette and Count de Noailles on board, who were proceeding to France on public business. During the rest of the war Barry served with credit to himself and benefit to his country, and after the cessation of hostilities, was appointed to superintend the building of the frigate United States in Philadelphia, which was designed for his command. He retained the command of the United States until she was laid up in ordinary.

Barry, John Arthur, Australian journalist: b. 1850. He led a roving life for many years, but finally settled in Sydney, N. S. W. His writings include: 'Steve Brown's Bunyip' (1893); 'The Great Deep' (1895); 'The Lack of the Native Born' (1898); 'A Son of the Sea' (1899); 'Against the Tides of Fate' (1899); 'Old and New Sydney' (1901); 'Red Lion and Blue Star' (1902).

Barry, John Daniel, American novelist: b. Boston, Mass., 31 Dec. 1866. He has written 'A Daughter of Thespis'; 'The Intriguers'; 'Mademoiselle Blanche'; 'The Princess Margarethe, a Fairy Tale'; etc.

Barry, Sir John Wolfe, English engineer of eminence, youngest son of Sir Charles Barry: b. London, 7 Dec. 1836. He built the present Blackfriars Bridge in London, the Tower Bridge, the Barry Dock at Cardiff, and planned the railway in Argentina from Buenos Ayres to San Rosario. He has published 'Railway Appliances' (1876); 'Lectures on Railways and Locomotives' (1882); 'The Tower Bridge' (1894).

Barry, Martin, English physiologist: b. Fratton, Hampshire, 1802; d. Beecles, Suffolk, April 1855. He studied at the medical schools of London, and at several on the Continent, and took his degree of M.D. in Edinburgh, in 1833. He wrote much on physiological subjects, and especially on animal development and embryology. He was elected a member of the Royal Society in 1840. In 1844 he was appointed house-surgeon to the Royal Maternity Hospital, Edinburgh. His means being ample, he gave his professional services largely to the poor.

Barry, Patrick, American horticulturist: b. near Belfast, Ireland, May 1816; d. Rochester, N. Y., 23 June 1890. He came to the United States at 20 and settled at Rochester in 1840. He was a member of the nursery firm of Elwanger & Barry. He published a much valued work called 'The Fruit Garden,' and at various times edited the 'Horticulturist' and the Genesee *Farmer*.

Barry, Spranger, Irish actor, the great rival of Garrick: b. Dublin, 1719; d. London, 1777. He was brought up as a silversmith; but was attracted to the stage. He first appeared (1744) at the Theatre Royal, Smock Alley, Dublin; and in 1746 was engaged at Drury Lane, London, as alternate to Garrick, in 'Hamlet' and 'Macbeth.' Having aroused Garrick's jealousy by his success as Romeo, he was engaged (1749) at Covent Garden, where his supremacy in 'Romeo and Juliet' was generally

conceded. He spent 1754–66 trying to found a theatre at Dublin. In 1767 he reappeared at London in the part of Othello. From 1774 till his death he acted at Covent Garden. He is buried in Westminster Abbey.

Barry, Thomas Henry, American soldier: b. New York, 13 Oct. 1855. He graduated at West Point, 1877, and passed through the various grades of the service to his appointment as brigadier-general, United States volunteers, 18 June 1900. From August 1898 to February 1900 he was adjutant-general of the 8th army corps in the Philippines, and became chief of staff, Division of the Philippines, 1900–1, and became Brigadier-General 18 Aug. 1903.

Barry, William Farquhar, American military officer: b. New York, 18 Aug. 1818; d. 18 July 1879. He first saw actice service in the Florida war (1852–3), and in the Mexican war acted as aide-de-camp to Gen. Worth. At the outbreak of the Civil War he was made chief of artillery, and organized the artillery of the Army of the Potomac. He subsequently became chief of artillery to Sherman, and took part in the march to the sea. In 1865 he was brevetted major-general. In 1867 he had charge of the Artillery School at Fort Monroe. He was part author with J. G. Barnard of 'Engineer and Artillery Operations of the Army of the Potomac, 1861–2,' and of 'Tactics for the Field Artillery of the United States.'

Barry, William Francis, English Roman Catholic priest, theologian, and novelist: b. London, 21 April 1849. He was educated at Oscott and the English College, Rome; was professor of philosophy at Birmingham Theological College, 1873–7; professor of divinity at Oscott, 1877–80; and has been rector of a parish in Dorchester, Oxfordshire, from 1883. Besides writing much on metaphysical themes in English reviews, he is the author of several brilliant novels, including: 'The New Antigone' (1887); 'The Place of Dreams' (1894); 'The Two Standards' (1898); 'Arden Massiter' (1900); 'The Wizard's Knot' (1901); 'Ernest Renan' (1905). He has also published 'The Papal Monarchy' (1902).

Barry, William Taylor, American statesman: b. Lunenburg, Va., 5 Feb. 1784; d. Liverpool, England, 30 Aug. 1835. He graduated at William and Mary College (1803), and was soon after admitted to the bar. In 1810 he became a member of Congress from Kentucky. He served in the War of 1812; and from 1814–16 was United States senator from Kentucky. In 1828 he was appointed postmaster-general under Jackson; and was on his way abroad as minister to Spain at the time of his death. He was the first postmaster-general who had a seat in the Cabinet.

Barry Cornwall. See PROCTER, BRYAN WALLER.

Barry, a seaport and railway terminus of south Wales, county of Glamorgan, seven miles southwest of Cardiff. It has been practically brought into existence by the construction (1884–9) of a dock of 70 acres area here, between Barry Island and the mainland, at a cost of about £850,000, the entrance being between two breakwaters respectively 2,600 and 700 feet in length. Barry possesses churches and chapels, market-hall, public-hall, seamen's institute, etc., and carries on a large export trade in coal. As a municipality it is markedly progressive. Pop. (1901) 27,000.

Barry Lyndon, the best of Thackeray's shorter novels. It was originally written as a serial for 'Fraser's Magazine,' and was published in book form in 1844. It is cast in the form of an autobiography. The hero is an Irish gambler and blackleg, but of audacious courage and of picturesque versatility. He tells his story in a plain matter-of-fact way, without concealment or sophistication, glorying in episodes which would seem shameful to the most rudimentary conscience, and holding himself to be the greatest but most ill used of men.

Barrymore, Maurice, American actor: b. India, 1847; d. Amityville, L. I., 25 March 1905. He was educated at Cambridge. Having gone upon the stage he came to America and made his first appearance in 1875. Since then he has been most of the time in this country, acting as leading man with Modjeska, Mrs. Langtry, Mrs. Bernard Beere, and Olga Nethersole. He has also written several plays, among them 'Nadjeska.'

Bar'sabas, the son of Alpheus, brother of James the Less and of Jude, and one of the candidates nominated for the apostolical office left vacant by the treachery and suicide of Judas. According to tradition he was afterward appointed bishop of Eleutheropolis, a town of Palestine, about 20 miles from Jerusalem, and suffered martydrom. Another Barsabas, surnamed Judas, and supposed to be the brother of the above, is mentioned in the Acts as one of the companions of Paul and Barnabas when they went to preach the gospel at Antioch. He is supposed to have returned to Jerusalem, and died at a very advanced age.

Barsu'ma, or **Barsumas,** Nestorian bishop who flourished in the 5th century. He became bishop of Nisibis and Metropolitan in 435. He established a theological school which sent out many missionaries, and is regarded as the founder of the Nestorian faith in Persia and eastern Asia.

Bartan, bär-tän', a town of Asia Minor, at the junction of the river Bartan and a smaller stream, the former navigable for small vessels entering the Black Sea a few miles below. It is surrounded by a ruinous wall, and consists of about 800 houses, built on two low hills of cretaceous limestone. The houses, on account of the marshy character of the surrounding country, are all built of two stories, only the upper one of which is inhabited. For the same reason the streets are carefully paved with large limestone slabs. It has several mosques, khans, and baths; and carries on an active trade with Constantinople, from which it imports various kinds of merchandise, sending in exchange hemp, fruit, and building-timber. Pop. 4,000.

Bartas, bär-ta, **Guillaume de Salluste du,** French soldier, diplomatist, and man of letters: b. Montfort, 1544; d. 1590 of wounds received at the battle of Ivry. His chief poem, 'The Divine Week,' gives an account of the creation, and is said to have had a considerable influence on Milton's 'Paradise Lost.' Thirty editions of the work passed through the press in six years. Joshua Sylvester (1563–1618) translated

into English 'Du Bartas, His Divine Weeks and Works' (1598). Mrs. Anne Bradstreet, the earliest American woman of letters, was an ardent admirer of his strained pedantic style and modeled her own verse upon it.

Bartenstein, bär'tĕn-stīn, **Treaty of,** a treaty between Prussia and Russia against France, concluded at Bartenstein, Prussia, 26 April 1807, soon after the battle of Eylau. The objects of the alliance were to re-establish Prussia within the limits of 1805; to dissolve the Rhine Confederation; to restore Tyrol and Venice to Austria; to secure the co-operation of England and Sweden; to aggrandize Hanover at the expense of France; to restore the House of Orange; and to obtain from France indemnities to the kings of Sardinia and Naples. The terms of this alliance are chiefly important for their similarity to the terms offered Napoleon at Prague (1813). The town of Bartenstein has manufacturing interests of importance. Pop. (1900) 6,779.

Barter, a term used in commerce and political economy, to express the exchange of one commodity for another, as contrasted with the sale of commodities for money. It is simply a primitive form of exchange carried on in countries in which the use of money has not yet been introduced, or is not prevalent. It was an economic stage through which all communities must have passed. Even yet in many rude countries barter is very common; and European travelers find it convenient to take with them weapons, tools, and ornaments to exchange with the natives for their commodities. In civilized communities barter is a very exceptional thing, having been superseded by the use of money in various forms.

In law, barter, or exchange, as it is now more generally called in law books, is a contract for transferring property, the consideration being some other commodity; or it may be described as a contract for the exchange of two subjects or commodities. It thus differs from sale, which is a contract for the transference of property in consideration of a price in money. See also SALE.

Bartfeld, bärt'fĕlt, a town in Hungary, 156 miles northeast of Budapest, on a rising ground near the banks of the Tepla and Lauka. It is one of the oldest towns in Hungary, and is well built; has several Roman Catholic churches, a Lutheran church and school, a Franciscan monastery, military academy, hospital, theatre, paper-mills, potteries, etc. Some acidulous chalybeate springs and baths, near the town, are much frequented. The trade in wine, hemp, linen cloth, and woolen yarn is considerable. Pop. 5,069.

Barth, bärt, **Auguste,** French Oriental scholar: b. in Strassburg, 22 May 1834. He is a member of the French Institute and his annual reports in 'Revue de l' Historie des Religions' are much esteemed. His most important work is 'Les Religions de l' Inde' (1879; English translation 1882).

Barth, Heinrich, distinguished geographer and African traveler: b. Hamburg, 16 Feb. 1821; d. 25 Nov. 1865. He received his education partly in his native town, and partly at the University of Berlin, and having determined to explore all the countries bordering on the Mediterranean, set out with this intention in the beginning of 1845. After his return in the end of 1847 he wrote an account of his travels, which he published with the title 'Wanderungen durch die Küstenländer des Mittelmeeres' (Berlin, 1849). In less than two years after his return from his first travels he was invited by the English government to join Dr. Overweg in accompanying the expedition that was about to proceed under James Richardson to Central Africa. The expedition having landed at Tripoli in the end of 1849, set out thence for the interior of Africa in February 1850. His explorations, which extended over an area of about 2,000,000 square miles, hitherto almost entirely unknown, were continued for more than five years, in spite of the death both of Richardson and Overweg, and he did not return to Tripoli till the autumn of 1855. The chief geographical results of these travels consist in the light they throw on the true nature of the Desert of Sahara, in showing that the eastern upper branch of the Niger, the Benuwe, is not connected with Lake Chad, and in the determination of the course of the Niger between Say and Timbuctoo. The result of these travels, entitled 'Travels and Discoveries in North and Central Africa,' was published in English (1857–8). Immediately after its publication he set out upon a new series of travels through the countries bordering on the Mediterranean, the last of which occupied the summer of 1865. Besides the works mentioned, he published 'Sammlung und Verarbeitung Central-afrikanischer Vokabularien' (1862–3).

Barth, or **Bart, Jean,** French seaman: b. Dunkirk, 20 Oct. 1650; d. there, 27 April 1702. He was the son of a fisherman, and at an early age evinced a love of adventure, which led him to follow the sea. He desired to enter the royal service, but at this period the lower classes were never commissioned in the French royal navy, and Barth was constrained to take the command of a privateer. In this position opportunities soon occurred for distinguishing himself, and his name became known to Louis XIV., who commissioned him to cruise in the Mediterranean. His bravery soon raised him in the favor of the king, and he was appointed captain of the squadron in 1697. France being now at war with the Dutch, a field was opened of which Barth was not slow to take advantage, and the most unexampled feats of daring soon made him the terror of his enemies. On one occasion, a famine existing in France, Barth recaptured from the Dutch 100 sail of vessels, loaded with grain. At another time when Dunkirk was blockaded, taking advantage of a fog, he sailed through the English and Dutch fleets, and destroyed 86 merchantmen: then making a descent near Newcastle, Northumberland, he destroyed 200 houses, and returned safely with property valued at 500,000 crowns. Barth was rough in manners, and entirely uneducated; indeed, he could with difficulty scrawl his own name; but he was as simple-minded and honest as he was brave. A statue to his memory, by David d'Angers, was erected at Dunkirk in 1845. See Badin, 'Jean Bart' (1867); Landelle, 'Jean Bart et son fils' (1874).

Barth, Paul, German sociologist: b. Baruthe, Silesia, 1 Aug. 1858. He is a professor in the University of Leipsic and in addition to his much-valued 'Philosophie der Ge-

schichte als Sociologie' (1897), is the author of 'Geschichte Philosophie Hegels und die Hegelianer bis auf Marx und Hartmann' (1890); 'Beweggründen des Sittlichen Handelns' (1889); Tiberius Gracchus' (*2* ed. 1893).

Barth, a seaport of Prussia, in the province of Pomerania, northwest of Stralsund. Its chief industries are ship-building and fish curing and packing, and it has also a good trade in grain and wool. Its church dates from the 13th century. Pop. (1900) 7,100.

Barthélemy, bär-tā-l'-me, **Auguste-Marseille,** French poet and politician: b. Marseilles, 1796; d. there, 23 Aug. 1867. Educated at the Jesuit College of Juilly, he went to Paris in 1822, and soon made himself famous by a series of vigorous and pointed political satires in verse, directed against the Bourbons, and full of suggestive regrets for the glories of the empire. In 'Napoleon in Egypt' (1828), and still more in his elegy for Napoleon's son, 'The Son of the Man' (1829), he spoke out his imperialism more boldly, and the latter occasioned his imprisonment on the eve of the revolution of July. His liberation, of course, was immediate; and with his friend Méry, he celebrated the victory of the people in a poem dedicated to the Parisians, entitled 'The Insurrection.' During all the changes which followed, Barthélemy was indefatigable as a brilliant versifier on the political events of the day; though, in his later years, his popularity somewhat declined. He was, from the first, a warm supporter of the second Napoleonic régime. Some of his sayings are memorable, as the oft-quoted "L'homme absurde est celui qui ne change jamais." He died in Marseilles, of which city he was librarian.

Barthélemy, François, Marquis de, French diplomatist: b. Aubagne (Provence), 20 Oct. 1747; d. Paris, 3 April 1830. He was brought up by his uncle, the author of 'Anacharsis'; and the protection of the Duke of Choiseul established him in diplomacy. The Revolution did not hinder his success in life; in 1793 he was minister plenipotentiary to Switzerland. He successively negotiated the Peace of Basel with Prussia, Spain, and the elector of Hesse, the first treaties concluded by the French republic. This won for him an enviable reputation; but he was especially popular among the *Clichyen* or royalist party, by which he was, in 1797, elected member of the directory; consequently on the republican *coup d'état* of the 18th Fructidor, he was ejected from the government, arrested, and transported with Pichegru and Ramel, to Guiana, whence he escaped to the United States. Shortly afterward he was in England, and after the 18th Brumaire was recalled by the first consul, who made him a senator. On the establishment of the Empire he received the title of count and showed great devotion to Napoleon during the course of his prosperity, but as soon as misfortune threatened Barthélemy sided at once with his enemies. He was made a minister of state and a marquis by Louis XVIII. and in 1819 proposed the restriction of the electoral franchise.

Barthélemy, Jean Jacques, French antiquarian: b. Cassis, near Marseilles, 20 Jan. 1716; d. 30 Jan. 1795. He received a good education from the fathers of the oratory at Marseilles, and was about to prepare himself, under the Jesuits, for holy orders; but becoming disgusted with his teachers declined all offers of clerical promotion, and only accepted the title of *abbé,* in order to show that he belonged to this class. He became deeply interested in the study of Oriental languages and antiquities, and his indefatigable industry and acuteness soon enabled him to communicate to the learned new discoveries in this Oriental study, among which the 'Alphabet of Palmyra,' published 1754, holds a principal place. In 1747 he was chosen member of the Academy of Inscriptions at Paris. About this time he became acquainted with the Count Stainville (afterward the minister Choiseul), who was on the point of departing as ambassador for Rome, and invited Barthélemy to accompany him. Having been appointed director of the Cabinet of Medals in 1753, he accepted the offer and went, in 1754, to Rome. He traveled through Italy, collected antiquities, and occupied himself, after his return, with learned works and with the arrangement of the cabinet which had been intrusted to his care, and to which he added a great number of costly and rare medals. Among his works none are so distinguished for learning and beauty of description as the 'Travels of the Younger Anacharsis in Greece,' on which he had labored 30 years, and which was translated into English, German, and other languages. He himself was modest enough to call this an unwieldy compilation, but all the learned men of France and foreign countries received it with the greatest applause. Barthélemy, in his advanced age, resolved to compose a complete catalogue of the Royal Cabinet of Medals, but was interrupted in 1788 by the storms of the Revolution. In 1789 he received a place in the Académie Française. In 1793 he was arrested on a charge of aristocratic leanings, but was soon after set at liberty. When the chief librarian of the national library, the notorious Carra, was executed, 31 Oct. 1793, Barthélemy received the offer of his place but declined it.

Barthélemy-Saint-Hilaire, Jules, French politician and philosopher: b. Paris, 19 Aug. 1805; d. there, 25 Nov. 1895. On completing his studies he received an appointment in the ministry of finance, being at that time also on the staff of the *Globe* newspaper. After the revolution of 1830 he founded a journal called *Bon Sens,* and continued to support the liberal party in the press. In 1834 he became examiner in French literature at the École Polytechnique, and four years later he was appointed to the chair of Greek and Latin philosophy in the Collège de France. He played a part on the side of the moderate party in the revolution of 1848, and was elected to the constituent assembly for Seine-et-Oise. The *coup d'état* of December 1852 caused him to forsake political life for a considerable time and to resign his professorship. From this retirement he emerged in 1869, the year of his election as deputy for the first circumscription of Seine-et-Oise. He was shortly afterward sent to the National Assembly as the representative of that department, and during the troublous times of 1870–1 he was closely associated with M. Thiers. In 1875 he became a life senator, and in the cabinet of M. Jules Ferry, constituted 1880, he was appointed minister of foreign affairs. The chief event of his tenure of this office was the occu-

pation of Tunis. In 1881 he again abandoned public life for study and literary work. His greatest work is his complete French version of Aristotle (1837–93); and among his other writings are 'De la Logique d'Aristote' (1838); 'Des Védas' (1854); 'Du Bouddhisme' (1855); 'Letters on Egypt' (1856); Le Bouddha et sa Religion' (1862); 'Mahomet et le Coran' (1865); 'De la Métaphysique' (1879); 'L'Inde Anglaise' (1887); 'La Philosophie dans les rapports avec les Sciences et la Religion' (1889); 'Etude sur Francis Bacon' (1890); 'Victor Cousin' (1895); and other works on Hindu religions, philosophy, etc.

Barthez, bär-tās, **Paul Joseph,** distinguished French physician: b. Montpellier, 11 Dec. 1734; d. 15 Dec. 1806. He was the founder of a medical school at Montpellier which acquired a reputation throughout all Europe. Later he received high honors at the hands of Napoleon. Among his numerous writings may be specially mentioned the 'Nouvelle Mécanique des Mouvements de l'Homme et des Animaux.'

Bartholdi, Frédéric Auguste, distinguished French sculptor: b. Colmar, Alsace, 2 April 1834; d. Paris, 4 Oct. 1904. While a student in painting under the celebrated Ary Scheffer, he showed a greater bent and aptitude for sculpture, and devoted his energies to this branch of art, exhibiting numerous works at the salons. After the Franco-German War of 1870–71, in which he fought on the staff of Garibaldi, he came into prominence by the gigantic 'Lion of Belfort' carved out of the red rock on the hill which towers over the Alsatian city, and commemorates its celebrated siege and defense. His statue of 'Lafayette Arriving in America,' now in Union Square, New York city, was presented to the metropolis by France as a testimonial of gratitude to Americans for sympathy and service during the Franco-German War. During the days of the Commune when unable to pursue his studio work in Paris, Bartholdi visited the United States, and when arriving in the beautiful harbor of New York, conceived the idea of the colossal statue of 'Liberty Enlightening the World,' erected on one of the islands of the harbor to welcome with its flaming torch all arrivals in the Land of Liberty. On his return to France he divulged his plan, and a body of distinguished Frenchmen formed a society to carry out his project. Bartholdi gave 20 years of devoted effort to the work, personally superintending the raising of the subscription of $400,000 with which the French nation gave the statue to the United States. The donations came mainly from the pence of the poor, requiring enormous attention and detail, and when subscriptions lagged, Bartholdi pledged his own private fortune to defray the running expenses and practically impoverished himself over the work. Patiently overcoming all difficulties and obstacles, he had the satisfaction to see the statue dedicated with imposing ceremonies by President Cleveland 28 Oct. 1886. (See LIBERTY, STATUE OF.) Bartholdi was a prolific sculptor, and among the most notable of his other works are the figures of Washington and Lafayette on the Place des États-Unis in Paris, the Bartholdi fountain of the Botanical Gardens in Washington, the bronze group of the 'Lyre among the Berbers, a Souvenir of the Nile,' exhibited at the Salon of 1857; 'Genius in the Talons of Misery,' Salon of 1859; 'Portrait of General Schramm, the Modern Martyr' (1864); 'Portrait of Laboulaye' (1866); 'The Leisures of Peace' (1868); 'Young Alsatian Grape Grower' (1869); an equestrian statue of Vercingetorix (1870); portraits of Messieurs Erckmann-Chatrian; his well-known 'Curse of Alsace' (1872); and 'Swizerland Assuaging the Sorrows of Strasbourg, Siege of 1870' (1873).

Bartholin, bär'tō-len, **Kasper,** Danish physician: b. Malmo, Sweden, 12 Feb. 1585; d. Soröe, 13 July 1630. He traveled in Germany, France, England, and Italy, and taught medicine at Padua, Wittemberg, and Copenhagen. He was for many years rector of the university of Copenhagen, and his 'Institutiones Anatomical' was a text-book in general use in Europe in the 17th century in various translations.

Bartholin, Thomas, Danish physician, the most distinguished of the sons of the preceding: b. Copenhagen, 20 Oct. 1619; d. 4 Dec. 1680. After traveling throughout Europe, he became professor of anatomy in the University of Copenhagen, and made several discoveries in this science. He revised his father's 'Anatomy' and was a firm believer in Harvey's theory of the circulation of the blood. His son, Kaspar (1654–1704), was a famous anatomist, and his son Thomas (1650–90) was an antiquarian writer whose 'Antiquitatum Danicarum Libri Tres' (1689) is of much value.

Bartholin's Glands (named after their discoverer, Kaspar Bartholin (q.v.), are the vulvo-vaginal glands, two in number, situated inside the vaginal opening. They secrete a mucous secretion and are subject to infection, forming abscesses. See also BARTHOLINITIS; COWPERITIS.

Bartholomew, of the Martyrs, archbishop of Braga in Portugal: b. 1527; d. 1590. He wrote several treatises on spiritual subjects, was an intimate friend of Saint Charles Borromeo, and did for the Church in Portugal what Saint Charles did for religion in Italy. He was one of the most influential members of the Council of Trent, and the enactment of most of the reformatory decrees in that Council was due to his zeal and perseverance. Consult his 'Life' translated by Lady Herbert.

Bartholomew, Edward Sheffield, American sculptor: b. Colchester, Conn., 1822; d. 2 May 1858. He studied in New York and in Rome, where he lived during the latter part of his life. Among his works are 'Blind Homer, Led by His Daughter,' 'Eve,' 'Youth and Old Age,' 'Ganymede,' and 'Evening Star.'

Bartholomew, Saint (son of Tolmai), the apostle, probably the same person as NATHANAEL, mentioned in the Gospel of St. John as an upright Israelite, and one of the first disciples of Jesus. The name «Tholmai» was not a patronymic, but a surname given to the apostle, a common practice, owing to the well-known scarcity of Hebrew family names. He is said to have taught Christianity in the south of Arabia, into which, according to Eusebius, he carried the Gospel of St. Matthew in the Hebrew language. Chrysostom mentions that he preached in Armenia and Asia Minor, and tradition tells that he was flayed alive and crucified head downward. His day is the 24th of August.

Bartholomew, Saint, archbishop of Nakschiwan, "Apostle of Armenia," b. Bologna; d. 1333. Having learned of his missionary zeal, Pope John XXII. consecrated him bishop of Maraga in Armenia. He belonged to the Dominican Order and established a province of the same in Armenia. With the assistance of confreres he translated into Armenian the Psalter, the Missal, the moral tracts of Saint Augustine, and Saint Thomas' four books, 'Contra Gentiles.'

Bartholomew Fair, a celebrated fair formerly held in West Smithfield, London, on Saint Bartholomew's Day, 24 August. It was first established in the reign of Henry I., and was originally devoted mainly to the purposes of business and traffic. It was finally abolished in 1855.

Bartholomew, Saint, one of the Leeward Islands, in the West Indies, 120 miles to the northwest of Guadeloupe, belonging to France (to which it was transferred by Sweden in 1877), about 8 square miles in area, and rising to the height of about 1,000 feet. It produces tobacco, sugar, cotton, indigo, cassava, drugs, etc., with some excellent woods (including lignum vitæ), and limestone. All the fresh water which can be procured is saved in cisterns, as there are no springs. The climate is healthy. The island is encompassed by formidable rocks, which render it dangerous of access to shipping. Pop. 2,835. The only town is Gustavia or Saint Bartholomew. In the South Pacific Ocean are two other islands of the same name.

Bartholomew, Massacre of Saint, the slaughter of French Protestants in Paris and other cities in France on various dates between 24 Aug. and 3 Oct. 1572. After the death of Francis II., Catherine de Medici had assumed the regency for her son, Charles IX., then only 10 years old, and in spite of the opposition of the Guises she issued an edict of toleration in favor of the Protestant party, 1562, which she had favored in many ways. The party of the Guises now persuaded the nation that the Roman Catholic religion was in the greatest danger. Religious dissension grew rife, and each party, Roman Catholic and Huguenot, under pretext of religion, treated the other with cruelty. Prince Condé took up arms; the Guises had recourse to the Spaniards, Condé to the English, for assistance. Both parties were guilty of the most atrocious cruelties, but finally concluded peace. The queen-mother caused the king, who had entered his 14th year, to be declared of age, that she might govern more absolutely under his name. Duke Francis de Guise had been assassinated by a Huguenot, at the siege of Orleans; but his spirit continued in his family, which considered the Admiral Coligny as the author of his murder. The king had been persuaded that the Huguenots had designs on his life, and had conceived an implacable hatred against them. Meanwhile the court endeavored to gain time, in order to seize the persons of the prince and the admiral by stratagem, but was disappointed, and hostilities were renewed in 1565, and still again after the Peace of Lonjumeau, 1568, this time with greater cruelty than ever. In the battle of Jarnac, 1569, Condé was made prisoner and shot by Capt. de Montesquieu. Coligny collected the remains of the routed army; the young Prince Henry de Béarn (afterward Henry IV., king of Navarre and France), the head of the Protestant party after the death of Condé, was appointed commander-in-chief, and Coligny commanded in the name of the Prince Henry de Condé, who swore to avenge the murder of his father. The advantageous offers of peace at St. Germain-en-Laye (8 Aug. 1570) satisfied the chiefs of the Huguenots, particularly Admiral Coligny, who was wearied with civil war. The king appeared to have entirely disengaged himself from the influence of the Guises and his mother; he invited the old Coligny, the support of the Huguenots, to his court, and honored him as a father. The sister of the king was married to the Prince de Béarn (18 Aug. 1572); this union opened up a field for the most distinguished Huguenots in Paris. Meanwhile the queen had allied herself to the Guise family, and jealous of the influence of Coligny with the king, determined to have him assassinated. On 22 August a shot from a window wounded the admiral. The king hastened to visit him, and swore to punish the author of the villainy; but on the same day he was induced by his mother to believe that the admiral had designs on his life. "God's death!" he exclaimed: "kill the admiral; and not only him, but all the Huguenots; let none remain to disturb us!" The following night Catherine held the bloody council which fixed the execution for the night of St. Bartholomew, 24 Aug. 1572. After the assassination of Coligny a bell from the tower of the royal palace, at midnight, gave to the assembled companies of 2,000 burghers the signal for the general massacre of the Huguenots. The Prince of Condé and the king of Navarre saved their lives by choosing mass rather than death, and pretending to embrace the Roman Catholic religion. Roman Catholics as well as Huguenots fell victims to the political and personal hatred of the slayers. By the king's orders the massacre was extended through the whole kingdom; and if, in some provinces, the officers had honor and humanity enough to disobey the orders to butcher their innocent fellow citizens, yet instruments were always found to continue the massacre. This horrible slaughter continued over 40 days; the victims are calculated from 10,000 to 100,000. The Calvinist martyrology cites 786 names; 2,000 is the number computed by late historians. At Rome the massacre was reported as a victory over a great Huguenot conspiracy against the king; it was for this reason the Pope ordered the Te Deum to be chanted and a medal struck commemorating the event. Those of the Huguenots who escaped fled into the mountains and to Rochelle. The Duke of Anjou laid siege to that city, but, during the siege, received the news that the Poles had elected him their king. He concluded a treaty, 6 July 1573, and the king granted to the Huguenots the exercise of their religion in certain towns. See also HUGUENOTS. See Loughnan, 'The Month' (1892).

Bartholomew's Hospital, Saint, formerly the priory of St. Bartholomew, and made a hospital by Henry VIII. in 1547. It contains 676 beds, and, on an average, 6,000 patients are annually admitted to the hospital, while about 100,000 out-patients are relieved by it.

Barthol'omites. See BASILIANS.

Bar'tizan, a battlement on the top of a house or castle; a small overhanging turret projecting from the angle on the top of a tower, or from the parapet or other parts of a building; or, the battlement surrounding a spire or steeple, or the roof of a cathedral or church.

Bartlett, Elisha, American physician and author: b. Smithfield, R. I., 1805; d. there, 18 July 1855. He graduated from the medical department of Brown University in 1826, and delivered the course of lectures on pathological anatomy at the Berkshire medical institute in Pittsfield, Mass., in 1832. In. 1836 or 1837 he was elected the first mayor of Lowell. He subsequently lectured at Dartmouth College, and in Transylvania University and the universities of Maryland and New York. In 1851 he became professor of materia medica and medical jurisprudence in the College of Physicians and Surgeons in New York, which place he held until his death. He published 'Essay on the Philosophy of Medical Science' (1844); 'Fevers of the United States' (1850); and a volume of poems, entitled 'Simple Settings in Verse for Portraits and Pictures in Mr. Dickens' Gallery' (1855).

Bartlett, Edwin Julius, American chemist: b. Hudson, O., 16 Feb. 1851. He was graduated at Dartmouth College in 1872, and at Rush Medical College in 1879; made associate professor of chemistry in Dartmouth in 1879, and full professor in 1883. He is a member of the American Chemical Society, and the New York Medico-Legal Society, and an honorary member of the New Hampshire Medical Society. He is the author of many papers on chemical subjects.

Bartlett, Sir Ellis Ashmead. See ASHMEAD-BARTLETT.

Bartlett, Homer Newton, American composer: b. Olive, N. Y., 28 Dec. 1846. He began his public career when 9 years of age, and at 10 composed violin music, piano duos, songs, and vocal duets. He has written a large number of anthems, quartets, and glees for vocal rendering, and pieces for the flute, stringed instruments, and military bands and orchestras. His best compositions include a three-act opera, 'La Valliere'; a cantata, 'The Last Chieftain'; an oratorio, 'Samuel,' etc.

Bartlett, Ichabod, American lawyer: b. Salisbury, N. H., 1786; d. 19 Oct. 1853. He graduated at Dartmouth College in 1808, commenced the practice of the law in Durham, but soon removed to Portsmouth, where his skill and ability soon commanded success. He is celebrated as an opponent of Webster and Mason. He was frequently a member of the State legislature, and of the United States House of Representatives for three terms, 1823–9.

Bartlett, John, American author and publisher: b. Plymouth, Mass., 14 June 1820; d. Cambridge, Mass., 3 Dec. 1905. He entered the university book-store, became a publisher in Cambridge in 1836, and senior partner in the house of Little, Brown & Company, in 1878. His works include: 'Familiar Quotations' (1854; 9th ed. 1891); 'New Method of Chess Notation' (1857); 'The Shakespeare Phrase-Book' (1882); 'Catalogue of Books on Angling, Including Ichthyology, Pisciculture, etc.' (1882); 'The Complete Concordance to Shakespeare's Dramatic Works' (1894); and 'Poems.'

Bartlett, John R., American naval officer: b. New York, 1843; d. Saint Louis, 22 Nov. 1904. He was appointed an acting midshipman in the navy from Rhode Island in 1859; entered the United States Naval Academy, where he remained till the beginning of the Civil War, when he was assigned to the West Gulf Blockading Squadron. He took part in the bombardment and passage of Forts St. Philip and Jackson, and the Chalmette batteries, and the capture of New Orleans and attack on Vicksburg in June 1862. He was promoted lieutenant in 1864; took part in the bombardment of Fort Fisher in December, and the assault on its works in January. Subsequently he was on surveying duty in Nicaragua and on the United States Coast Survey; was promoted to captain, 1 July 1892; and was retired 12 July 1897. After the declaration of war against Spain, in 1898, he was recalled to active service, and on 9 July succeeded Rear-Admiral Erben as commander of the Auxiliary Naval Squadron, organized for the protection of the Atlantic coast cities.

Bartlett, John Russell, American author: b. Providence, R. I., 23 Oct. 1805; d. 28 May 1886. He was educated for a mercantile career, and after 1837 entered the book-importing trade in New York. In 1850, he was appointed one of the commissioners to determine the Mexican boundary. In 1855 he was made secretary of State of Rhode Island. He published various valuable records, genealogies, local histories, etc., but his best known work is his 'Dictionary of Americanisms' (1850).

Bartlett, John Sherren, Anglo-American journalist, founder of the *Albion* newspaper in New York: b. Dorsetshire, England, 1790; d. 24 Aug. 1863. He was educated as a physician in London; was appointed surgeon in the royal navy in 1812; sailed to the West Indies on board the packet Swallow; was captured by the American frigates President and Congress, under Commodore Rodgers, and remained a prisoner at Boston until discharged in 1813. At the close of the war he married a lady of Boston and established himself there as a physician. The *Albion,* commenced by him in New York, 22 June 1822, as an English organ of conservative politics, gained a wide and profitable circulation. Bartlett subsequently commenced one or two other papers of a similar character at a cheaper price, and on the beginning of Atlantic steam navigation also established at Liverpool the *European,* a weekly compendium of the latest news for American circulation. Owing to the failure of his health, he withdrew from the *Albion* in 1848. He subsequently published the *Anglo-Saxon,* a weekly paper at Boston, which he continued about two years. In 1857 he served as English consul at Baltimore.

Bartlett, Joseph, American wit, poet, and adventurer: b. Plymouth, Mass., 1763; d. Boston, 27 Oct. 1827. He began the study of law at Salem, but soon gave it up for a voyage to England. Here he pursued the career of an adventurer, gambled, spent, got into prison, wrote a play for his release, and went upon the stage himself. From an actor he became a merchant, and having sailed for America with

a large supply of goods on credit, was shipwrecked on Cape Cod. In 1799 he delivered a poem on 'Physiognomy' before the Phi Beta Kappa society of Harvard, satirical and clever, and said to touch upon the traits of individuals at the time. To the edition of this poem, published in 1823, were appended a number of 'Aphorisms on Men, Principles, and Things,' the results of his various experience. The same year he delivered a Fourth of July oration at Boston, and afterward recited a poem, entitled the 'New Vicar of Bray,' which obtained considerable celebrity. He next attempted the practice of law and of politics in Maine, was elected to the State legislature, and nearly secured an election to Congress by his active exertions as a speaker and newspaper writer. He then practised law at Portsmouth, N. H., and finally closed his improvident life, a burden to his friends, at Boston. See Duyckinck's 'Cyclopædia of American Literature.'

Bartlett, Josiah, American statesman: b. Amesbury, Mass., November 1729; d. 19 May 1795. He commenced the practice of medicine in 1750, at Kingston, and established a reputation, during the prevalence of the *angina maligna* in 1754, by treatment with Peruvian bark, in opposition to the usage of other physicians. He received several appointments from the royal governor, John Wentworth, but lost them in 1775, for being a zealous Whig. Being chosen delegate to the Continental Congress, he was the first who voted for, and the first, after the president, who signed the Declaration of Independence, his name being first called as representative of the most easterly province. He accompanied Stark in 1777 to Bennington. He was appointed chief justice of the common pleas in 1779, justice of the supreme court in 1784, and chief justice in 1788. He was an active member of the convention called to adopt the Federal constitution in 1788. In 1790 he was president of New Hampshire, and in 1793 was chosen the first governor under the new State constitution. He was also president of the medical society established in 1791, by his exertions. In all his various offices his duties were ably and faithfully discharged.

Bartlett, Paul Wayland, American sculptor: b. New Haven, Conn., 1865. He entered the École des Beaux Arts, Paris, 1880; became chevalier of the Legion of Honor, 1895. His principal works are: an equestrian statue of Gen. McClellan in Philadelphia; one of Lafayette in Paris (presented to France by the school children of the United States); a statue of Gen. Joseph Warren in Boston; statues of Columbus and Michel Angelo in the Library of Congress, and 'The Bear Tamer,' in the Metropolitan Museum of New York.

Bartlett, Samuel Colcord, American educator: b. Salisbury, N. H., 25 Nov. 1817; d. 16 Nov. 1898. He was educated at Dartmouth College, and became a teacher there and at Andover Theological Seminary. He had charge of a church at Monson, Mass.; subsequently becoming professor of philosophy in Western Reserve University, Ohio. He afterward became pastor of a church in Manchester, N. H., and later of the New England Church in Chicago. In 1858 he was made professor of biblical literature in the Chicago Theological Seminary, where he remained until 1873, when he spent a year of travel in the East. In 1877 he accepted the presidency of Dartmouth College, which he held until 1892, when he resigned. He was the author of a number of works, including: 'From Egypt to Palestine' (1879); 'Sketches of Missions of the American Board'; 'Sources of History in the Pentateuch'; and 'The Veracity of the Hexateuch'; and also wrote a part of the American edition of 'Smith's Dictionary of the Bible.'

Bartlett, William Francis, American military officer: b. Haverhill, Mass., 6 Jan. 1840; d. 17 Dec. 1876. He was a student at Harvard University at the outbreak of the Civil War, but left to enter the army. He was wounded in the battle of Ball's Bluff, suffering the loss of a leg; but continued in the service; was twice wounded at Port Hudson; and in the battles of the Wilderness, while leading the 57th Massachusetts regiment, was again wounded, taken prisoner, and sent to Libby Prison. At the close of the war, he was made a major-general of volunteers for distinguished services in the field.

Bartlett, William Henry, English artist: b. Kentish Town, London, 29 March 1809; d. 25 Sept. 1854. He served an apprenticeship with the distinguished architectural antiquary, John Britton, who employed him to make drawings for his 'Cathedral Antiquities' and 'Picturesque Antiquities of English Cities.' Bartlett subsequently traveled extensively abroad, and the works which he published, descriptive of the countries visited by him, obtained great success with the public. They include 'Walks About Jerusalem' (1844); 'Forty Days in the Desert' (1848); 'The Nile Boat or Glimpses of Egypt' (1849); 'Footsteps of Our Lord and His Apostles in Syria, Greece, and Italy' (1851); 'The Pilgrim Fathers' (1853); 'Jerusalem Revisited' (1855).

Bartlett, William Holmes Chambers, American soldier and scientist: b. Lancaster County, Pennsylvania, 1809; d. 11 Feb. 1893. He was educated at West Point, and as lieutenant of engineers, was assistant professor there, 1827–9. He was engaged on the construction of Fort Munroe and Fort Adams; was assistant engineer at Washington, 1832–4; and again at West Point as assistant professor, 1834–6. When he resigned his lieutenancy in 1836, he was made full professor of philosophy at West Point, and held this position until he retired in 1871. He was a member of the Natural Academy of Sciences and other scientific societies, and wrote several scientific books, including 'Treatise on Optics' (1839); 'Synthetical Mechanics' (1850–8); 'Acoustics and Optics' (1852–9); 'Analytical Mechanics' (1853–9); and 'Spherical Astronomy' (1858–9).

Bartley, Elias Hudson, American chemist: b. Bartleyville, N. J., 6 Dec. 1849. He was graduated at Cornell University in 1873; was an instructor there in 1874–5; professor of chemistry at Swarthmore College, 1875–8; lecturer at the Franklin Institute, Philadelphia, in 1877–8. He removed to Brooklyn in 1879; graduated at Long Island College Hospital in 1879; was lecturer there on physiological and practical chemistry in 1880–5; and then became professor of chemistry and toxicology. He was made chief chemist of the health department of Brooklyn, in 1882. He is the author

of several articles in Wood's 'Household Practice of Medicine' (1885), and of 'A Text-Book of Medical Chemistry.'

Bar'tok, Ludwig von, a Hungarian poet and dramatist: b. 1851. 'Carpathian Songs' includes his happiest verse. As a playwright, he is even more distinguished; the comedy of 'The Most Beautiful' (1880), and the historical tragedy, 'Margareta Kendi,' as well as 'Anna Thuran,' a historical drama, having been frequently acted.

Bartol, Cyrus Augustus, American Unitarian clergyman: b. Freeport, Me., 30 April 1813; d. 17 Dec. 1900. He was graduated at Bowdoin College in 1832, and at Cambridge Divinity School in 1835; became colleague pastor with Dr. Charles Lowell of the West Church (Unitarian),) in Boston, 1837, and full pastor in 1861. He was a member of the Transcendental Club. His works include: 'Discourses on the Christian Spirit and Life' (1850); 'Discourses on Christian Body and Form' (1854); 'Pictures of Europe Framed in Ideas' (1855); 'History of the West Church and Its Ministers' (1858); 'Church and Congregation' (1858); 'Word of the Spirit to the Church' (1859); 'Radical Problems' (1872); 'The Rising Faith' (1874); 'Principles and Portraits' (1880).

Bartoli, bär'tō-lē, **Adolfo,** Italian historian: b. Fivizzano, 19 Nov. 1833; d. 1894. He has long been a recognized arbiter of taste and the elegancies in connection with his country's literature; his 'First Two Centuries of Italian Literature' (1870–80), and 'History of Italian Literature' (1878-89) being masterpieces. In 1874 he became professor of Italian literature in the Institute of Florence.

Bartoli, Daniello, a learned Italian Jesuit: b. Ferrara, 12 Feb. 1608; d. Rome, 13 Jan. 1685. He was the author of a celebrated history of the order of the Jesuits, published at Rome in six volumes (1653–75). Bartoli had access to many curious manuscripts in the Vatican, of which he availed himself. This gives to his work peculiar interest, and portions of it, as for instance that on Asia, passed through several editions. The first edition of 1667 contains also an interesting account of the mission to Mongolia, and a sketch of the life of Father Acquaviva. He also wrote on physics and philology. A new edition of his complete works in 12 volumes appeared at Turin in 1825, and a select edition of the most striking passages at Milan in 1826.

Bartoli, Pietro Santi, sometimes called Perugio, Italian painter and engraver: b. about 1635; d. Rome, 1700. He was a pupil of Nicolas Poussin. His engravings, numbering over 1,000, are scarce and valuable. His skill as a copyist was so great that he could counterfeit the effects of time on the colors of pictures. The 'Admiranda Romanorum Antiquitatem Vestijia,' a collection of engravings much esteemed archæologically, is his most important work.

Bartolini, bär-tō-lē'ne, **Lorenzo,** celebrated Italian sculptor: b. Vernio, 1777; d. Florence, 1850. In his youth he was a pupil of Desmarets, a French painter, and made considerable progress; but the bent of his genius leading him rather to handle the chisel than the brush, he proceeded to Paris and entered the studio of the sculptor Lemot. Napoleon intrusted him with a multitude of works, among others a colossal bust of the emperor placed above the entrance of the French Institute, and a magnificent statue of him, which, in consequence of the events of the restoration, was never delivered to government, and is now in America. On the fall of the empire he returned to Florence, where he continued to exercise his profession. Among his greater works may be mentioned his groups of Charity, and Hercules and Lycas, and the beautiful monument in the cathedral of Lausanne, Switzerland, erected in memory of Lady Stratford Canning, who died there in 1817. Bartolini ranks next to Canova among modern Italian sculptors. See Canova, 'Schools and Masters of Sculpture' (1898).

Bartolommeo, bär-tō-lŏm-mā'ō, **Fra,** or **Baccio Della Porta,** one of the most distinguished of the Florentine painters: b. Savignano, 1469; d. Florence, 1517. He learned in Florence the first principles of painting from Cosimo Roselli, and acquired a more perfect knowledge of art by studying the works of Leonardo da Vinci. He was an admirer and follower of Savonarola, on whose death, in consequence of a vow made during the peril of persecution, he took the Dominican habit in 1500, and assumed the name of Fra Bartolommeo. For the space of four years he did not touch his pencil, and employed it afterward only on devotional subjects. Raphael visited Florence in 1504 and gave instructions to Bartolommeo in perspective, receiving in return his lessons in coloring. Some years afterward the latter visited Michael Angelo and Raphael at Rome. After his return to Florence he executed several religious pictures, among which were a Saint Mark and Saint Sebastian, which are greatly admired. His style is severe and elevated, but very graceful in youthful figures; his coloring, in vigor and brilliancy, comes near to that of Titian and Giorgione. But he particularly excels in drapery, which none before him represented with equal truth, fulness, and ease. His pictures are preserved in the gallery of the Grand-Duke at Florence and in the palace of Pitti. See Jameson, 'Memoirs of the Early Italian Painters' (1887); Symonds, 'The Renaissance in Italy' (1885); Radcliffe, 'Schools and Masters of Painting' (1898); Cartwright, 'The Painters of Florence' (1901).

Bartolozzi, bär-tō-lōt'sę, **Francesco,** a distinguished Italian engraver: b. Florence, 21 Sept. 1728; d. Lisbon, Portugal, April 1813. In Venice, in Florence, and Milan, he etched several pieces on sacred subjects, and then went to London, where he received great encouragement and accommodated himself entirely to the national taste, so as even to work in the popular red dotted manner. His pieces were so universally sought for that a complete collection of them was valued at £1,000. He was elected a member of the Royal Academy of Arts in London. After 40 years' residence in London he went to Lisbon to engrave on copper the portrait of the regent, where he received, in 1807, the order of Christ. With accuracy of design he united great delicacy of execution. Among his best engravings is the 'Death of Lord Chatham,' after Copley, and the 'Virgin and Child.' His works, among which are imitations

in etching of drawings of the great masters, amount to more than 2,000. See Clement, 'Painters, Sculptors, and Engravers' (1899).

Bar'tolus, Osso, or **Bartolus A. Saxofferrato,** a celebrated Italian jurist: b. Sasso Ferrato, in the Marches of Ancona, about 1313; d. Perugia, 1356. He took his degree of doctor of law at Bologna, became professor, first at Pisa, and then at Perugia, was ennobled and honored with other distinction and privileges by the emperor Charles IV., and not only published many important works such as treatises 'On Procedure,' 'On Evidence,' and commentary on the 'Code of Justinian,' but distinguished himself in various other branches of knowledge.

Barton, Andrew, Scottish naval commander, who flourished during the reign of James IV., and belonged to a family which for two generations had produced able and successful seamen. In 1497 he commanded the escort which accompanied Perkin Warbeck from Scotland. After doing considerable damage to English shipping, he was killed in an engagement with two ships which had been especially fitted out against him (1512).

Barton, Benjamin Smith, American naturalist: b. Lancaster, Pa., 10 Feb. 1766; d. Philadelphia, 19 Dec. 1815. He studied the natural sciences and medicine in Philadelphia, Edinburgh, and London, and took his degree at Göttingen. He practised medicine in Philadelphia, and held successively the chairs of botany and natural history, materia medica, and theory and practice of medicine in the university there. He became president of many learned societies, was a correspondent of Humboldt, and, among other works, wrote 'Elements of Botany' (1812–14); 'Collections for an Essay toward a Materia Medica of the United States' (3d ed. 1810); and 'Flora Virginica' (1812).

Barton, Bernard, English poet, often styled the Quaker poet: b. London, 31 Jan. 1784; d. 19 Feb. 1814. In 1806 he removed to Woodbridge, in Suffolk, where he entered into a business in coals and corn; but subsequently gave up this occupation, and in 1810 became clerk in a bank at Woodbridge, a situation which he held till not long before his death. In 1824 a reading society founded by him at Woodbridge presented him with £1,200, and he afterward received a pension of £100 through Sir Robert Peel. His first appearance as an author was in 1812, when he published a small volume of poems under the title of 'Metrical Effusions,' which led to a correspondence with the poet Southey. This was followed in 1818 by 'Poems by an Amateur,' and in 1820 by a volume entitled simply 'Poems,' which became popular, and gained him the friendship of Lamb and Byron. Of his other productions the chief were: 'Napoleon, and other Poems' (1822); 'Poetic Vigils' (1824); 'Devotional Verses' (1826); 'A New-Year's Eve, and other Poems' (1828); besides many contributions to the annuals and magazines. His last work was 'Household Verses' (1845). His daughter, Lucy, published 'Selections from the Poems and Letters of Bernard Barton,' in 1849. His poetry, though deficient in force, is pleasing, fluent, and graceful, animated by a love of nature, and by a pure religious spirit.

Barton, Clara, American philanthropist: b. Oxford, Mass., 1830. She early became a teacher, and founded at Bordentown, N. J., a free school, opening it with six pupils. In 1854 it had grown to 600, when she became a clerk in the patent office in Washington. On the outbreak of the Civil War she resigned her clerkship and became a volunteer nurse in the army hospitals and on the battle-field. In 1864 she was appointed to the charge of the hospitals at the front of the army of the James. She was present at several battles, and in 1865 was placed by President Lincoln in charge of the search for missing men of the Union armies, having already devoted much time to that work at her own expense. On the breaking out of the Franco-Prussian war in 1870, she aided the Grand Duchess of Baden in preparing military hospitals, assisted the Red Cross Society, and, at the request of the authorities, superintended the distribution of work to the poor of Strasburg in 1871, after the siege, and in 1872 did a like work in Paris. At the close of the war she was decorated with the Golden Cross of Baden and the Iron Cross of Germany. On the organization of the American Red Cross Society in 1881 she was made its president, and in that capacity in 1884 had charge of the measures to relieve sufferers from the Mississippi and Ohio floods. In 1883 she was appointed superintendent of the Reformatory Prison for Women at Sherborn, Mass. In 1889 she had charge of movements in behalf of sufferers from the floods at Johnstown, Pa.; in 1892 distributed relief to the Russian famine sufferers; in 1896 personally directed relief measures at the scenes of the Armenian massacres; in 1898, at the request of President McKinley, took relief to the Cuban reconcentrados, and performed field work during the war with Spain; and in 1900 undertook to direct the relief of sufferers at Galveston, but broke down physically. She resigned from the Red Cross Society in 1904. She has published 'History of the Red Cross' (1883); 'History of the Red Cross in Peace and War' (1898).

Barton, David, American legislator: b. probably in Waco County, Ky., 1785; d. Booneville, Mo., 27 Sept. 1837. He was one of the earliest settlers in Missouri; presided over the convention that drew up the State constitution in 1820; and was a United States Senator from that State in 1821–31.

Barton, Elizabeth, English religious impostor (commonly called the Holy Maid of Kent): b. about 1506; d. 20 April 1534. She was used as an instrument by the adherents of Queen Catherine to excite the English nation against the proposed divorce of Henry VIII. from his first wife, and the apprehended separation of the English Church from Rome, with which the king then threatened the Pope. Her delirious utterances, in a nervous illness, were made use of by the parson of Aldington, Richard Maister, and by a canon of Canterbury named Bocking, to persuade her that she was a prophetess inspired by God. Among other things she prophesied that Henry, if he persisted in his purpose of divorce and second marriage, would die a shameful death and be succeeded by Catherine's daughter. Her revelations, published and distributed by the monk

Dering, produced such a fermentation among the people that Henry ordered the apprehension and examination of Elizabeth and her accomplices before the star-chamber. After they had there confessed the imposture they were condemned to make a public confession and to imprisonment; and the Maid, Bocking, Maister, Dering, and three others were afterward adjudged guilty of high treason for a conspiracy against the king, and executed. The venerable Bishop Fisher and Sir Thomas More were among those accused of holding correspondence with the Holy Maid; and the former was pronounced guilty of misprision, or concealment, of treason in consequence.

Barton, George Hunt, American geologist: b. Sudbury, Mass., 8 July 1852. He was assistant on Hawaiian Government survey, 1881–3; assistant in geology in the Massachusetts Institute of Technology in 1883–4; then assistant professor of geology there; he also occupied the corresponding chair in Boston University and the Teachers' School of Science; and was assistant geologist of the United States Geological Survey. In 1896 he was a member of the sixth Peary expedition to Greenland. He is a member of the Boston Society of Natural History, the National Geological Society, and the Geological Society of America, and the author of many technical papers.

Barton, William, American military officer: b. Warren, R. I., 26 May 1748; d. Providence, R. I., 22 Oct. 1831. He joined the Revolutionary army soon after Bunker Hill, and on the night of 10 July 1777, he performed the exploit which made him famous. Leading a small party of men, in four whale-boats, across Narragansett Bay, he surprised and captured the British general, Prescott, at his headquarters, and hurried him away to Washington's camp in New Jersey. Barton received a sword from Congress, and was brevetted colonel. He was afterward a member of the State convention which adopted the Federal Constitution.

Barton, William Paul Crillon, American botanist: b. Philadelphia, Pa., 17 Nov. 1786; d. 29 Feb. 1856, a nephew of Benjamin Smith Barton (q.v.). He was educated at Princeton College, and in the medical school of the University of Pennsylvania; was surgeon in the United States navy and became professor of botany in Jefferson Medical College, in 1815. He was author of 'Flora of North America' (1818–24); 'Vegetable Materia Medica of the United States' (1817–25); 'Compendium Floræ' (1818).

Bartram, John, an eminent American botanist: b. Chester County, Pa., 23 March 1699; d. 22 Sept. 1777. He is frequently called the "father of American botany," and he founded at Kingsessing the first botanical garden in America. Linnæus termed him "the greatest natural botanist in the world." He published 'Observations of the Inhabitants, Climate, Soil, Diverse Productions, Animals, etc., Made in His Travels from Pennsylvania to Lake Ontario,' and a similar volume on eastern Florida (1766). He was in constant correspondence with European botanists, to whom he sent large collections of American plants and would readily undertake a journey of a hundred miles to see a new plant.

Bartram, William, American botanist and ornithologist: b. Kingsessing, Pa., 9 Feb. 1739; d. there 22 July 1823; a son of John Bartram. He spent five years in the southern States studying natural history, and published the results in 'Travels Through North and South Carolina and East and West Florida.' He compiled a list of American birds, which was the best of its kind up to the time of Wilson.

Bartsch, bärtsh, **Adam von,** Austrian engraver and art writer: b. Vienna, 17 Aug. 1757; d. there, 21 Aug. 1821. At the age of 16 he brought himself into the notice of the Austrian government by a series of engravings of the gold and silver medals issued during the reign of Maria Theresa, and, in 1781, was appointed keeper of the prints of the royal collection. In 1803 he produced the first volume of his well-known and authoritative work, 'Le Peintre-Graveur,' in 21 volumes, giving a description of the principal engravers of Europe, and criticisms on their works. He etched upward of 500 pieces, and published several catalogues of works of art.

Bartsch, Karl Friedrich Adolf Konrad, German philologist: b. Sprottan, Silesia, 25 Feb. 1832; d. 19 Feb. 1888. He was professor at Rostock, where he established the earliest Germanic seminary in Germany, 1858–71; and for the remainder of his life was head of the department of German and Romance philology at the University of Heidelberg. He was an extremely brilliant, versatile, industrious scholar whose attention was chiefly given to Middle High German and Provençal poetry, and was an original poet also, publishing a volume of lyrics in 1874. Beside an important study of the 'Nibelungenlied' (1865), he published 'The Song of Roland' (1874); a translation of Burns ((1865); and of Dante's 'Divina Commedia' (1867), as well as introductions to the study of Provençal and old French, etc.

Barttelot, bär-tlō', **Edmund Musgrove,** English soldier: b. 1859; d. 1888. Entering the Indian army he served in the Afghan campaign, and as major in the Egyptian army, joined the Stanley expedition for the relief of Emin Pasha in 1887. In June 1888 he began a journey into the heart of Africa and in the course of a mutiny among his followers was shot by one of his men. He was accused of barbarous cruelty in his command by Stanley, a charge oposed by Barttelot's brother in his 'Life of Edmund Musgrove Barttelot' (1890).

Baru, ba-roo', Philippines, a town of Leyte, 31 miles from the capital of the province, Taclobam. Pop. 12,322.

Baru (Maylay), a wooly material found at the base of the leaves of a sago palm-tree, *saguerus saccharifer*. It is much used in stuffing cushions and calking ships.

Baruch, bā'rŭk (Hebrew, "the blessed"), the name of several individuals, of whom the most celebrated was the son of Neriah, scribe and assistant to the prophet Jeremiah. During the reign of Jehoiakim, about 607 B.C., Jeremiah while in prison, having been divinely commissioned to put all his prophecies in writing, dictated them to Baruch, who inserted them in a roll, which he was ordered to read both within and at the entrance of the temple. Jehoiakim on hearing its commencement cut it in pieces

and threw it into the fire. At the captivity, after the destruction of Jerusalem, Jeremiah and Baruch were permitted to remain in Palestine, but were afterward carried into Egypt, 588 B.C. The subsequent life of Baruch is little known. One of the apocryphal books bears the name of Baruch. The Council of Trent gave it a place in the canon, but its authenticity was not admitted either by the ancient Jews or the early Christian fathers.

Ba'rus, Carl Hazard, American physicist: b. Cincinnati, O., 19 Feb. 1856. He studied at Columbia College and the University of Würzberg; was physicist of the United States Geological Survey in 1880–92; professor of meteorology in the United States Weather Bureau, 1892–3; and physicist of the Smithsonian Institution, in 1893–5. In 1895, he became professor of physics at Brown University. He is a member of the National Academy of Sciences; was vice-president and chairman of the section of physics in the American Association for the Advancement of Science in 1897; and is a corresponding member of the British Association for the Advancement of Science. He contributes to the American Journal of Science, and has written also valuable monographs for the United States Geological Survey.

Bary, bä're, **Heinrich Anton de,** German physician and botanist: b. Frankfort-on-the-Main, 26 Jan. 1831; d. 19 Jan. 1888. He is noted for his investigations in cryptogamic botany, and was professor of botany at Freiburg in 1855, at Halle in 1867, and at Strasburg in 1872. Among his works are 'Die Mycetozen' (1859); 'Vergleichende Morphologie und Biologie der Pilze, Mycetozen und Bacterien' (1884); 'Vorlesungen über Bactorien' (1885).

Barye, ba-re, **Antoine Louis,** noted French sculptor: b. Paris, 24 Sept. 1795; d. there, 25 June 1875. He studied engraving with Fourrier and a goldsmith named Beinnais; in 1812, was a topographical engineer, and is supposed to have modeled a number of relief maps now in the French war office. In 1816 he studied drawing with the painter Gros, and sculpture with Basio; and, in 1819, took the second prize for a 'Milo di Crotona,' which was awarded him at a Concours of the Beaux Arts. From 1823 till 1831 he worked under Fauconnier, jeweler to the Duchesse d'Angouleme. In 1831 he exhibited the celebrated 'Tiger Devouring a Crocodile,' and was then employed by M. Lefuel to make four groups for the pavilion on the Place du Carrousel. He was an officer of the Legion of Honor, a member of the Institute, and a professor at the Jardin des Plantes. See Brownell, 'French Art' (1892).

Bary'ta, barium monoxid. See BARIUM.

Barytes, a common name for BARITÉ (q.v.).

Baryton (viola di Bardone), a chamber instrument, very popular in the 18th century, but now obsolete. It was somewhat like the viol di gamba in tone, but had a broader finger-board, with six or seven gut-strings, while under the neck there were from 9 to 24 strings of brass wire, which were pinched with the point of the thumb, to produce a sound, while the gut-strings were acted on by a bow.

Barytone. See BARITONE.

Bas, or **Batz,** a French island in the department of Finisterre, 2½ miles from the coast in the English Channel. Although but three miles long and two miles wide it is defended by two forts and four batteries. It has a lighthouse at an elevation of 212 feet, and three fishing villages. Pop. (1896) 1,286.

Bas-relief, bä-re-lēf' (in Italian, *basso-rilievo,* or low relief), as applied to sculpture, a representation of one or more figures, raised on a flat surface or background, in such a manner, however, as that no part of them shall be entirely detached from it. *Alto-rilievo,* or high relief, is that in which the figures project half of their apparent circumference from the background. *Mezzo-rilievo,* or middle relief, is a third species, between the two. But, generally speaking, the first term is made to comprehend both the others. The term itself was invented in Italy, about the 11th or 12th century, on the revival of the arts; for the Greeks called such works simply carved (*anaglypta*); and to what is now called high relief they only applied the term rounded (*toreutikē*).

Bas-relief is particularly allied to architecture and under its dominion, since any considerable work of this kind must be made for the pediment, frieze, or panel of a building, or for some other architectural work, such as a tomb, sarcophagus, pedestal, or column. Bas-reliefs seem to have been invented in the earliest ages by the Egyptians, for the whole of their ancient monuments are covered with them, being executed in the same way as the hieroglyphics on their sepulchral chambers, obelisks, and temples. This has been finely illustrated by the drawings and models of the tomb of Sethi I., originally discovered near the ancient Thebes by Belzoni, and which has since become familiar to many persons; all the walls of that extraordinary excavation being covered with thousands of figures in low relief, colored, and exhibiting the religious and warlike ceremonies of that wonderful people. Bas-reliefs, too, are found in India, decorating the subterraneous temples of Ellora and Elephanta in an astonishing profusion. The subjects are, of course, sacred, and in the style of drawing resemble very strongly those of the Egyptian monuments, but are evidently inferior, having larger heads and disproportioned bodies and limbs. Both these temples have been well illustrated and described by Thomas Daniell, R.A., and Capt. Scaley; and for further information their respective works may be consulted. The Persians, too, like other ancient nations, employed bas-relief as a figured writing, thereby recording and representing the symbols of the power and energy of the Divinity, their own religious ceremonies, and warlike achievements. The sculptures still existing on the ruins of the palace of Persepolis and the royal tombs accord in many striking particulars with those taken to England by Belzoni. In both the figures are arranged in lines, either horizontal or perpendicular, to suit the double purpose of decoration and description. In both of them the natives of Egypt are distinguished by the hood with lappets, the mitre, the full hair artificially curled, the close tunic, the apron of papyrus; the Hindus, by the necklaces, bracelets, and anklets; the Hebrews, by their long beards, and hair in spiral ringlets, their caps, full tunics, with regular folds and large sleeves; the Medes, again, by their close tunics; while the Persians themselves, in many particulars, resemble the

Hebrews. The comparison may be easily made by looking over the prints in Sir Robert Ker Portre's 'Travels in Persia,' and those in Le Bruyn's 'Travels,' and then the engravings of Denon's and Belzoni's large works.

Since it has been well observed that the Greeks commenced in works of art precisely where the Egyptians left off, we find that the early bas-reliefs of Greece resemble pretty accurately those of Egypt. The objects are represented in the same hard and simple manner, and the marbles taken to England from the temple of Ægina serve to fill up the history of sculpture, in the interval between its first introduction into Greece and its full development under Phidias, at Athens, when that glorious work, the Parthenon, was produced under the auspices of Pericles.

The draperies in these early bas-reliefs are thin and meagre, showing the forms of the body and limbs; the folds regular, small, and distinct, consisting chiefly of perpendicular and **zigzag** lines. Some of the head-dresses consist of small curls, very like the fashions of barbarous nations; and in a bronze patera in the British Museum the club of Hercules is ornamented with spiral flutes, like one brought by Capt. Cook from the Sandwich Islands.

The best examples of bas-relief now in existence are to be found within the walls of the British Museum. We mean, of course, those of the Elgin Marbles, which are executed in this manner. And in the same collection are the tombstone of Xanthippus, and a man curbing a horse, both conjectured to be of the age of Phidias, and which formed part of the Townley collection. In the collection of the Marquis of Lansdowne is a Greek bas-relief of Calchas, the size of life. At Wilton there is a beautiful representation of the 'Death of Meleager,' and a small but curious 'Hercules and Æglé'; a bas-relief composed of mosaic in natural colors, which is supposed to be unique. The celebrated Barberini vase, formerly in the possession of the Duke of Portland, is of dark-blue glass, bearing figures in bas-relief of white enamel or glass of admirable workmanship. Fragments of bas-reliefs of similar materials have been found in the ruins of Cæsar's palace at Rome, where they had been fixed in the walls. The two triumphal columns of Trajan and Antonine are covered with bas-reliefs, containing several thousand figures (the first, indeed, has 2,500 human figures, according to Vasi), without reckoning horses, elephants, mules, and the implements of war.

Basaiti, bä-sä-ē'tē, **Marco,** celebrated painter of Greek extraction: b. Friuli about the middle of the 15th century. He settled in Venice, where several of his paintings, remarkable for the brilliancy of their coloring, and distinguished by other excellences, are seen. His masterpiece, now in the Venetian Academy, is 'The Calling of St. Andrew and St. Peter.' He was the contemporary, and not unfrequently the successful rival, of Gian Bellini.

Basalt', a class of rocks belonging to the volcanic series and characterized by augite and plagioclase feldspar as essential constituents, and by iron ores (magnetite and ilmenite) as accessory minerals. Olivine is also present in typical basalts; among the rarer minerals are orthorhombic pyroxene, black mica, hornblende, quartz, leucite, and nepheline. Those varieties which contain notable quantities of olivine are known as olivine basalts, while the presence of leucite and nepheline characterizes the leucite basalts and the nepheline basalts. In texture the basalts vary from a finely crystalline apparently homogeneous mass to coarsely crystalline aggregates; but the normal type is a fine-grained, black rock, in which olivine is the only mineral that can be recognized without the microscope. The ground mass of the denser varieties contains more or less glass, due to the rapid cooling of the magma from the molten state. Basalts are extremely abundant especially in those regions which have undergone volcanic disturbance within geologically recent times; in fact most of the volcanoes of the present day erupt basaltic materials. In the United States they occur mostly in the region west of the Mississippi River, where great areas have been flooded by fissure eruptions. The tendency of basalt to assume a columnar structure often lends a characteristic appearance to scenery, as is illustrated by the famous Giants' Causeway on the north coast of Ireland.

Basanite, baz'a-nīt (Gr. *basanos,* "touchstone"). See TOUCHSTONE.

Bascinet, or **Basnet,** a light helmet, sometimes with but more frequently without a visor, and worn by knights at times when, though apprehension of danger was not imminent, it might not have been safe to be altogether unarmed. It resembled a basin, and hence its name. It was in general use for English infantry in the reigns of Edward II. and III., and Richard II., and is frequently mentioned in Parliamentary and other public records.

Bas'com, Florence, American educator, daughter of Dr. John Bascom (q.v.). She was educated at the University of Wisconsin and at Johns Hopkins University, receiving from the first the degree of B.A. and B.L. in 1882, B.S. in 1884, and M.A. in 1887; and from the latter that of Ph.D. in 1892. She was the first woman to whom Johns Hopkins granted a degree, and the first to receive a Ph.D. from any American college. She had much difficulty in securing admission to Johns Hopkins as a graduate student, the only concession to her sex being that she might attend the lectures on geology, and use the laboratory apparatus in that branch. She had previously applied herself to geology, and her thesis on receiving her Ph.D. was on inorganic geology, palæontology and chemistry being minor subjects. Subsequently she was engaged in teaching; was assistant editor of the 'American Geologist'; became professor at Bryn Mawr College; and in 1899 was chosen to supervise the geological survey of Chester County, Pa.

Bascom, Henry Bidleman, American clergyman: b. Hancock, N. Y., 27 May 1796; d. 8 Sept. 1850. He was licensed to preach in 1813, and made chaplain to Congress in 1823; president of Madison College, Pennsylvania (1827–9), and of the Transylvania University, Ky., 1842. In 1850 he was made a bishop of the Methodist Episcopal Church. He edited the 'Quarterly Review,' 1846–50. His writings were published in 1856.

Bascom, John, American educator and philosophical writer: b. Geneva, N. Y., 1827. He was president of the University of Wiscon-

sin, 1874-87, and in 1900 was professor of political science in Williams College. He has written a number of philosophical works, among them 'Philosophy of English Literature' (1874); lectures before the Lowell Institute; 'Comparative Psychology' (1878); 'Sociology' (1887); 'An Historical Interpretation of Philosophy' (1893); 'Growth of Nationality in the United States' (1899); and 'God and His Goodness' (1901).

Base. In *architecture:* (*a*) The part of a column between the bottom of the shaft and the top of the pedestal. In cases in which there is no pedestal, then the base is the part between the bottom of the column and the plinth. (*b*) A plinth with its moldings constituting the lower part (that which slightly projects) of the wall of a room.

In *botany,* a term applied to the part of a leaf adjoining the leaf-stalk, to that portion of a pericarp which adjoins the penduncle, or to anything similarly situated.

In *chemistry,* a body capable of replacing the hydrogen of an acid so as to produce a new compound, called a "salt," which contains the base and all the elements of the acid except the displaced hydrogen. The name was given by Rouelle in 1744, and is now loosely used to signify a metal, a salt-forming oxid or hydroxid, or an organic body, such as an alkaloid, an amide, an amine, pyridine, quinoline, etc., which is capable of combining with an acid to form a salt. When oxids combine with acids their oxygen unites with the liberated hydrogen of the acid, to form water. A body (like caustic potash, KOH), is said to be strongly basic when it forms salts that are very stable and are not altered by hot or cold water.

In *fortification,* the exterior side of a polygon, or the imaginary line connecting the salient angles of two adjacent bastions.

In *geometry:* (*a*) The base of an ordinary triangle is its third side, not necessarily the one drawn at the bottom of the diagram, but the one which has not yet been mentioned, while the two others have (Euclid, book i., prop. 4, Enunciation). (*b*) The base of an isosceles triangle is the side which is not one of the equal two (*Ibid.* prop. 5, Enunciation). (*c*) The base of a parallelogram is the straight line on which in any particular proposition the parallelogram is assumed to stand (*Ibid.* prop. 35). It also is not necessarily drawn the lowest in the figure (*Ibid.* prop. 47). (*d*) The base of a cone is the circle described by that side containing the right angle which revolves (Euclid, book xi., def. 20). (*e*) The bases of a cylinder are the circles described by the two rotary opposite sides of the parallelogram, by the revolution of which it is formed (*Ibid.* def. 23).

In *heraldry,* the lower part of a shield, or, more specifically, the width of a bar parted off from the lower part of a shield by a horizontal line. It is called also base-bar, baste, and plain point ('Glossary of Heraldry').

In *military affairs,* see TACTICS.

In *ordnance,* the protuberant rear portion of a gun between the knot of the cascabel and the base-ring.

In *sculpture,* the pedestal of a statue.

In *trigonometry, surveying,* and *mapmaking,* a base or base-line is a straight line measured on the ground, from the two extremities of which angles will be taken with the view of laying down a triangle or series of triangles, and so mapping out the country to be surveyed.

In *zoology,* that portion of anything by which it is attached to anything else of higher value or signification (Dana).

Base of Operations. See TACTICS.

Baseball, a popular sport in the United States, of such general interest as to be known as "the national game." It had its origin in the old English game of "rounders," but developed on American soil into a very different sport. In Philadelphia an early form was played under the name of "town-ball," and a similar game was known in Upper Canada as early as 1838. It was in the neighborhood of New York, however, that baseball received its greatest development, regularly organized clubs contesting in the "Elysian Fields," at what is now the site of the city of Hoboken, N. J., as early as 1845. It was not until 1857, however, that the first baseball convention was held for the purpose of framing uniform rules out of the various methods of each district and club, and in the following May the first "National Baseball Association" was organized.

The first real series of games played between organized clubs was that between teams picked from the various clubs of New York and Brooklyn on the old Fashion Racecourse at Flushing L. I., in 1858, the first authorized code of rules being formulated and published for their direction. From the present view-point these rules were crude. For instance, the regulation ball weighed 6½ ounces and measured 10½ inches in circumference. It was a lively ball (anticipating by 50 years the latest development of the golf-ball), being made with 2½ ounces of rubber, covered with yarn and leather. The bat was unlimited as to length, but was decreed not to exceed 2½ inches in diameter. In the delivery of the ball there was a greater difference than in any other respect as compared with the later development of the game: for the ball could only be pitched; all throws and jerks being prohibited. The pitcher was at liberty to take any number of steps before delivery, and his limit was anywhere behind a line 12 feet across, and 45 feet from the home base. Then, too, he could pitch his ball almost without limitation so long as he pitched "as near as possible to the home base."

As then played, none but amateurs participated; indeed, no one could represent his club unless he had been a member for 30 days, and "money, place, or emolument" was a bar. Games were originally played on free grounds, but on the establishment of the Union Ball Ground and the Capitoline Club of Brooklyn in 1863, the admission money went to the proprietor, the players later having a share, and thus was laid the foundation of professional play. So matters drifted for six years, with a gradual tendency to greater restrictions in rules, greater skill in play, and more and more professionalism, until 1869, when for the first time a salaried team, the "Red Stockings of Cincinnati," began a tour of games, and naturally carried everything before them. Through 1869 and up to June 1870, they played without losing a single game.

The delivery of the pitcher had been gradually developing. As early as 1860 the disguised underhand throw had come into vogue, and by 1866 Arthur Cummings, of the Excelsior Junior

Nine, introduced a curved delivery. With the advent of the swifter-playing professional, and the reduced size and weight of the ball, came into necessity, and therefore into use, the various safeguards, of padded gloves, catchers' mitts, breast-pads, and masks.

By 1871 the game had become so extensive and the professional element so popular that a "National Association of Professional Baseball Players" was formed, and in 1875 the various club-owners took control of the professional players and organized "The National League of Professional Ball Clubs," which continued in undisputed possession of the professional field until 1890, when a rival association, "The American League," was founded. There are several other leagues of minor importance. Baseball naturally found favor in American universities and colleges, but its technique in the early days was crude, even among the best teams. Team play as now interpreted was almost unknown, the hitting was harder, and the fielding poorer, the outfielders played much farther afield. As late as the middle sixties scores of 50 runs were not uncommon, and a hard-hitting college team would make over 100. As late as 1867, when two college nines made, respectively, 13 and 8, it was considered a phenomenon. There is no intercollegiate championship in the ordinary sense; each college plays a set of games with other colleges. A full and exact knowledge of the game can be acquired only by a study of the official rules. Briefly, the game is played between two teams of nine men each, on a field in which a diamond-shape with sides of 90 feet each has been marked out according to certain technical rules, the angles being named, respectively, the home plate and first, second, and third bases, reckoning to the right from the home plate. The pitcher's "box" is situated near the centre of the diamond, about 60 feet from the batsman's stand, and from that point the pitcher is required to deliver balls to the batsman, pitched according to definite rules. The catcher stands behind the batsman; his principal office is to catch unhit balls and return them to the pitcher, or to throw to the baseman when the batsman is making a run. The fielders are known as the *infield,* consisting of first, second, and third basemen and short-stop; and the *outfield,* or left right, and centre fielders. The office of the first section is to catch batted or thrown balls, and to touch therewith the batsman running between bases, or, failing in this, to return the ball to the pitcher; that of the second section may be stated generally as the stopping or catching of batted balls and returning them to the pitcher or throwing them to the baseman for the purpose of putting out running batsmen. The positions and duties of the fielders are defined with strict limitations by the rules. The aim of each team is to make as many runs as possible. To score a run a player must make a complete circuit of the bases, but not necessarily at one hit. With his own hit he may get as far as first base; then may get to second base while the pitcher is delivering a ball to the second batter, and to the third base on the hit of that man, or even on the hit of the third batsman. When three men are put out, one inning is finished; and the other team takes its turn, with three men one after the other, and so on until there have been nine innings on each side. A batsman is out who is touched by the ball after leaving one base and before he reaches another, or whose batted ball is caught by one of the fielders before it reaches the ground. The batsman is also declared out when hit by a batted ball; or when being forced to run for a base by reason of all bases being occupied, the ball is held by the fielder at the base for which he is making. The batsman must not step out of his box, and must strike at every ball that crosses "the plate" on a level between his knees and shoulders — such are called "fair balls." If he fails either to strike at or to hit it counts as a "strike" against him, and if he fails three times he is out, providing the third ball is caught by the catcher before it reaches the ground. If the pitcher delivers a ball which does not pass over the plate in the defined zone, it is counted as "one ball" in favor of the batsman, and after four such balls he is entitled to go to the first base unmolested. Baseball has been re-transplanted back to England, but without much success. In Australia it has become popular.

The principal authorities on the game are Spalding's 'Baseball Guide'; 'The Art of Pitching and Fielding, Batting and Base-Running,' by Henry Chadwick (1886); 'Baseball,' in the Oval Series (1896); and 'Baseball,' by J. M. Ward (1888).

Basedow, bä'zę-dō, **Johann Bernhard,** often called by himself Bernard von Nordalbingen; German educator: b. 11 Sept. 1723; d. 25 July 1790. He had in Dessau an institution for education called Philanthropinon. The chief features of Basedow's system are the cosmopolitan character which he endeavored to instil into his pupils, and the full development of the faculties of the young at which he aspired, in pursuance of the notions of Locke and Rousseau. With Salzmann, Campe, etc., he established some good institutions, and deserves special credit for his efforts for the education of the lower classes.

Basedow's Disease (also called Graves' Disease), a peculiar affection of the sympathetic nervous system, characterized by rapid and irregular heart-action, large protruding eyeballs, swelling of the neck, extreme nervousness, and marked muscular tremor. Its exact cause is unknown, but it seems to be associated with some variation in the function of the thyroid gland. It usually occurs in young females and is not infrequently a curable affection, although some patients are incurable. Surgical operations on the cervical sympathetic have cured some cases. (See Goitre.) Consult: Osler, 'Practice of Medicine'; Nothnagel, 'System of Medicine.'

Basel, bä'zel, **Basle,** or **Bale,** bäl, Switzerland; one of the largest cities in the federation and capital of canton Baselstadt, 43 miles north of Bern. It consists of two parts, situated on opposite sides of the Rhine, and communicating by a long wooden bridge. It is walled and irregularly, though fairly well built; and has an ancient cathedral. Basel was formerly a free imperial city, but joined the Swiss Confederacy in 1501. Buxtorf, Wetstein, Hermann, the Bernouillis, and Euler were born in Basel. Erasmus also lived there several years, and lies buried in the cathedral. Among the institutions of the city are the university, founded in 1459; various collections of paintings, a seminary for missionaries, and a German Bible Society. In 1849 a large museum was completed,

which contains the university library (now consisting of about 80,000 volumes), with 4,000 manuscripts, and all the collections belonging to the town. Its manufactures consist principally of ribbons, silk goods, cotton prints, linen, gloves, leather, jewelry, and turnery ware. Its advantageous position on the Rhine, a little below the point where it becomes navigable, and at the terminus of the French and German railways, has made it a centre of trade, and starting point for travelers in Switzerland. It is the seat of a United States consulate. Pop. (1900) about 113,000.

Basel, Confession of, a Calvinistic confession introduced by Œcolampadius at the opening of the Synod of Basel (1531). It was adopted by the Protestants of Basel in 1534. Simple and comparatively moderate in its terms, it occupies an intermediate place between Zwingli and Luther.

Basel, Council of, a council announced at the Council of Constance, and convoked by Pope Martin V., and his successor Eugenius IV. It commenced its sittings 14 Dec. 1431 under the presidency of the cardinal legate Juliana Cæsarini of St. Angelo. The objects of its deliberations were to extirpate heresies (that of the Hussites in particular), to unite all Christian nations under the Roman Catholic Church, to put a stop to wars between Christian princes, and to reform the Church. The Pope, having learned that the Fathers were about to reopen a discussion upon Hussite doctrines already definitely pronounced upon, and also because of the expressed wish of the Greek bishops to reopen negotiations for reunion at a council to be held on Italian soil, instructed the cardinal legate to dissolve the Council. That body opposed the claims of the Pope, with severe animadversions on his neglect of the welfare of the Church, and, notwithstanding his repeated orders to remove to Italy, continued its deliberations under the protection of the Emperor Sigismund, of the German princes, and of France.

In order to secure itself against the attacks of Eugenius IV. it re-enacted the decrees of the Council of Constance concerning the power of a general council (in matters of faith, of schism, and of reformation) to command the Pope, as well as all Christendom, and to punish the disobedience of the clergy, and even of the Pope, by virtue of its judicial character as the representative of the universal Church. It likewise pronounced all the doings and remonstrances of the Pope against its proceedings of no force, and began a formal process against him after he had issued a bull for its dissolution; appointed him, term after term, to appear before its tribunal, and exercised as much as possible the papal prerogatives in France and Germany.

Meanwhile it concluded, in the name of the Church, a peace with the Hussites (whose deputies appeared 6 Jan. 1433, with 300 horse, in Basel), by which the use of the cup in the communion was granted to them. This peace was ratified 20 Nov. 1433, by the Calixtines, the most powerful and finally prevailing party of the Hussites. The council deviated on this point, indeed, from the decrees of the Council of Constance, but was obliged so to do in order to assist its most faithful protector, the Emperor Sigismund, to the acquisition of Bohemia by this compromise with the Hussites, who were not to be subdued by force. Eugene IV. revoked in 1433 his decree of dissolution, and at the sixteenth session, 5 Feb. 1434, was read a document subscribed to by the Pope, in which it was declared that the Council had been lawfully convened. In return the Fathers recalled everything that had been said against the person of the Pope or the dignity of his office. The council, proud of this victory over the Pope, then attempted to interfere in the quarrels of the German princes, but was reminded by Sigismund, who protested against its intermeddling in the affairs of the Crown, of its proper point — the reformation of the Church. Toward the limitation of the power of the Pope, a proceeding which naturally evoked papal opposition, it had already made an important step by depriving him of the disposal of the prebends of cathedral and collegiate churches, which had been obtained by his predecessors; by restoring to the chapters the free election of their officers, and by obliging the Pope to confirm them gratuitously. It proceeded to the reformation of the clergy by ordaining that the excommunicated should not incur the penalties of their sentence before its publication; that interdicts should never be granted at the request of single individuals; and that repeated appeals should not be allowed, on account of their complaints (20th session, 22 Jan. 1435); that the *annates* (q.v.), the sums paid for the *pallia,* etc., should be regarded as simoniacal, and should not, under any pretext, be demanded or paid in future; that the divine service, the mass, and the canonical hours should be regularly observed by the clergy of each class; that disturbances of public worship should be prevented by a good ecclesiastical police; that the Feast of Fools and all irreverent celebrations customary in the Church about Christmas should be abolished (21st session, 9 June 1435).

In the 23d session (25 March 1436) the form of election, the confession of faith, and the official oath of each Pope, by which he bound himself to obey the decrees of the council, and the annual repetition of the same, were provided for; all preferment of the relations of a Pope was forbidden, and the college of cardinals was limited to 24 prelates and doctors of all nations, who should be elected by the free votes of the college, should be entitled to half of the revenues of the states of the Church, should watch over the Pope, and always sign his bulls. They granted him only the right to dispose of the prebends belonging to the diocese of Rome, and abolished the investiture of Church preferments in reversion.

In the 26th session it again summoned him to appear, on account of his disobedience of its decrees, declared him guilty of contumacy, and, after Eugenius had opened his counter-synod at Ferrara, decreed his suspension from the papal chair in the 31st session (24 Jan. 1438). In the same session it forbade appeal to Rome without resort to the intermediate jurisdictions, left to the papal disposition but 1 out of 10 and 2 out of 50 prebends of a church, and destined the third part of all canonries which might become vacant to men who had taken regular degrees. The removal of Eugenius, however, seemed to be so questionable a pro-

ceeding that some prelates, who till then had been the boldest and most influential speakers in the council (for example, the cardinal legate Juliano, and the great canon Nicholas of Cusa, Archdeacon of Liége, with the most of the Italians), left Basel and went over to the party of Eugenius. The Archbishop of Arles, Cardinal Louis Allemand, a man of superior spirit, courage, and eloquence, was now made first president of the council, and directed its proceedings with much vigor.

Although its number was diminished, its most powerful protector, the Emperor Sigismund, deceased, and its authority doubted by several princes and nations on account of its open rupture with the Pope; yet, in the 33d session (16 May 1439), after violent debates, in which the Archbishop of Palermo, Nic. Tudeschi (known under the name of Panormitanus, as the greatest canon of his time), who was the delegate of the king of Aragon and Sicily, took the part of the Pope — it declared Eugenius, on account of his obstinate disobedience of its decrees, a heretic, and formally deposed him, in the following session, as guilty of simony, perjury, violation of the laws of the Church, and bad administration in his office. In the 34th session, June 1439, the council pronounced the deposition of Eugene. At this session there were but two representatives of Spain and Italy, and the total number of prelates including abbots was 39.

Notwithstanding the plague, then raging in Basel, which continually diminished its number, it proceeded in a regular conclave (17 Nov. of the same year) to elect the Duke Amadeus of Savoy to the papal chair. This prince then lived in retirement at Ripaglia, on the Lake of Geneva, and seemed particularly qualified for the office on account of his piety, his riches, and his connections. But Felix V.,— this was the name he adopted,— was acknowledged by only a few princes, cities, and universities. The chief powers, France and Germany, assented to the decrees of the council for the reformation of the Church, but they chose to remain neutral in the contest with Eugenius. Meanwhile he acquired new credit by the union concluded with the Greek deputies at Florence (but afterward rejected by the Greek Church) and the friendship of the Emperor Frederic III. The council on the other hand, denounced by Eugenius and deserted by its protectors, gradually declined under its feeble Pope, and, consulting only appearances and the personal safety of its members, held its 45th and last session 16 May 1443, after an inaction of three years interrupted only by a few insignificant decrees. At this session the place of meeting was changed to Lausanne. Here some of the prelates remained together under the cardinal Louis Allemand until 1449, when, after the death of Eugenius and the resignation of Felix V., they gladly accepted the amnesty offered by the new Pope, Nicholas V., and pronounced the council closed. The decrees of the Council of Basel are admitted into none of the Roman or official collections, and by the Roman Church are considered of no authority. They have been regarded, however, as of authority in points of canon law, in France and Germany, as their regulations for the reformation of the Church were to some extent adopted in both countries, and, as far as they regard clerical discipline, were actually enforced. Some concordats concluded at subsequent dates have modified the application of them, but never formally and entirely annulled them. The Council of Basel was one of the most important in the history of the Church. The spirit of the councils of Pisa (1409) and of Constance (1414–18) was formulated in the decrees of Basel, and led to a twofold result; on the one hand the many salutary decrees of reform, on the other the clear expression of many dangerous principles in regard to the organization of the Church. Its history has often been misrepresented by historians, some seeing in it only an unhappy tendency from the true centre of unity; others regarding it as a great progressive movement, but forgetting that it was simply the growth of an expediency due to exceptional conditions. To know it impartially it must be studied in the original sources.

Consult: Hardouin; Labbé; Cossart; Mansi's collection consists of 31 folios; Alzog, 'Church History'; and Parsons, 'Studies in Church History.'

Basel, Treaties of Peace at, 5 April and 22 July 1795, between Prussia, Spain, and France, in which Prussia and Spain separated themselves from the coalition against France and acknowledged the republic. France retained the Prussian provinces on the left bank of the Rhine until the general peace, and accepted the mediation of Prussia, when any German princes wished to conclude separate treaties of peace with it. A secret article was inserted in the treaty, the object of which was to secure compensation to Prussia in case the left bank of the Rhine should remain with France at the general peace. The landgrave of Hesse-Cassel afterward concluded a treaty with the French republic at Basel, 28 Aug. 1795, by which the latter retained possession of the territories of Hesse-Cassel on the left bank of the Rhine until the general peace. By the Peace of Basel all the conquests of France beyond the Pyrenees were restored to Spain, in exchange for which that country ceded to France the Spanish part of the island of St. Domingo.

Basel, University of, an institution opened in 1460. After the Reformation it became strongly Protestant and exerted a widespread influence in behalf of the new faith. Among its professors were Erasmus, Œcolampadius, Euler, and the Bernoullis. It is at present the principal theological school in Switzerland, with departments of medicine, law, and philosophy. Its library contains 230,000 volumes and 1,500 MSS.

Basel'la, or **Malabar Nightshade,** a monotypic but very variable genus of tropical herbs of the natural order *Chenopodiaceæ*. *B. rubra,* a twining annual or biennial plant, native of India, where it is cultivated as a pot herb, is often raised in Europe, and has been introduced into the United States as a substitute for spinach, which it succeeds in season (July until frost). It is decidedly mucilaginous when cooked. Sometimes it is used as a greenhouse climber. One variety bears edible tubers, and another furnishes a purple dye.

Basement, in architecture, the base or lowest story of a building. It should have externally an appearance of strength, but its height

and proportion to the rest of the edifice are very various, depending on the character of the apartments on the ground floor.

Basey, bä'sā, Philippines, a town in Samar, with a population in 1898 of 13,756.

Bashahr', one of the Punjab hill states, on the lower slopes of the Himalayas, traversed from east to west by the Sutlej; area, 3,320 square miles. The rajah and upper classes in the southern parts are Rajputs, and the people generally are of the Hindu race, but their observance of Hinduism is very partial. The rajah pays tribute to the British government, for which he is required to raise troops in time of war, and by which his sentences of death must be confirmed. Pop. 75,727.

Bashan, bā'shăn or ba-shän' (meaning uncertain, perhaps "soft, rich soil"), the name in Scripture for a singularly rich tract of country lying beyond the Jordan, between Mount Hermon and the land of Gilead. These two regions, Bashan and Gilead, attracted the attention of those tribes that desired to continue the pastoral life to which they and their fathers had been accustomed; and Gilead was accordingly divided between Reuben and Gad, while Bashan was given to the half-tribe of Manasseh. Its forests contain magnificent oaks, and the "strong bulls of Bashan" of ancient times are still represented by vast herds of black cattle. Bashan had been the kingdom of the Canaanite giant Og, whom Moses destroyed; and one district of the country, Argob, had at that time 60 fenced cities, with walls, gates, and bars, besides many unwalled towns, remains of which are yet to be seen. Among the cities of this region were Edrei, Kenath, Golan, and Bozrah. After the captivity it is mentioned as divided into Trachonitis (the ancient Argob), Gaulanitis (Golan), Auranitis (Hauran, mentioned by Ezekiel), and Batanæa, or Bashan proper.

Bashford, James Whitford, American clergyman: b. Fayette, Wis., 27 May 1849. He was graduated at the University of Wisconsin in 1873, and at the Theological School of Boston University in 1876; became instructor of Greek at the University of Wisconsin in 1874, and president of the Wesleyan University of Ohio in 1889. His works include 'Science of Religion,' numerous published sermons, and contributions to periodical literature.

Bashi-Bazouks', irregular troops in the pay of the Turkish Sultan. They are a wild, turbulent body of men, mostly from Turkey in Asia, and in the duties with which they are entrusted resemble the Cossacks in the Russian army. In the spring of 1876 the Bashi-Bazouks were guilty of great atrocities in checking a threatened insurrection in the district around Philippopolis in eastern Rumelia.

Bashi' Islands. See Batan Islands.

Bashkirs', or **Bashkeers',** a tribe of half-civilized people subject to Russia, and inhabiting the banks of the Ural and Volga. They are probably descended from the Nogay Tartars and resemble them in their manners. They formerly roamed about, under their own princes, in southern Siberia. To avoid the Siberian khans they settled in their present territory, extended themselves along the Volga and the Ural, and submitted to the khan of Khasan. At the time when this state was overthrown by Ivan II. they voluntarily took refuge under the Russian sceptre; but their frequent revolts long prevented their increase and kept them in a weak condition. They number about 500,000, and inhabit chiefly the governments of Orenburg, Perm, and Samara. They are Mohammedans, and live chiefly by hunting, the breeding of cattle and horses, and keeping of bees. They prepare from mare's and camel's milk a fermented beverage, *koumiss* (q.v.), which is their favorite drink. They furnish the Russian army with a body of irregular cavalry.

Bashkirtseff, bäsh-kērt'sēf, **Marie,** Russian author: b. Russia, 1860; d. Paris, 1884. She came of a noble and wealthy family, went to Italy to study singing, and to Paris to study art. Her fame rests on her private 'Journal,' which seems to have been written with ultimate publication in view. It begins with her 13th year and continues through her later life. According to her own words, it was intended to be "the transcript of a woman's life." It appeared in Paris in 1885, and was abridged and translated into English in 1889, and was called by Gladstone "a book without a parallel." Like Rousseau's 'Confessions,' it claims to be an absolutely candid expression of individual experience. From the age of three years she cherished inordinate ambition, and felt herself destined to become great as singer, writer, artist, or queen of society. Admiration was essential to her, and she records compliments to her beauty or her erudition with equal pleasure. Her life was a curious mixture of the interests of an attractive society girl with those of a serious student. Her chronic discontent was due to the disproportion between her aspirations and her achievements. She was never unself-conscious, and her book reveals her longings, her petty vanities, and her childish crudities, as well as her versatile and brilliant talents.

Basic Slag, the slag of refuse matter which is obtained in making basic steel, and which, from the phosphate of lime it contains, is a valuable fertilizer.

Basic Steel. See Steel Manufacture.

Basil, bā'zĭl or băz'ĭl, **Saint,** surnamed The Great, Bishop of Cæsarea, Cappadocia: b. about 326; d. 380. He was studying in Athens in 355, and there became the friend of Gregory, afterward Bishop of Nazianzen. He was baptized in 357, and after extensive travels retired to the desert of Pontus and there founded an order of monks named Basilians. He succeeded Eusebius in the see of Cæsarea in 370, and by his opposition to Arian doctrines greatly offended the Emperor Valens. The liturgy of St. Basil is still used in the Eastern Church.

Basil I., emperor of Constantinople: b. Macedon, of poor parents, about the beginning of the 9th century; d. 886, from a blow given him by a stag while hunting. In his 25th year he made his way to Constantinople, and gained the favor of an archimandrite, who procured him service with an officer of the court of the Emperor Michael III. Later he was appointed head-chamberlain to the emperor. Despite intrigues against him he advanced so rapidly in the emperor's favor that he was adopted as his colleague. He murdered his chief rival, Bardus, and knowing that Michael had rendered himself odious by his cruelty and debauchery, he headed

a body of conspirators and murdered him in his bed in 867, and assumed sole occupancy of the throne. Notwithstanding his criminal acts, he proved an able and equitable sovereign; paid equal attention to the internal administration and the foreign relations of the empire, and, not overlooking even its religious interests, sent an archbishop into Russia and laid the foundation of that ascendency which the Greek Church has so long possessed in that country. He compiled a body of laws called the Basilica, which, augmented by his son and successor, Leo the Philosopher, were in force till the fall of the empire. Basil I. deprived Photius of the see of Constantinople, and restored Ignatius; but on the death of the latter he recalled Photius. He successfully carried on war with the Saracens. The versatility, if not the depth of his intellect, is strikingly displayed in his exhortations to his son Leo, which are still extant.

Basil II., emperor of the East: d. 1025. On the death of his father, the Emperor Romanus the Younger, in 963, he was kept out of the succession for 12 years by two usurpers; the first, Nicephorus II. (Phocus), who died in 969, and the second, Johannes (John) Zimisces, who associated Basil and his brother Constantine with him in the empire in 975, and died the following year, leaving the whole power to Basil although Constantine was still his colleague in name. His reign was almost a continuous warfare, in which the contending parties seemed to vie with each other in committing deeds of cruelty. In 1014, after a great victory over the Bulgarians, in which he had taken 15,000 prisoners, he had 99 out of every 100 deprived of their eyes and thus sent home. This horrible cruelty caused the death of Samuel, king of the Bulgarians. The war ended in 1019 by the complete conquest of Bulgaria.

Basil (*Ocimum*), a genus of fragrant annual herbs of the natural order *Labiatæ*, natives of warm climates, cultivated for culinary purposes and for ornament. The species generally raised are sweet basil (*O. basilicum*), bush or dwarf basil, (*O. minimum*), (considered by some botanists a form of *O. basilicum*), and tree basil (*O. gratissimum*). The name basil is also applied to certain species of several other related genera; for instance, *Pycnanthemum* and *Calamintha*. For culture and uses, see Herbs (*Culinary.*)

Basilan, bä-sē'län, Philippines, the largest island of the Sulu Archipelago. It is of oblong form, about 36 miles long and situated south of Mindanao, from which it is separated by a strait nine miles wide. The island is very mountainous, and most of it is covered by virgin forests. The soil is extremely rich and produces a variety of valuable crops, including cotton, coffee, sugar, chocolate, tobacco, indigo, and spices of all sorts. Basilan has about 15,000 inhabitants and three excellent harbors. The name is also applied to the whole group of 34 adjacent islets. The leading port is Isabela, on Basilan Strait.

Basil'ean Manuscripts, two manuscripts of the Greek New Testament, now in the library of Basel: (1) a nearly complete uncial copy of the Gospels of the 8th century; (2) a cursive copy of the whole New Testament except the Apocalypse, of the 10th century.

Basil'ian Liturgy, that form for celebrating the eucharist drawn up, toward the close of the 4th century, by Basil the Great, still used in the Greek Church.

Basilian Monks, a monastic order, chiefly belonging to the Greek Church, which strictly follow the rules of St. Basil (q.v.), who, after visiting the monasteries of Egypt, Syria, and Palestine, induced many to enter and even to found convents. His rule was confirmed by Pope Liberius in 363. In 379 there were at least 80,000 in the Eastern monasteries. Many convents were dispersed in the 8th century, during the Iconoclast persecutions, and all began to languish about the time of the Eastern schism. The order comprises priests, lay-brothers, cenobites living in community, anchorites in cells, and hermits in solitudes. They are governed by an archimandrite who has several convents under his jurisdiction, and by exarchs deputed by the archimandrite to visit the convents. The order has developed more extensively in Russia than in other countries. In Austria, Poland, and Hungary there are many communities, known as Ruthenians, in union with Rome. In Italy also they had convents in Calabria, Sicily, and Naples. In Spain they flourished for nearly two centuries until 1835. The communities of Sisters of this name were founded by St. Maerina, sister of St. Basil. Other communities following the rule of St. Basil are the Melchites, with about 600 houses in Libanus; the Bartholomites of the Armenian rites, so called because, after taking refuge in Genoa in 1307, they had possession of St. Bartholomew's church there until 1659. This name is likewise given to a community of secular priests founded by Bartholomew Holzhauser in Germany in 1640, and once propagated in Hungary, Poland, and Spain, but now extinct. There are but six Basilians in the United States (in Chicago) affiliated to the provincial house in Toronto, Canada.

Basil'ica (literally, a royal hall, originally the hall occupied by the *archōn basileus* or "king archon" among the ancient Athenians), the name of buildings belonging to classical antiquity, which acquired their characteristic form among the Romans. In the first centuries of the Christian era the Roman basilicas were splendid public buildings, of an oblong shape, commonly adorned with columns and statues, where the citizens collected to consult for their common welfare, the merchants exposed their wares, young orators exercised themselves in declamation, etc. Constantine the Great gave some basilicas to the Christians in Rome for their worship. Thence it happened that the first Christian churches obtained the name of *basilicæ*. But in the 4th century after Christ the ancient form of the basilica began to be modified and developed. (See Christian Architecture.) The chief changes that from that time onward were gradually made in its construction consisted in the raising of the nave above the rest of the building, the introduction of upper windows, the addition of the transepts, and the decoration of the interior with works of mosaic. At a later time towers were introduced, and still later vaulted roofs instead of the flat timber roofs with which they were formerly provided. The original church on the site of which St. Peter's is built was a basilica, and hence the

name is often applied to the present church, which is not, strictly speaking, a basilica.

Basilica, a code of laws founded on the code of Justinian, supposed to have been named after the Greek emperor Basilius I., in whose reign its compilation was begun. It was finished by Leo the Philosopher, and revised by order of his son Constantine Porphyrogenitus in 945. It consisted of 60 books, but we no longer possess them in a complete form. The principal editions are those of Fabrot (7 vols., Paris, 1647), and Heimbach (Vols. I–V, Leipsic, 1833–50).

Basilicata, bä-zĭl-ē-kä′ta, the ancient Lucania, in southern Italy, composed solely of the province of Potenza; so called after the Emperor Basilius II., who reconquered it from the Saracens and Lombards in the 11th century. It is mountainous, several peaks rising to upward of 4,500 feet (Monte Pollino, 7,375 feet). The Apennines here divide into two parts, which branch off to the east and west. From these the rivers Bradano, Basento, Salandrella, Agri, and Sinni take their source, and, after draining this fertile district, fall into the Gulf of Taranto in the Ionian Sea. There are also many lakes, some of volcanic origin. The chief are Monticchio, Pesole, Maorno, and Santa Palagina. The bulk of the people are poor and ignorant, and talk a dialect called *basilisco*. Its coast line being for the most part marshy, and, as a consequence, unhealthful, the province derives next to no commercial benefit from it. The orange and lemon grow well near the coast. Other products are cotton, flax, silk, honey, wax, licorice, dried fruit, saffron, tobacco, etc. Mineral springs are many, chiefly sulphurous. There are marble quarries at Avigliano, Latronico, Muro, Lucano, and Picerno; chalk at Mauro Forte and Montemuro; transparent quartz at Lagonegro; tufa at Matera; and excellent lignite at San Chirico Raparo and Rotonda. Area, 3,845 square miles; pop. (1901) 490,000.

Basilicon, ba-zil′ĭ-kŏn, a name of several ointments, the chief ingredients of which are wax, pitch, resin, and olive oil.

Basilicon Do′ron (the royal gift), the title of a book written by King James I. in 1599, and printed in Edinburgh in 1603, containing a collection of precepts on the art of government, and maintaining the claim of the king to be sole head of the Church.

Basilides, ba-sĭl′ĭ-dēz, founder of one of the most remarkable sects of ancient Alexandria. He lived under the reigns of Trajan, Adrian, and Antoninus, but the place of his birth, supposed to be in Persia, Syria, or Egypt, is unknown. He was well acquainted with Christianity, but, under the pretense of freeing it from corruption, corrupted it still more by mixing it up with the wildest dreams of the Gnostics and peopling the earth and the air with multitudes of æons. He had numerous followers, who spread from Syria and Egypt into Italy, and even as far as France, but they suddenly sank into obscurity and are scarcely heard of after the 4th century.

Basil′io da Gama, gä′mä, **José,** a Brazilian poet: b. San José, 1740; d. Lisbon, 1795. His principal poem gives a picturesque and romantic account of the bloody wars which the Portuguese waged, in 1756, against the natives of Paraguay. He was a protégé of the Brazilian minister Pombal, who gave him employment in his Cabinet. He shared Pombal's exile, and also dedicated verses to him in token of his gratitude. On his return to Rio de Janeiro he was favorably received by the authorities and the literary notabilities, and with their co-operation he became one of the founders of the first Brazilian academy. In 1790 he again had to resort to flight, and he succeeded in escaping to Lisbon. He was the author of many lyrical pieces and sonnets, and of a poem, 'Quitubia,' written on an African chieftain whose devotion to Portugal engaged the poet's sympathy; but the most abiding monument of his genius is his 'Uruguay,' which is still popular wherever the Portuguese language is known.

Basilis′cus, brother of Verina, wife of Leo, emperor of the East: d. 477. In his youth he obtained some successes against the Scythians, and in 468, through the influence of his sister, was appointed to command the immense armament fitted out at Constantinople against Genseric, king of the Vandals in Africa. This expedition consisted of upward of 1,100 vessels, conveying soldiers and sailors to the number of more than 100,000 men, and its equipment is said to have cost about $25,000,000. But this vast fleet, after reaching the coast of Africa in safety, was altogether destroyed or dispersed by Genseric, through the incapacity or treachery of its leader. Basiliscus escaped to Constantinople, and obtained the pardon of the emperor only by the earnest intercession of the empress. After the death of Leo, and of his successor, Leo II., in 474, Basiliscus usurped the imperial throne. But he was unable to sustain himself in this position, and was not long after overthrown and put to death by Zeno, the legitimate heir.

Basilisk, băz′ĭ-lĭsk, according to Pliny (lib. viii. c. 21), a kind of serpent found in the African deserts, named *basiliskos,* or little king, because its body was marked with bright spots, and those on the head had the appearance of a crown or diadem. It had a very pointed head, with fiery eyes, and was of a dark color, verging to blackness. All other snakes were said to fly from the sound of its hissing; and instead of trailing along like other serpents the basilisk raised its body nearly erect, and, as it passed along, killed the herbs and fruits by its touch, and even by its breath. Yet this monster was destroyed by weasels. If these fables had reference to any real animal, it is probable that it was a species somewhat similar to the *cobra de capello,* or the asp viper. Both are accustomed to erect a very considerable part of the body, though not to move forward in this way. It is highly probable that the basilisk of the ancients was merely a creature of fiction.

The name is now applied to one of the Central and South American lizards of the family *Iguanidæ* and genus *Basiliscus,* remarkable for the high and erectile crests which are developed along the back and tail of the males. They have long legs and long flexible toes, enabling them to climb trees with great activity. They prefer such trees as overhang the water, into which they plunge at any sign of danger. They feed entirely upon vegetable matter. The best-known species is *Basiliscus americanus,* which

has a length of nearly three feet, three fifths of which is tail. In color the basilisks are green and brown, with dark cross-bars on the back, and the crest of the males is red. In early spring they lay about a dozen eggs in a hole among the roots of a tree. See also IGUANA.

Basilosaurus. See ZEUGLODON.

Ba'sin, in physical geography, the whole tract of country drained by a river and its tributaries. The line dividing one river basin from another is the watershed, and by tracing the various watersheds each country is divided into its constituent basins. The basin of a lake or sea comprises as well all the territory drained by the rivers which run into it. Such hydrographic basins owe their origin either to erosive action or to a depression of the earth's crust. When rivers become established upon a new land surface they proceed to deepen and widen their channels, and in course of time may appreciably lower the level of the drainage area. Glaciers are also important agents in the establishment of hydrographic basins, as is illustrated by the numerous rock basins (now occupied by lakes) that were hollowed out by the great ice-sheets that once invaded northern North America and Europe. Other depressions have been formed by vertical movements of the strata comprising the earth's crust. The Great Basin lying between the Rocky Mountains and the coast ranges, and many of the lake basins of central Africa, originated in this way. In geology a basin is the synclinal arrangement of strata so that they dip or are inclined toward a common centre. The Paris Basin and the London Basin are familiar instances. See RIVER; LAKE; VALLEY; etc.

Bas'ingstoke, England, a town and parish of Hampshire, situated near the source of the Loddon, 18 miles north-northeast from Winchester. Its streets are well built, paved, and lighted, and the town is amply supplied with water. It has a town-hall, containing a spacious corn-market and ball-room. It has also a fine Gothic church, erected in the time of Henry VIII.; several other places of worship; a mechanics' institute, with good library; and numerous charities. A considerable trade is carried on in corn and malt. Population of municipal borough (1901) 9,810.

Bas'kerville, John, English printer and artist: b. Wolverley, Worcestershire, 1706; d. 1775. Inheriting a small estate, he was brought up to no profession, but, acquiring great skill in penmanship and carving letters on stone, at the age of 20 he settled at Birmingham as a writing-master. He subsequently engaged in the manufacture of japanned works, and in 1750 entered upon his great career as printer and typefounder, in which he displayed extraordinary ability, as well as in the manufacture of the ink and paper used in his productions. His first great work was an edition of Virgil, in royal quarto, 1756, which was followed by many of the Latin classics, and some English ones, in quarto and smaller sizes. After his death his types and matrices were sold to Beaumarchais at Paris for £3,700.

Basket, a vessel made of osier twigs or other flexible materials, as rushes, strips of wood, splits of bamboo, rattan, etc., and used for holding and carrying all sorts of commodities. The word is of Britanno-Celtic origin and still subsists in the Welsh language in the form *Basgawd,* from *Basg,* plaiting, net-work: it was adopted into the Latin language in the 1st century with form little altered — *Bascauda.* The baskets made in Britain were highly prized by the Romans, and the poets Juvenal and Martial make mention of them as articles of no trifling value. They were evidently regarded as rare exotic curios in Juvenal's day, for the poet, in drawing an exaggerated picture of the shipwreck in which his friend Catullus threw overboard his most cherished possessions, couples Bascaudæ (baskets) with articles of chased silver wrought by famous artists (Sat. xii.). And Martial (xiv. 99) makes the British basket say of itself:—

Barbara de pictis veni bascauda Britannis,
Sed me jam mavult dicere Roma suam —
"The Basket Barbaric, I'm come from the painted Britanni,
But Rome now would choose rather to title me Roman."

In primeval times basket-making was a branch of the art of weaving, and both of these arts grew out of the still more primitive one of wattling, first employed in making enclosures. Tylor ('Early History of in making enclosures. Tylor ('Early Hist. of Mankind') notes the existence of wicker-weaving among primitive tribes throughout the world. This is the first step in the art of weaving textile fabrics. It is practised, or rather was practised, by the natives of New Zealand and of northwestern America, and as late as 1856 by an Indian tribe living northwest of Lake Huron. In the lake habitations of Switzerland have been found specimens of wicker-weaving work consisting of strands of untwisted fibre, probably hemp, bound together by transverse strands wattled in among them; and in the same localities have been found specimens of the same kind of weaving but of a progressively higher and finer type. There is even a genetic relation between the arts of basket-making and pottery, proved by specimens of rude pottery found in all quarters of the world: in these are seen the impresses of the basket-work on which the clay was molded and which was burnt away in the kiln. Even after the art of molding the clay without the basket-work frame was invented, the potters seem to have imitated the markings left by it. Among the Indians of the Mississippi valley along the gulf, all pottery vessels of large size used to be modeled in baskets of willow or splints, which, being burnt off, their markings remained. Shields of basket-work covered with hide were in use among the Britons at the time of Cæsar's invasion, and similar shields are still employed by primitive peoples wherever they live in savage isolation. Boats, too, of basket-work, with a covering of hide (coracles), were used by the ancient Britons, and boats of the same type were seen by Herodotus (I. 194) navigating the Euphrates. These were of round form, without distinction of bow and stern, and similar boats are still in use on some rivers in India. On account of its lightness, combined with strength and durability, basket-work is preferred to joinery in the manufacture of various commodities, as window-screens, pony-carriage bodies, chairs, tables, etc. In South America the natives weave of rushes baskets capable of holding liquids, and those of Tasmania, now

extinct, used to weave of leaves water-tight vessels. The material most commonly employed in basket-making is the willow or ozier twig, and the production of this material is an important industry in France, Germany, Belgium, Holland, and Britain. The product of France and Britain is the most highly esteemed for firmness, toughness, and evenness; that of Germany is reputed inferior to the French; the Dutch product is in least esteem, being soft and pithy. Besides ozier twigs, a great variety of other materials are employed in basket-making. In this country coarse, strong baskets are made of shavings or long broad splits of various tough woods. In China and Japan the usual materials are bamboo and rattan, and the Chinese and Japanese excel in the manufacture of wares of these materials, their products being unrivaled for fineness, elegance, and finish; and some of their work, as in the encasing of the egg-shell porcelain of the Japanese is marvelous for the delicacy of the manipulation: even the examples seen in our marts, of common little porcelain saucers so encased in basket-work, are worthy of admiration for painstaking workmanship. The fronds of the Palmyra palm, originally employed in India in making «Cajan» baskets, now afford a staple material for use in the art throughout the world. So, too, *Phormium tenax,* native of New Zealand, which yielded to the natives of that country their peculiar basket-making material, is now employed in all countries for the same purpose.

Basket-making is one of the simplest of the mechanic arts; and the workman, in making baskets designed for use, not for ornament or to please the fancy, has no absolute need of tools or apparatus beyond those requisite for cutting the rods and interlacing them — a knife and a bodkin, with a mallet to beat them into place. The process can be learned in principle by inspection of a basket-maker at work in fashioning a basket from the foundation to the rim. Having provided a sufficient quantity of rods or splints of much greater length than the proposed dimensions of the finished work, he lays a number of them on the floor in parallel pairs at small intervals in the direction of the longer diameter of the basket: this is the woof, so to speak. Then these are crossed at right angles by two of the largest osiers, with their thick ends toward the workman, who sets his foot upon them; next, each of these is woven alternately over and under the lengthwise parallel pieces, and thus the parallel pieces are held fast; this is the «slath,» — the foundation. Now the end of one of the two transverse rods is woven over and under the lengthwise rods all round the bottom till that whole rod is worked in; and the same is done with the other transverse rod, and then additional long oziers are woven in till the bottom is of the required size. The bottom is now finished and work begins on the superstructure by driving the sharpened large ends of a sufficient number of long, stout oziers between the rods at the bottom from the edge toward the centre: these are the ribs or skeleton, being set up in the direction of the sides; between these ribs other rods are woven in till the structure reaches the desired height. To finish the edge the ends of the ribs are turned down over each other and thus compactly united. A handle is added by forcing two or three sharpened rods of the requisite length down through the weaving of the sides, close together, and pinning them fast a little below the brim; the rods are then either bound or plaited in any way the workman chooses.

Our North American Indians were once among the most expert basket-weavers in the world. Now only the older Indians know the art, and certain tribes whose work was incomparably fine and beautiful have already lost it. After much pauperizing under the abominable reservation system, it was decided that the Indians needed an industry to save them from sinking still lower. Lace-making, after Brussels and French patterns, was first superimposed on a Minnesota reservation, whence it has spread. Now, lace-making, which has been developed by the European woman, fits her like a glove; and quite as truly, basket-making fits the Indian like a moccasin. Yet the Indians have succeeded at making lace, for they have remarkable skill with the fingers. An enlightened administrator of Indian affairs has taken up the task of human development in the right way and has made plans to revive basket-making by introducing it into the Government Indian schools, where the children, who now know nothing of this beautiful art, may learn from the only masters capable of teaching them — their own people, directed by white teachers who know the needs of the constantly widening market. Hundreds of thousands of dollars' worth of baskets are imported from Japan and Germany every year — money which by every right should be earned by our capable and needy Indians; and better than the money they will earn is the satisfaction of doing what they do with surpassing skill.

Basket-ball, a distinctly American game. Its history begins in 1891, when a lecturer in psychology at the Young Men's Christian Association Training School in Springfield, Mass., suggested, as an exercise of inventiveness, a game that would comply with certain conditions. One of his pupils, James Naismith, taking note of the hypothetical conditions indoors,— limited area, limited number of contestants, equally applicable to either sex, etc.,— applied his mind to meet those conditions, and invented « basket-ball.»

It is played on a marked oblong square containing not more than 3,500 feet of actual playing-space, by teams of five each, known respectively as centre, left, and right forwards, and left and right backs. The ball is round and inflated, not less than 30 nor more than 32 inches in circumference, and very like that with which «Association» foot-ball is played. The goals are hammock nets of cord, suspended from metal rings 18 inches in diameter, and placed 10 feet from the ground, in the centre of the ends of the playing-space. The time of playing, for seniors, is two halves of 20 minutes, with an interval of 10 minutes; and for juniors, two halves of 15 minutes, with a similar interval. No kicking of the ball with the foot, or hitting with the fists, is permitted; the ball must be held by the hands only.

For rules, and much other necessary information for actual playing, consult Hepbion's 'Official Basket-Ball Rules.'

Basket-fish, a name given about 1670 by John Winthrop, governor of Connecticut, to the *Astrophyton agassizii.* It belongs to the

group *Euryalida*, and is allied to the sand-stars, but differs in the arms being much branched and ending in long slender tendrils which are so much interlaced as to suggest basket-work. It is very large, the disk being two inches across, and the entire animal often a foot in diameter. It lives off the coast of New England in from 10 to 100 fathoms of water. Other names are "Medusa's-head," and "Sea-basket."

Basket-worm. See BAG-WORM.

Baskett, James Newton, American zoologist: b. Kentucky, 1 Nov. 1849. He was graduated at the Missouri State University in 1872. He has devoted himself to the study of comparative vertebrate anatomy, with ornithology as a specialty. In 1893 he presented a paper on 'Some Hints at the Kinship of Birds as Shown by Their Eggs' at the World's Congress of Ornithologists in Chicago. Among his publications are 'The Story of the Birds'; 'The Story of the Fishes'; 'The Story of the Amphibians and Reptiles'; 'The Story of the Mammals'; 'At You-All's House' (a novel); 'As the Light Led' (a novel), etc.

Basking-fish, or **Basking-shark.** See SHARK.

Basle. See BASEL.

Basnage, bä-näzh, a family of French Protestants, remarkable for the number of able men and eminent writers whom it has produced.

1. NICOLAS, who, having espoused the doctrines of the Reformation, was compelled by persecution to take refuge in England, where he became the minister of a congregation at Norwich. When, by the accession of Henry IV., a better era began to dawn, he returned to his country and officiated, till his death, as minister of a church at Carentan.

2. BENJAMAN, son of the former: b. 1850; d. 1652. He succeeded his father in his charge, and held it for the long period of 51 years. He long held a prominent place among the reformers of France; presided in the assembly held at Rochelle in 1622; undertook the dangerous task of negotiating for English aid; traveled into Scotland to arouse the Protestant feeling in that country; and on his return took the lead in the important synods held at Charenton in 1623 and 1631, and at Alençon, in 1637. His principal work, entitled, 'Treatise on the Church,' is a good specimen of his talents.

3. HENRY DE FRANQUENAY: b. 1615; d. 1695. He was the youngest son of Benjamin, studied for the bar, and as a provincial advocate in Rouen long stood at the head of his profession. His eloquence, learning, and unsullied integrity secured him the esteem, not only of the Protestants, whose views he held, but even of those most violently opposed to him. His complete works, confined to juridical subjects, were published at Rouen in 2 vols. folio in 1778.

4. JACQUES, eldest son of Henri: b. Rouen, 1653; d. 1723. He is the best-known and perhaps the ablest member of the family. He studied theology at Geneva and Sedan, and in 1676 became minister of the Protestant Church at Rouen. In 1685 his church having been closed by decree of Louis XIV., he removed to Holland and officiated as minister, first at Rotterdam, and then permanently at The Hague. Among his works may be mentioned 'History of the Church,' 2 vols. folio; 'History of the Jews,' 15 vols. 12 mo.; 'Annals of the United Provinces,' 2 vols. folio; and 'The Holy Communion.'

Basques, bäsks, or **Biscayans,** in their own language, EUSCALDUNAC; a remarkable race of people dwelling in the southwest corner of France, and in the north of Spain, on both sides of the Pyrenees. They are probably descendants of the ancient Iberi, who occupied Spain before the Celts. The French Basques (Gascons) settled, at the end of the 6th century, on the north side of the Pyrenees, between those mountains and the Garonne. After long struggles they submitted to the kings of the Franks. Under the Carlovingian race they elected their own dukes, but after the extinction of that family they fell under the dominion of Aquitania in the 11th century, and with it under that of France in 1453. The Basques preserve their ancient language, former manners, and their national dances, and make admirable soldiers, especially in guerrilla warfare, to which their native temperament inclines, and their frequent expeditions in carrying on the smuggling, to which they are much addicted, inure them. They are good seamen, and were the first Europeans who engaged in the whale-fishery, which they have, however, long since relinquished. They occupy, in Spain, the provinces of Biscay, Guipuzcoa, and Alava; in France, the departments of the Upper and Lower Pyrenees, Ariége and Upper Garonne. See BISCAY.

Basrah. See BASSORA.

Bass, Edward, first Protestant Episcopal bishop of Massachusetts: b. Dorchester, Mass., 23 Nov. 1726; d. Newburyport, Mass., 10 Sept. 1803. He was graduated at Harvard in 1744; was ordained in England in 1752; and later became pastor of the church at Newburyport, Mass. During the Revolution he omitted from the church service all reference to the royal family and the British government. For this he was expelled from the Society for the Propagation of the Gospel. In 1797 he was consecrated bishop of Massachusetts, and finally also of New Hampshire and Rhode Island.

Bass, Michael Thomas, English brewer: b. 1799; d. 1884. He became head of the Burton brewing firm of Bass & Company upon the death of his father, and was a member of Parliament from 1848 to 1883. His benefactions were very numerous, and included the building and endowing of St. Paul's Church, Burton (the total expenditure on the parish being about $500,000); and the establishment of recreation grounds, a free library, and swimming baths for Derby, at a cost of $185,000. Of simple tastes, he more than once declined a baronetcy and a peerage.

Bass, the name of various trimly shaped, active, gamy fishes of both fresh and salt water, mostly in northern regions. The term was originally applied to the *Morone labrax* of the west coast of Europe, and was thence transferred to many other fishes having a real or fancied likeness to this in appearance and qualities. This fish represents the sea-perch family, *Serranidæ*, is perch-like in form, usually 12 to 18 inches long, and frequents the shoal shore-waters in great numbers, being noted for its fierceness and voracity. Its flesh is excellent. The same family and genius are represented in North America by many species, of which the

nearest relative is the yellow bass (*M. interrupta*) of the southern Mississippi valley. It is a brassy-yellow with seven very distinct black longitudinal lines, those below the lateral line being interrupted posteriorly, the posterior parts alternating with the anterior. Its body is oblong-ovate with the back much arched. The dorsal fin and anal spines are stout. It is a light fish for its length, ordinarily weighing one to two pounds, but often measuring 12 to 18 inches, and weighing five pounds. It is very gamy, and is esteemed by some anglers the equal of the black bass in this respect.

In the same family falls the well-known striped bass or "rock fish" (*Roccus lineatus*), of the northeastern Atlantic, which approaches the coast and enters fresh water only at spawning-time, when its ascends the rivers. It was absent from the Pacific coast until planted there artificially, since which it has multiplied from Puget Sound to lower California. The largest fish are to be found in Chesapeake Bay, where they average from 30 to 50 pounds in weight, and occasionally reach double that. In color they are brassy-olive, the fins and sides rather pale, and the latter marked with seven or eight blackish stripes. The favorite way of fishing for the striped bass is by casting a "squid" through the surf, using as a bait pieces of clam, shrimp, or crab; but they will rise to a fly; and on the Pacific coast are easily lured by a shining spoon-bait.

The white bass (*R. chrysops*) is a near relative of the striped bass, and inhabits the Great Lakes from the St. Lawrence to Manitoba, and southward in the Mississippi valley to Arkansas. Its preference is for still waters, and it is even lighter in weight for length than the yellow bass. It is generally taken with bait, though it will rise to the fly. It is silvery in its color, tinged with golden below, with dusky lines along the sides.

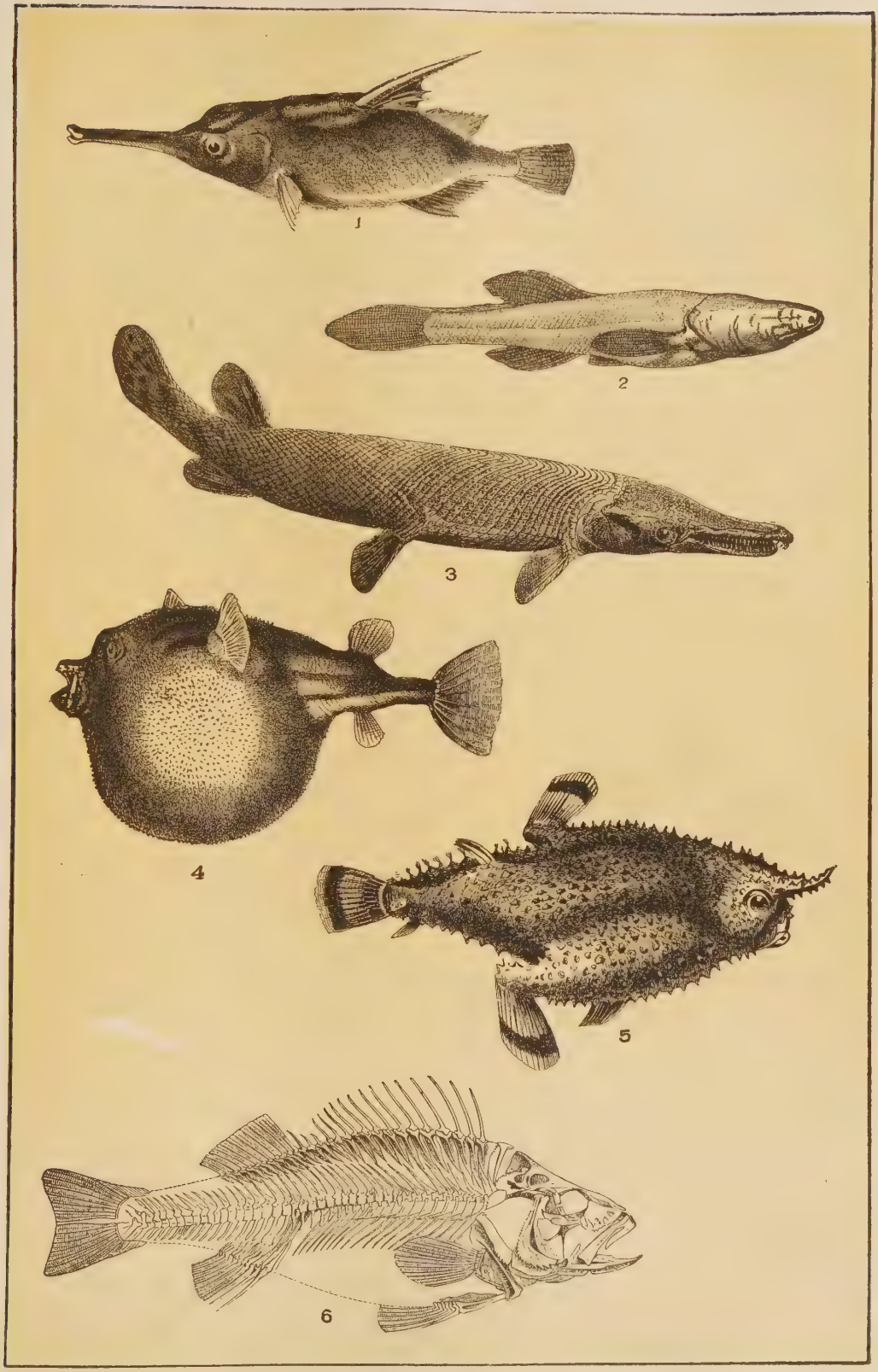
The most important of the American fresh-water bass are the black bass — two species of percoid game fishes of the distinctly American family *Centrarchidæ,* which also contains the various sunfish (q.v.). One is the "big-mouthed" and the other the "small-mouthed" black bass. Both were originally confined to the waters of the upper Mississippi valley, and Great Lakes region, but in 1853 they were introduced into the head waters of the Potomac River, whence they have spread into all the rivers that empty into Chesapeake Bay. More recently bass have been introduced into New England and into many of the far western States; as well as transported into England, France, Germany, and other countries. The body is oblong, compressed, the back not much elevated, head oblong-conic, lower jaw prominent, teeth on jaws, vomer and platines in broad villiform bands, the inner depressible, usually no teeth on tongue. Black bass vary greatly in size in different waters. The small-mouthed, however, seldom exceeds six pounds in weight, while the large-mouthed, especially in the South, is larger, running as high as 14 pounds. In color both are dull golden-green with a bronze lustre, the scales on the cheeks are more minute than those on the body, and the dorsal fin is deeply notched. In the small-mouthed species (*Micropterus dolomieu*) the maxillary does not extend beyond the eye, and the scales on the cheek are arranged in 17 rows. In the large-mouthed (*M. salmoides*) the maxillary extends beyond the eye and there are but 10 rows of scales on the cheeks. The lateral line in both is nearly straight, passing from the upper edge of the gill-cover to the centre of the base of the caudal fin. The small-mouthed has the wider range, extending from the Red River of the North to Texas and Mexico. Both varieties are free, but capricious, biters, and both are game fighters. They are taken with artificial flies, such as the "Rube Wood," "Seth Green," "silver doctor," and "Parmachenee bell," as well as by casting with a wide range of natural baits, such as crayfish, minnows, worms, and small frogs; or they may be taken by trolling from a boat, using a stiff rod, especially in lakes, with any standard silver or golden spoon-bait. In some districts the large-mouthed bass is called "straw" bass; in others "slough," "lake," "marsh," or "Oswego" bass, or "green trout," "welchman," etc.

Another species deserving mention is the "rock-bass," one of the sunfish (*Ambloplites rupestris*), found in practically every lake, pond, and stream east of the dry plains. It does not usually attain more than half a pound in weight, is easily caught, and is the least persistent fighter of any of the family. In color it is mottled-olive or brassy-green.

Consult: Henshall, 'Book of the Bass' (1889); and Jordan and Evermann, 'American Food and Game Fishes' (New York 1902).

Bass, bās (It. *basso,* deep, low), the lowest part in the harmony of a musical composition. It is the most important of all the parts, the foundation of the harmony, and the support of the whole composition. Different forms of bass are: *Basso concertante,* or *Basso recitante,* the bass of the little chorus; the bass which accompanies the softer parts of a composition, as well as those which employ the whole power of the band. This part is generally taken by the violoncellos. *Bass-counter* or *contra-bass,* the under bass; that part which, when there are two basses in a composition, is performed by the double basses, the violoncellos taking the upper bass or *basso concertante. Basso repieno* (Ital.), the bass of the grand chorus; that bass which joins in the full parts of a composition, and, by its depth of tone and energy of stroke, affords a powerful contrast to the lighter and softer passages or movements. *Figured bass,* a bass which, while a certain chord or harmony is continued by the parts above, moves in notes of the same harmony. *Fundamental bass,* that bass which forms the tone or natural foundation of the harmony, and from which that harmony is derived. *Ground bass,* a bass which starts with some subject of its own, and continues to be repeated throughout the movement, while the upper part or parts pursue a separate air and supply the harmony. *Thorough bass,* the system in which words are denoted by placing figures over the bass note. *Bass clef,* the character put at the beginning of the stave, in which the bass or lower notes of the composition are placed, and serving to determine the pitch and names of those notes.

Bass (bās) **Rock,** a remarkable trap-rock island, at the mouth of the Firth of Forth, three miles from North Berwick. It is of circular shape, about a mile in circumference, and rises precipitously to a height of 420 feet. It is inac-



1. Bellows Fish (Centriscus scolopax).
2. Cave Fish (Amblyopsis spelaeus).
3. Bill Fish (Lepidosteus osseus).
4. Balloon Fish (Tetrodon fahaka).
5. Bat Fish (Malthe vespertilio).
6. Skeleton of a Bass (Perca fluviatilis).

cessible except on one flat shelving point on the southeast. Its summit is estimated at about seven acres, and this supports a few sheep, the mutton of which is considered a great delicacy. Solan geese and other sea-fowl in myriads cover its rocks, and fly around it in clouds. The surrounding water is of great depth on the northeast, but shallow on the south. Among the historical ruins on the island are the remains of a fortalice commanding the landing-place, capable of accommodating upward of 100 men, formerly accessible only by ladders or buckets and chains; and the ruins of a chapel about halfway up the acclivity. The Bass was purchased by the English government in 1671, and its castle, long since demolished, was converted into a state prison in which several eminent Covenanters were confined. It was the last place in Britain that held out against William III., its small band of gallant defenders yielding only to starvation. The island anciently belonged to a family of the name of Lauder, whose head was styled Lauder of the Bass.

Bass (băs) **Strait,** a channel beset with islands, which separates Australia from Tasmania, 120 miles broad, discovered by George Bass, a surgeon in the British navy, in 1798.

Bass (bās) **Viol,** a stringed instrument resembling the violin in form, but much larger. It has four strings and eight stops, which are subdivided into semi-stops, and is played with a bow. See VIOL.

Bas'sa, Africa, a district on the west coast forming part of the negro state of Liberia (q.v.).

Bassanio, bä-sä'nĕ-ō, the lover of Portia in Shakespeare's 'Merchant of Venice.'

Bassano, băs-sä'nō, **Hugues Bernard Maret, Duc de,** French publicist and statesman: b. Dijon, 1763; d. 1839. On the first outburst of the French Revolution he enthusiastically embraced its principles, published the *Bulletin de l' Assemblée,* and soon after was appointed editor of the *Moniteur.* He became acquainted with Bonaparte, and was made by him chief of division in the ministry of foreign affairs. In 1811 he was created Duke of Bassano and appointed minister of foreign affairs; and in 1812 he conducted and signed the treaties between France, Austria, and Prussia, preparatory to the fatal expedition to Russia. When the emperor was sent to Elba in 1814, Bassano retired from public life; but immediately after Napoleon's return he joined him, and was very nearly taken prisoner at Waterloo. On the emperor's final overthrow Bassano was banished from France, but at the Revolution of July 1830 he was recalled and restored to all his honors. In 1838 he was made minister of the interior and president of the council, but the ministry of which he formed a part survived only three days.

Bassano, Jacopo, (real name GIACOMO DA PONTE), Italian painter: b. Bassano (whence his surname), 1510; d. 1592. He painted historical pieces, landscapes, flowers, and portraits; among the latter those of the Doge of Venice, of Ariosto, Tasso, and other persons of eminence. Several of his best works are in the churches of Bassano, Venice, Vicenza, and other towns of Italy. He left four sons, all painters, of whom Francesco was the most distinguished.

Bassano, Italy, a city in the province of Vicenza, on the Brenta (lon. 11° 43′ E.; lat. 45° 46′ N.). Its 30 churches contain beautiful paintings. A stone bridge, 182 feet long, unites the town with the large village Vincantino. Vines and olives are cultivated in the vicinity and there is considerable trade in silk, cloth, and leather. Its principal manufactures are straw hats, porcelain, and wax. Napoleon made Bassano a duchy, with 50,000 francs yearly income, and granted it to his minister of foreign affairs, Maret (see BASSANO, HUGUES). Near Bassano, 8 Sept. 1796, Bonaparte defeated the Austrian general Wurmser. Bassona was the birthplace of the famous printer Mauritius, as well as of the historical painter Giacomo da Ponte (see BASSANO, JACOPO), and a short distance away lies the village of Possagus, the birthplace of Canova. Pop. (1902) 15,443.

Bassein, băs-sān', India, a decayed town in the presidency of Bombay, at the south end of a small island of the same name, 28 miles north of Bombay, and separated from the Island of Salsette by a narrow channel. It was fortified by the Portuguese in 1536, and remained in their possession until captured by the Mahrattas in 1739. During this period it rose to be a fine and wealthy city of over 60,000 inhabitants, with many stately buildings, including a cathedral, 5 convents, 13 churches, and handsome private residences. Pop. (1901) about 11,000.

Bassein, Burma, a town in the Irrawaddy division on the left bank of the Bassein River, one of the mouths of the Irrawaddy, with a suburb on the right bank; lat. 16° 46′ N.; lon. 94° 48′ E. The English fort with the court-houses, treasury, police-office, etc., are on the left bank. In the suburb on the right bank are the rice-mills and store-yards of the principal merchants. The river is navigable up to the town for ships of the largest burden, and Bassein is now a place of considerable trade, exporting large quantities of rice, and importing coal, salt, cottons, etc. It is the seat of a consul of the United States. Pop. about 30,000.

Basselin, bäs-lăn, or **Bachelin, Oliver,** French poet: b. Val-de-Vire, Normandy, about 1350; d. about 1419. It has been asserted that the vocabulary of theatrical and poetical literature is indebted to him for the word «vaudeville.» He seems to have been a cloth-fuller or presser, much given to versified narration and iteration of convivial themes in rhymed fragments dubbed *vaux-de-vire* in honor of the poet's birthplace. In the 'Book of New Songs and Vaux-de-Vire' (1610) appears a collection of these bacchanalian stanzas, the most touching of which is addressed by the singer 'To My Nose,' the rubescence thereof being tastefully and exquisitely celebrated.

Basses-Alpes, bäs-ălp («lower Alps»), a department of France, on the Italian border. See ALPS.

Basses-Pyrénées, bäs-pē-rā-nā («lower Pyrenees»), a French department bordering on Spain and the Bay of Biscay. See PYRENEES.

Basset, a game of cards, formerly much played, especially in France. It is very similar to the modern faro. Severe edicts were issued against it by Louis XIV., and it was afterward played under the name of *pour et contre.* De

Moivre, in his 'Doctrine of Chances,' has calculated many problems connected with this game.

Basset-horn, a wooden wind-instrument (called also CORNET by reason of its curvature), believed to have been invented in Passau in 1770. It was afterward perfected by Theodore Lotz in Presburg. It is, properly considered, an enlarged clarinet; and, notwithstanding the difference of its form, it resembles that, not only in its qualities and tone, but also as regards its intonation, the mode of holding it, and fingering; so that every clarinet player can perform on it. Besides the mouthpiece it is formed of five pieces — the head-piece, two middle pieces, the trunk, and the bell, the last of which is usually of brass. It differs from the clarinet chiefly in having four additional low keys worked by the thumb of the right hand. Its compass is three and a half octaves, from lower F in the bass to double C of the treble. It is seldom used in the orchestra; though it is found in Mozart's 'Requiem' and some other pieces. It may also be used as a bass instrument.

Basset-hound, a dog with many hound-like characteristics, somewhat used for rabbit-hunting, clumsy in shape, and allied to the dachshund (q.v.). Its head is as massive and solemn-looking as that of a bloodhound, which it also resembles in the length of its ears. Its body is as bulky as that of a foxhound, to which it is also similar as regards color, hair and form, save that its fore legs are but four inches high and crooked at the knee. Below this point is a wrinkled ankle terminating in a massive paw, each toe of which stands out distinctly. Its coat is short, smooth, and fine, with the gloss of a thoroughbred race-horse; and its colors are black and white and tan. In weight it varies from 40 to 45 pounds. It is probably of French origin.

Basseterre, bäs-tār, the name of two towns in the West Indies. (1) The capital of the Island of St. Christopher's, a seaport situated at the mouth of a small river, on the south side of the island, and on the edge of the fertile vale of Basseterre, a tract yielding rich crops of sugar and fruits. The town was destroyed by fire in 1867, but has been rebuilt with better houses and wider streets than before. It is a place of considerable commercial importance, with a population of about 8,000. (2) The capital of the Island of Guadaloupe, situated near the south end of the island, and consisting of one principal long street stretching along the seashore. It is defended by forts Royal and Matilda. The anchorage is unsheltered and exposed to a constant swell. Pop. about 10,500.

Bas'sett, James, American missionary: b. Hamilton, Canada, 31 Jan. 1834. He was graduated at Wabash College 1856, and at Lane Theological Seminary 1859; was chaplain in the Union army 1862–3; and later pastor of Presbyterian churches in Newark and Englewood, N. J. In 1871 he went to Persia as a missionary, and in a short time acquired such a familiarity with the language that he composed a volume of hymns in Persian ('Teheran,' 1875; 1884). Other of his writings are: 'Among the Turcomans' (contributed to the 'Leisure Hour,' 1879–80); 'Note on the Simnuni Dialects ('Journal of the Royal Asiatic Society,' 1884); 'Persia, the Land of the Imams' (N. Y. 1886). He has also translated the Gospel of St. Matthew into Gaghatti Tartar (London 1880).

Bassett, John Spencer, American historian: b. Tarboro, N. C., 10 Sept. 1867. He was graduated at Trinity College, Durham, N. C., in 1888, and took Ph.D. at Johns Hopkins in 1894. His works include 'Constitutional Beginnings in North Carolina'; 'Slavery and Servitude in the Colony of North Carolina'; 'Anti-Slavery Leaders of North Carolina'; 'Slavery in the State of North Carolina'; 'The War of the Regulation,' etc. In 1900 he was professor of history in Trinity College, N. C.

Bassford, William Kipp, American musician: b. New York, 23 April 1839. He has composed many songs and pianoforte numbers: as, Mass in E flat (1894), and a two-act opera, 'Casilda,' still in manuscript. He completed the opera 'Estrella,' left unfinished by the composer, William Vincent Wallace, at his death.

Bassi, bäs'sē, **Laura Maria Caterina,** Italian philosopher: b. Bologna, 29 Oct. 1711; d. 20 Feb. 1778. She received a doctor's degree as an acknowledgment of her attainments, and delivered public lectures on experimental philosophy. She also lectured in the Philosophical College, where she was appointed professor. Her correspondence with the most eminent scholars of Europe was very extensive. She married Giuseppe Verrati in 1738 and had several children.

Bassi, bäs'sē, **Ugo,** Barnabite monk, and distinguished Italian patriot: b. Cento, in the Roman states 1804, of an Italian father and Greek mother. He was much distinguished among the brethren for his extraordinary learning and talents. The liberality of his political opinions, however, rendered him obnoxious to the papal court, and he was sent into exile in Sicily, from which he returned on the accession of Pius IX. in 1846. On the breaking out of the Lombard revolution in 1848 he greatly distinguished himself by his valor in battle and his untiring services in the hospitals. On the capitulation of Treviso he went to Venice, where he fought in the ranks against her Austrian besiegers. Thence he went to Rome and joined Garibaldi's legion as chaplain. On the fall of Rome he was one of those who followed Garibaldi when he made a last attempt to fight his way to Venice, which still held out against the Austrians. The little band was, however, dispersed and cut up by Austrian troops, and Garibaldi himself escaped with great difficulty. Bassi was taken prisoner, carried to Bologna, and condemned to death 18 Aug. 1849. He was the author of a work on 'The Church After the Image of Christ,' and an unfinished poem called 'Constantine, or the Triumph of the Cross.' His talents were universal. He was an accomplished musician and composer, wrote his own language in remarkable perfection, and was a perfect master of Greek, Latin, English, and French. He was equally remarkable for his personal beauty and his eloquence as an *improvisatore,* while his memory was so prodigious that he is said to have been capable of reciting the whole of Dante's 'Divina Commedia.'

Bassia, a genus of tropical trees found in the East Indies and Africa, of the natural order *Sapotaceæ.* One species (*B. parkii*) is supposed to be the shea-tree of Park, the fruit of which

yields a kind of butter that is highly valued and forms an important article of commerce in the interior of Africa. There are several other species, of which *B. longifolia,* or Indian oil-tree, and *B. butyracea,* or Indian butter-tree, are well known examples, yielding a large quantity of oleaginous or butyraceous matter. The wood is as hard and incorruptible as teak. See also BUTTER-TREE.

Bassompierre, bä-sôñ-pē-ār, **François** (fräṅ-swär) **de,** marshal of France, one of the most distinguished men of the courts of Henry IV. and Louis XIII., descended from a branch of the house of Clèves: b. Lorraine, 1579; d. 1646. In his youth he studied philosophy, jurisprudence, medicine, and the military art. After traveling through Italy he appeared at the court of Henry IV., where his taste for splendor, play, and gallantry soon made him conspicuous. In 1600 he made his first campaign against the Duke of Savoy, and fought with equal distinction in the following year against the Turks. His love of France soon called him back; he aspired to the hand of the daughter of the Constable de Montmorency, whose charms had excited the most violent passion in Henry IV. Bassompierre yielded to the solicitations of his king and renounced his intended union with her. In 1622 Louis XIII. appointed him marshal of France, and became so much attached to him that Luynes, the declared favorite, alarmed at his growing influence, insisted upon his removal from court. Bassompierre therefore accepted an embassy, and held this position successively in Spain, Switzerland, and England. After his return he entered again into the military service and was present at the siege of Rochelle and Montauban. Cardinal Richelieu, who soon after obtained entire control of the king and the country, feared the boldness of Bassompierre and his secret connection with the house of Lorraine; and the machinations of the latter served him as a pretext for sending Bassompierre, in 1631, to the Bastille, from which he was not released till 1643, after the death of the cardinal. During his detention he occupied himself with his memoirs (first published at Cologne, 1665), and the history of his embassies in Spain, Switzerland, and England, which sheds much light on the events of that time.

Bassoon′, a wooden reed instrument which forms the natural bass to the oboe, serving as a continuation of its scale downward. The reed is fixed to a crooked mouthpiece issuing from the side of the bassoon. The holes are partly closed by the fingers, partly by means of keys. It was formerly used as an accompaniment to the oboe, but it is now so far improved with keys as to be susceptible of being played solo. Its compass is more than three octaves, from low B flat to A flat in the treble; but its scale is complicated, and much depends upon the player and even upon the individual instrument. It consists of four tubes (besides the mouthpiece), bound together somewhat like a fagot. Hence the Italians term it *fagotto,* and from them the Germans *fagott.* It forms, when put together, a continuous tube about eight feet long, but as the bore is bent abruptly back on itself its height is only about four feet. In music designed for wind-instruments it often forms the bass. It is capable of very fine effects, and has been much employed by some of the best composers, sometimes as a tenor or even alto instrument.

Bassora, bäs-sō′rä, or **Basrah,** bäs′rä, Turkey, a city situated between two and three miles on the west side of and on a navigable canal leading from the Shat-el-Arab, as the united stream of the Tigris and Euphrates is called, about half way between the Persian Gulf and the junction of the two rivers. The Shat-el-Arab is navigable for vessels of 500 tons to Bassora, 70 miles. Merchants from Arabia, Turkey, Armenia, and Greece, also Jews and Indians, reside here, and it is the station of a United States consul. The Arabs are more numerous than the Turks, and their language is chiefly spoken. The city is surrounded by a wall about 10 miles in circuit, 20 to 25 feet thick. The houses are generally mean, partly constructed of clay, and the bazaars are miserable edifices. A considerable trade is carried on. Mail steamers run between Bombay and Bassora, and there are also other steamers trading here. Dates form the principal export; camels and horses, galls, gum, carpets, wool, and wheat are also exported; total exports over $5,000,000 annually. The imports are coffee, rice, spices, textiles, etc. The trade of the interior is conducted by means of caravans. The town is dirty and unhealthy; the environs are very fertile. The modern Bassora arose in the 17th century, and does not occupy the site of the older town, whose ruins lie about nine miles southwest of it. Pop. about 30,000. The vilayet of Bassora has an area of 16,482 square miles, and a population of about 200,000.

Bassora Gum, a gum brought from Bassora; supposed to be derived either from a cactus or a mesembryanthemum.

Bassorin, a kind of mucilage found in gum tragacanth (sometimes called adraganthin), which forms a jelly with water but does not dissolve in it. A clear, aqueous-looking liquid, apparently of the nature of Bassorin, exists in the large cells of the tubercular roots of some terrestrial orchids of the section *Ophyreæ.* It is formed of minute cells, each with its cytoblast; the whole being compactly aggregated in the interior of the parent cell.

Bassville, bäs-vēl, **Nicolas Jean Hugon de,** French journalist and diplomatist. As editor of the *Mercure National* he attracted attention to himself and was appointed secretary to the legation at Naples in 1792. Soon after this he was despatched to Rome, where he was killed, in 1793, by the populace for attempting, under orders of the French government, to oblige all French residents to wear the tricolor cockade. The death of Bassville has furnished the subject for many compositions in both prose and verse, in French and Italian.

Basswood, the American linden, or lime-tree (q.v.).

Bast, or **Bass,** the thin layer of fibrous tissue formed by, but outside the layer of cambium (q.v.), or in popular phrase the inner bark of dicotyledonous shrubs and trees. Less frequently it occurs in the leaves and pith of dicotyledonous herbs and in the stems of certain monocotyledonous plants in which it is not easily distinguished from the wood. By extension the term is also applied to the phloem portion

of the vascular system (q.v.) of flowering plants and ferns. For the plant, as well as for mercantile purposes, bast is highly important, for until it becomes changed into wood, it conducts the elaborated food from the green tissue to regions of use or storage. The bast cells are disposed and developed variously in different plants; occurring in rows, wreaths, more or less spread bundles, or single within the parenchyma. In some plants bast is formed but once, in others every year. Some fibres are simple, others branched; some primary, others secondary; some ever limber, and some change to wood. They are most developed toward the outside of the stem. While young they contain a granulary liquid, which disappears by the thickening of their walls. Young bast cells when treated by a solution of iodine and chloride of zinc, become pale blue, the older ones violet, the full-grown pink. Thickened cells are plainly stratified, and their walls often become contiguous by the disappearance of the cavity. The walls exhibit various designs, spiral or other lines, more or less constantly, according to the species of the plant. By microscopical examination and chemical analysis the nature of the various fabrics made of bast may be determined. Thomson and F. Baur have thus demonstrated the sheets around Egyptian mummies to be of linen. The degree of contraction, of twisting, the length, density, and form of the single cells of the bast vary in different plants. They are very long in flax, hemp, in some nettles, spurges, etc., very short in cinchona. Cotton consists of long hairs, and not of bast cells, which it very much resembles otherwise. The bast cells of monocotyledenous plants are mostly lignified. They conduct elaborated food but a short time, become filled with air, and thus dead to the plant. The unlignified are very hygroscopic and often contain chlorophyll. No bast cell has pits, but the coniferæ have sieve pores or canals. The uses of bast are manifold. Flax bast is soft, flexible, seldom with swellings; hemp bast is very long, stiffer and thicker than flax, more stratified; nettle (*Urtica dioica*) bast resembles cotton, has swellings and is thicker than hemp. Branched and lignified bast cells of great beauty are found in the mangrove tree (*Rhizophora mangle*) and the secondary ones of *Abies pectinata*. Among the monocotyledonous bast fibres, those of the New Zealand flax (*Phormium tenax*) are the most remarkable, being formed in bundles near the margin of leaves. They resemble hemp, are very white, sometimes yellowish, very long, and contain much lignin, in consequence of which they are somewhat stiff, but very tough and fit for stout ropes. In palms a highly developed body of lignified bast surrounds the vascular bundles, while bast bundles are found also in the bark, leaves, and interior of the stem. A similar disposition exists in the *Dracaena reflexa*, and in some *Aroideæ*. Everybody knows the tenacity of the bast of the lime tree, which is hence called basswood. The Chinese grass-cloth is made of *Boehmeria nivea* or *B. tenacissima*. Manila hemp comes from *Musa textilis;* rice bags are made in East India from *Antiaris toxicaria*. From the use of bast in ancient times for writing upon, the Latin name of bast, *liber*, has been applied to designate book. See also Fibre; Flax; Hemp; Jute; Ramie.

Bast, in Egyptian mythology, a goddess represented with the head of a cat or lioness. Bubastis, in Egypt, was the city where she held a high place, similar to that of Neith in Sais. Nearly a million Egyptians made annual pilgrimages to her shrine. Great numbers of bronze images of Bast were purchased in Bubastis.

Bastable, C. F., Irish political economist: b. Charleville, County Cork, Ireland, 1855, and since 1882 a professor of political economy in Dublin University. He is the author of 'An Examination of Some Objections to the Study of Political Economy' (1884); 'The Commerce of Nations' (1892); 'Public Finance' (1895); 'The Theory of International Trade' (1897).

Bastar, a feudatory state of British India, joined with the Chanda district of the Central Provinces. It has an area of 13,062 square miles. Pop. (1891) 310,884.

Bastard, one begotten and born out of lawful wedlock, or born during wedlock where the husband was under the age of puberty, or where the husband had died at such a time that there was no possibility of his being the father, or where there was no possibility of access on the part of the husband on account of his absence from the country, or where the husband labored under a disability due to some natural infirmity.

The Romans distinguished two kinds of natural children — *nothi,* the issue of concubinage, and *spurii,* the children of prostitutes; the former could inherit from the mother, and were entitled to support from the father; the latter had no claims whatever to support. Both were often raised to all the rights of legitimate children by affiliation. The Athenians treated all bastards with extreme rigor. By the laws of Solon, they were denied the rights of citizenship, and a law of Pericles ordered the sale of 5,000 bastards as slaves. What rendered these regulations more severe was, that not only the issue of concubinage and adultery, but all children whose parents were not both Athenians, were considered bastards at Athens. Thus Themistocles, whose mother was a native of Halicarnassus, was deemed a bastard. The law, as might be expected, was often set aside by the influence of powerful citizens. Pericles himself had it repealed in favor of his son by Aspasia, after he had lost his legitimate children by the plague. The condition of bastards has been different in different periods of modern history. Among the Goths and Franks, they were permitted to inherit from the father. Thiery, the natural son of Clovis, inherited a share of his father's conquests. William the Conqueror, natural son of Robert I., Duke of Normandy, and of Arlette, daughter of a furrier of Falaise, inherited his father's dominions. He called himself *Willelmus, cognomento Batardus.* The celebrated Dunois styled himself, in his letters, the Bastard of Orleans. In Spain, bastards have always been capable of inheriting. The bastardy of Henry of Transtamare did not prevent his accession to the throne of Castile. In France, the condition of bastards was formerly very different in the different provinces. Since the Revolution, it has been regulated in a uniform manner by the general law of the kingdom. The *code civil* thus fixes their rights: If the father or mother leave legitimate descendants, the bastard is entitled to one third of the portion he would

have inherited had he been a lawful child; if the father or mother die without descendants, but leave ascendants, or brothers or sisters, he is then entitled to one half of such a portion; if the father or mother leave no ascendants nor descendants, nor brothers nor sisters, he is entitled to three quarters of such a portion; and if the father or mother leave no relations within the degrees of succession, he is entitled to the whole property. These regulations do not apply to the issue of an incestuous or adulterous connection.

By the common law of England, a child born after marriage, however soon, is legitimate, or at least he is presumed to be so; for one born in wedlock, and long enough after the marriage to admit of the period of gestation, may still be proved illegitimate, under some circumstances, and this is the general rule in the United States. According to the common law, a bastard is not the heir of any one; and, on the other hand, his only heirs are his children born in wedlock, and their descendants. According to the Roman law, one born out of wedlock might be legitimated by subsequent marriage and acknowledgment of his parents. In 1236 the English prelates proposed the introduction of the Roman law, in this respect, into England, to which the nobility made the celebrated reply, *Nolumus leges Angliæ mutare* (We are unwilling to change the laws of England). See Schouler, 'Treatise on the Law of Domestic Relations.'

Bastard Bar, the ordinary name given to the heraldic mark used to indicate illegitimate descent. Properly speaking, it is not a bar at all, which is a band stretching horizontally across the shield, but a baton sinister; that is, it stretches diagonally across the shield in the direction of the sinister chief and the dexter base, but is couped or cut short at the ends, so as not to touch the corners of the shield. This circumstance serves to distinguish the bastard bar from the bend sinister, as well as the fact that the former is only one fourth of the breadth of the latter. When belonging to the illegitimate descendants of royalty it may be of metal; but in other cases it must be of color, even when on another color. This mark in heraldry is of comparatively recent origin, bastards in earlier times, not having been allowed to bear the arms of their fathers. It cannot be removed until three generations have borne it, and not even then unless replaced by some other mark assigned by the king of arms, or unless the coat is changed. Sometimes permission was granted to a bastard or one of his descendants to bear it dexter instead of sinister, although he was not allowed to cancel it altogether.

Bastard of Orleans, the name given to the natural son of Louis, brother of Charles VI. of France, Jean Dunois b. 1402; d. 1468. On account of his exploits in the Hundred Years' war he was created Count of Orleans.

Bastarnae, the earliest Teutonic people mentioned in history. They migrated from the region of the Vistula to the Lower Danube about 200 B.C. See Keane, 'Man: Past and Present' (1899).

Bastia, the former capital of the island of Corsica, 98 miles northeast of Ajaccio by rail. It is badly built, has narrow streets, a strong citadel near the sea, and a spacious but not very well sheltered harbor. The inhabitants carry on a considerable trade in manufactured goods, hides, wine, oil, wax candles, liquors, and maccaroni. The stilettoes manufactured here are held in great esteem by the Italians. In 1745 Bastia was taken by the British, and in 1768 was united with France. On the new division of the French territories (1791) Bastia was made the capital of the department of Corsica, of which at present Ajaccio is the capital. Bastia is still, however, the commercial and industrial capital of the island and a United States consul is stationed here. Pop. (1900) 22,522.

Bastian, Adolf, German traveler and anthropologist: b. Bremen, 26 June 1826. He has made extended journeys throughout Australia, Asia, America, and West Africa at various periods of his career, and his explorations have been prosecuted in such widely sundered countries as Yucatan, New Zealand, and Persia. At the age of 70 he started on an exploring voyage to the Malay Archipelago. He has been professor of ethnology in the University of Berlin, director of the Museum für Völkerfunde, and in 1901 became editor of the 'Ethnographisches Notizblatt,' published in Berlin. His nearly 60 works deal with the various aspects of anthropology, his range being broad and his services in behalf of science of the greatest value. Among his many volumes may be named 'Der Mensch in der Geschichte' (1860); 'Ethnographische Forschungen' (1871–3); 'Der Buddhismus in seiner Psychologie' (1882); 'Der Fetisch an der Küste Guineas' (1884); 'Vorgeschichtliche Schöpfungslieder' (1893); 'Die Nikronesischen Kolonien' (1899–1900); 'Die Völkerkunde und der Völkerwerkehr' (1900).

Bastian, Henry Charlton, English physician and biologist: b. Truro, 26 April 1837. He obtained the degree of M.A. in 1861 from the University of London, graduating subsequently in medicine at the same university. In 1864–6 he was a medical officer in Broadmoor Criminal Lunatic Asylum, and in the latter year was appointed lecturer on pathology and assistant physician in St. Mary's Hospital. In 1867 he became professor of pathological anatomy in University College, and in 1878 he was also appointed professor of clinical medicine. In 1887–95 he was professor of the principles and practice of medicine. Apart from numerous contributions to medical and other periodicals, and to Quain's 'Dictionary of Medicine,' his works include 'The Modes of Origin of Lowest Organisms' (1871); 'The Beginnings of Life' (1872); 'Evolution and the Origin of Life' (1874); 'Lectures on Paralysis from Brain Disease' (1875); 'The Brain as an Organ of Mind' (1880), which has been translated into French and German; 'Paralysis: Cerebral, Bulbar, and Spinal' (1886); 'A Treatise on Aphasia and other Speech Defects' (1898). He is a recognized authority in the pathology of the nervous system and an advocate of the doctrine of spontaneous generation.

Bastiat, Frédéric, a distinguished French political economist: b. Bayonne, 19 June 1801; d. Rome, 24 Dec. 1850. He entered in 1818 the counting-house of his uncle at Bayonne, but he

felt no enjoyment in the routine of mercantile life, and in 1825 retired to a property at Mugron, of which he became possessor on the death of his grandfather. Thus withdrawn from society he devoted himself with eagerness to meditation and study, mastering the English and Italian languages and literatures, speculating on the problems of philosophy and religion, and digesting the doctrines of Adam Smith and Say, of Charles Compte and Dunoyer. In 1845 he came to Paris in order to superintend the publication of his 'Cobden et la Ligue, ou l'agitation Anglaise pour la liberté des échanges,' and was very cordially received by the economists of the capital; from Paris he went to London and Manchester, and made the personal acquaintance of Cobden, Bright, and other leaders of the league. When he returned to France he found that his writings had been exerting a powerful influence; and in 1846 he assisted in organizing at Bordeaux the first French Free Trade Association. He wrote in rapid succession a series of brilliant and effective pamphlets and essays, showing how socialism was connected with protection, and exposing the delusions on which it rested. While thus occupied he was meditating the composition of a great constructive work, meant to renovate economical science by basing it on the principle that "interests left to themselves tend to harmonious combinations, and to the progressive preponderance of the general good." The first volume of this work, 'Les Harmonies Économiques,' was published in the beginning of 1850. The life work of Bastiat, in order to be fairly appreciated, requires to be considered in three aspects. (1) He was the advocate of free trade, the opponent of protection. The general theory of free trade had, of course, been clearly stated and solidly established before he was born, and his desire to see its principles acted on in France was quickened and confirmed by the agitation of the Anti-Corn-Law League for their realization in England, but as no one denies it to have been a great merit in Cobden to have seen so distinctly and comprehensively the bearing of economical truths which he did not discover, no one should deny it to have been also a great merit in Bastiat. He did far more than merely restate the already familiar truths of free trade. He showed as no one before him had done how they were applicable in the various spheres of French agriculture, trade, and commerce. Now the abstract theory of free trade is of comparatively little value; its elaboration so as to cover details, its concrete application, and its varied illustration are equally essential. And in these respects it owes more, perhaps, to Bastiat than to any other economist. In the 'Sophismes Économiques' we have the completest and most effective, the wisest and the wittiest exposure of protectionism in its principles, reasonings, and consequences which exists in any language. (2) He was the opponent of socialism. In this respect also he had no equal among the economists of France. He alone fought socialism hand to hand, body to body, as it were, not caricaturing it, not denouncing it, not criticising under its name some merely abstract theory, but taking it as actually presented by its most popular representatives, considering patiently their proposals and arguments, and proving conclusively that they proceed on false principles, reasoned badly, and sought to realize generous aims by foolish and harmful means. Nowhere will reason find a richer armory of weapons available against socialism than in the pamphlets published by Bastiat between 1848 and 1850. These pamphlets will live, it is to be hoped, at least as long as the errors which they expose. (3) He attempted to expound in an original and independent manner political economy as a science. In combating first the protectionists and afterward the socialists, there gradually rose on his mind a conception which seemed to him to shed a flood of light over the whole of economical doctrine, and, indeed, over the whole theory of society, namely, the harmony of the essential tendencies of human nature. The radical error, he became always more convinced, both of protectionism and socialism, was the assumption that human interests, if left to themselves, would inevitably prove antagonistic and anti-social, capital robbing labor, manufactures ruining agriculture, the foreigner injuring the native, the consumer the producer, etc.; and the chief weakness of the various schools of political economy, he believed he had discovered in their imperfect apprehension of the truth that human interests, when left to themselves, when not arbitrarily and forcibly interfered with, tend to harmonious combination, to the general good. Such was the point of view from which Bastiat sought to expound the whole of economical science. The sphere of that science he limited to exchange, and he drew a sharp distinction between utility and value. Political economy he defined as the theory of value, and value as "the relation of two services exchanged." The latter definition he deemed of supreme importance. It appeared to him to correct what was defective or erroneous in the conflicting definitions of value given by Adam Smith, Say, Ricardo, Senior, Storch, etc., to preserve and combine what was true in them, and to afford a basis for a more consistent and developed economical theory than had previously been presented. It has, however, found little acceptance, and Roscher, Cairnes, and others seem to have shown it to be ambiguous and misleading. A consequence of it on which he laid great stress was that the gratuitous gifts of nature, whatever be their utility, are incapable of acquiring value — what is gratuitous for man in an isolated state remaining gratuitous in a social condition. Thus, land, according to Bastiat, is as gratuitous to men at the present day as to their first parents, the rent which is paid for it,— its so-called value,— being merely the return for the labor and capital which have been expended on its improvement. In the general opinion of economists he has failed to establish this doctrine, failed to show that the properties and forces of nature cannot be so appropriated as to acquire value. His theory of rent is nearly the same as Carey's, that is, decidedly anti-Ricardian. His views on the growth of capital and interest, on landed property, competition, consumption, wages, and population, are independent, and, if not unqualifiedly true, at least richly suggestive.

Bastide, Jules, French statesman: b. Paris, 21 Nov. 1800; d. 1879. Early a democrat, he could never cease to labor for the downfall of the Bourbon monarchy, and fought hard in the revolution of July 1830. He was also opposed to the Orleans monarchy. Condemned to

death for his share in the insurrection of 5 June 1832, he escaped from prison and fled to England, where he resided two years. He returned in 1834, and was acquitted. After the death of Armand Carrel he became chief editor of the *National* newspaper. This place he resigned in 1846 and founded the *Revue Nationale* in 1847. He rendered great assistance to Lamartine in the office of the ministry of foreign affairs, and was minister for foreign affairs from 10 May to 20 Dec. 1848. He retired to private life after the *coup d'etat* of 1852. He was the author of 'La république française et l'Italie en 1848' (1858); 'Guerres de religion en France' (1859).

Bastien-Lepage, bäst-yen'-le-päzh, **Jules,** French painter: b. Damvilliers, 1 Nov. 1848; d. 10 Dec. 1884. He studied under Cabanel, and early began to attract notice by his impressionist pictures in the Salon. Some of his more important works were 'In Spring,' 'The First Communion,' 'The Shepherds,' 'The Potato Harvest,' 'The Wheat-field,' 'The Beggar,' and 'Joan of Arc Listening to the Voices.' His most striking portraits were those of his grandfather, his father and mother, Sarah Bernhardt, André Theuriet, and the Prince of Wales. He was made a chevalier of the Legion of Honor in 1879. See Theuriet, 'J. Bastien-Lepage, l'homme et l'artist' (1885).

Bastile, the state prison and citadel of Paris, built to protect the palace of Charles V. against the incursions of the Burgundians, and destroyed by the mob in the beginning of the Revolution in 1789, after an existence of over four centuries. It was founded by Hugues d'Aubriot in 1369, and completed by the addition of four towers in 1383.

Lettres de cachet were issued in the name of the king, but the names of the individuals were inserted by the ministers, who were the depositaries of these letters. Of the origin of this custom we may perhaps find the explanation in Montesquieu's Esprit des Lois, where it is said, «Honor is the virtue of monarchies, and often supplies its place.» A nobleman was unwilling to be dishonored by a member of his family. Filial disobedience and unworthy conduct were probably not more uncommon among the nobility of France than elsewhere. But in such cases fathers and relations often requested the confinement of the offender until the head of the family should express a wish for his release. At first this privilege was limited to the chief families of the country. The next step was, that the ministers of government considered themselves entitled to the same privileges as heads of families among the nobility. If an offense was committed in their offices or households, which, if known, would have cast a shadow upon the ministers themselves, they arrested, *motu proprio,* the obnoxious individuals, and often made use of their privilege to put out of sight persons whose honest discharge of duty had excited their displeasure, or who were acquainted with facts disgraceful to the ministers themselves. It sometimes happened that no further examination of the prisoners was held, and the cause of their detention nowhere recorded. In such cases an individual remained in prison sometimes 30 or 40 years, or even till his death, because succeeding officers took it for granted that he had been properly confined, or that his imprisonment was required for reasons of state. The invention of the *lettres de cachet* immediately opened the door to the tyranny of ministers and the intrigues of favorites, who supplied themselves with these orders, in order to confine individuals who had become obnoxious to them. These arrests became continually more arbitrary, and men of the greatest merit were liable to be thrown into prison whenever they happened to displease a minister, a favorite, or a mistress. On 14 July 1789 the Bastile was surrounded by a tumultuous mob, who first attempted to negotiate with the governor Delaunay, but when these negotiations failed, began to attack the fortress. For several hours the mob continued their siege without being able to effect anything more than an entrance into the outer court of the Bastile; but at last the arrival of some of the Royal Guard with a few pieces of artillery forced the governor to let down the second drawbridge and admit the populace. The governor was seized, but on the way to the hôtel de ville was torn from his captors and put to death. The next day the destruction of the Bastile began, and a bronze column now marks its site. The event considered by itself was of no great national importance, but it marked the beginning of the French revolution.

Much exaggeration took place in relation to the discoveries said to be made in its demolition, especially those in relation to one Count de Lorges; but it is sufficiently established that there was no such person in existence, much less in the Bastile. No exaggeration, however, was needed. Seven persons only were found in its cells and dungeons; one, the Count de Solage, a prisoner since his 11th year; another, Tavernier, the son of Paris Duverney, who, after 10 years at the Isles Marguerites, had passed 30 years in the Bastile, and who reappeared on his liberation, bewildered, with a broken intellect, like a man awakened from a sleep of 40 years, to a new world compared with that on which he had closed his eyes. Records of horrors even worse than this were found inscribed on the registers of the prison. Two will suffice. They are the names of Father Theodore Fleurand, of Brandenburg, a Capuchin, retained many years on suspicion of being a spy; and of one Lebar, arrested at 76 and dead at 90 years. Nearly 50 years before Cagliostro scrawled on the walls of his cell: «The Bastile shall be demolished, and the people shall dance on the area where it stood.» This prophecy, at least, of the empiric and impostor, was realized to the letter. It was the Carmagnole which they danced about the liberty trees to the tune of the 'Ça Ira.' See Arnold, 'Histoire de la Bastile' (1845–59); Bingham, 'The Bastile' (1888); Funck-Brentano, 'The Bastile' (1900).

Bastinado, a punishment employed by the Turks, which consists of blows upon the back or soles of the feet, applied with a light wooden stick or with a knotted string.

Bastion, a flanking tower in mediæval fortification, from which archers and war machines could direct their projectiles on the storming enemy while he was held in check by the ditch. On the introduction of artillery into Europe towers were made considerably larger than formerly, and ultimately, in the beginning

of the 16th century, the Italian engineers made them polygonal instead of round or square, thus forming a bastion. This is an irregular pentagon, one side of which is turned inward toward the tower, so that the opposite salient angle faces the open field. The two longer sides, enclosing the salient angle, are called the faces; the two shorter ones, connecting them with the town wall or rampart, are called the flanks. The faces are destined to reply to the distant fire of the enemy, the flanks to protect the ditch by their fire. The first Italian bastions still showed their descent from the ancient towers. They kept close to the main walls; the salient angle was very obtuse, the faces short, and the parapet revetted with masonry to the very top. Bastions are built in very different ways. Some are entirely filled with earth; some have a void space inside; some are straight, some curved, some double, some have even three or four flanks, one over the other; some have *fausse-brayes*, or low ramparts of earth outside; sometimes they have casemates, destined for the retreat of the garrison, or for batteries; sometimes cavaliers or orillons, etc. In modern times, among the fortifications built according to the system of bastions, those on the plan of Cormontaigne and the modern French works, are considered best adapted for defense. They are spacious; the flank of the side bulwark, which is perpendicular to the prolongation of the face of the principal bulwark, is not farther distant than 300 paces from its point; it is also straight, and orillons and other artificial contrivances are banished.

Baston, Robert, English poet: b. in the 13th century near Nottingham; d. about 1320. He became prior of a Carmelite convent at Scarborough, and is said to have accompanied Edward II. into Scotland, with the view of celebrating the anticipated victories of his sovereign, but having been taken prisoner, was compelled to change his strain, and wrote in honor of Robert Bruce. Besides poetry he left several works in Latin, one entitled 'De Variis Mundi Statibus,' and another, 'De Sacerdotum Luxuriis.'

Bastwick, John, English physician: b. Writtle in Essex, 1593; d. 1654. He settled at Colchester, but instead of confining himself to his profession entered keenly into theological controversy, and in 1624 procured the publication in Holland of a treatise which he had written, entitled 'Elenchus Religionis Papisticæ,' which, as he declares on the title-page, he proves it to be neither apostolic nor catholic, nay, not even Roman. He afterward published 'Flagellum Pontificis et Episcoporum Latialium,' which acquired some notoriety as a fervid attack on Episcopacy in general, and attracted the attention of the high-commission court, who called the author before them, and condemned him to a fine and two years' imprisonment. Bastwick became more zealous than before, however, and published a defense addressed to the English prelates and a new "litany," in which his former offenses were boldly repeated. A second sentence mercilessly condemned him to a much heavier fine, to exposure on the pillory, the loss of his ears, and imprisonment for life. The ascendency of the Parliament in 1640 procured his freedom; the sentence was formally repealed, and the amount of the fines imposed on him was afterward refunded. He appears to have been a stanch Presbyterian, for in 1648 we find him attacking the Independents.

Basutoland, an English crown colony of South Africa, lying to the east of the Orange River Colony, and on the northeast of Cape Colony. The Basutos belong chiefly to the great stem of the Bechuanas, out of one of the chief branches of whom, along with the survivors of various other Caffre tribes, they have arisen. Their countenance is better formed than that of the negroes, although they have the flat nose, protruding lips, and woolly hair of the latter. Their figure is slender and well-proportioned, the color of their skin a very dark brown, and their disposition cheerful, mild, and pacific. Their land, called by themselves Lesuto, is very fertile, and is cultivated with great industry; but its fertility has long exposed them to the encroachments of their neighbors. Under their chief Moshesh, who died in 1869, they were raised from a state of utter barbarism to a certain degree of civilization, and the land was thrown open to missionaries. Being exposed, however, to constant attacks of their warlike neighbors, Moshesh was at last induced to request the English government to adopt them as subjects. This was acceded to, and in 1868 Basutoland was declared English territory, being annexed to Cape Colony in 1871. In 1884, however, Basutoland was placed under the direct authority of the home government. It has an area of about 10,300 square miles, and the exports, which consist chiefly of grain, cattle, and wool, in 1900 amounted to $669,320. Pop. (estimated) about 260,000. See Widdicombe, 'Fourteen Years in Basutoland' (1892); Barkley, 'Among Boers and Basutos' (1900); Bryce, 'Impressions of South Africa (1899).

Bat, one of a group (order *Cheiroptera*) of small mammals adapted to life in the air by the possession of wings formed of a membrane stretched between the greatly prolonged bones of the arm and hand. The general organization of bats allies them to the *Insectivora*. The bones of the spine, hinder limbs, and tail are of a normal character; the chest is much enlarged to admit of the increased size of the lungs and heart, necessary to the relatively violent exertion necessary to flight, the breast bone is keeled as in birds, and the muscles of the fore limbs are much enlarged. The fore limbs themselves consist of the normal number and arrangement of bones, but all are greatly elongated, especially those of the fingers, which are so lengthened out as often to be equal to the total length of the spine. The thumb, however, is comparatively small, stands at right angles to the other bones, and terminates in a strong claw of great service in clinging to supports. The whole extent of the arm and hand in the bats is inclosed within a membrane which consists of leathery skin, more or less furry upon the outside, which stretches between the fingers, arm bones and body, forming an extensible membrane, or parachute, and constituting an effective instrument of flight. In some bats a similar membrane (which is only an extension of the skin and is of double thickness) stretches from the heel of each hind foot, where it is supported by a bony spur, to the tip of the tail, but in many bats the tail is free from any such mem-

1. Flap-nose Bat (Rhinopoma microphyllum).
2. Pigmy Bat (Vesperugo pipistrellus) (natural size).
3. Water Bat (Vespertilio daubentonii).
4. Horse-shoe Nose Bat (Rhinolophus ferrum-equinum),

brane. The tail is very variable in length, but is never prehensile nor bushy. The hinder limbs of bats are peculiar in being twisted in such a way that the knee bends backward, making walking very difficult.

The membranous wings of the bat are not only an organ of flight, enabling it to perform feats in the air probably not exceeded by any bird or insect, but are also a means of informing the creature as to its surroundings. Bats are mainly nocturnal and their eyes, though highly organized, are very small, imbedded in fur and comparatively useless in the dark, yet no animal seems more thoroughly wide awake and able to take care of itself, even in almost complete darkness, than this one, which habitually lives in gloomy caves and seeks its food only after daylight has departed. The ability which it displays in catching its prey by extraordinary agility in pursuit, and in avoiding obstacles as it darts about among the trees, seem to be due largely to an extreme sensitiveness in the wings. These are not only supplied with a great number of blood vessels and nerves, but their surfaces abound in minute sense-organs, each the terminus of a nerve fibrilla. This armature has evidently arisen as an added means of information, giving the animal a sense of touch more exquisite than we know of elsewhere in the animal kingdom. The well-known experiments of the Italian Spallanzani toward the end of the 18th century, which have been verified by more recent investigations, make it plain that bats depend very largely upon these sense-organs in their wings to guide them in their devious flight through the darkness. It was found that bats whose eyes were sealed up with varnish, or even completely destroyed, made their way with apparent ease not only through dark rooms, but in places where strings had been stretched across the path in various directions, and other obstacles had to be avoided. These blinded bats never collided with such obstructions, but seemed able to approach a wall at ease, alight upon a perch, or even find a small cavity without apparently searching for it.

For a similar purpose of information many bats are furnished with extraordinary membranous appendages upon the nostrils and ears, which give to some of them the most grotesque appearance. In the large fruit-eating fox-headed bats of the East Indies, which are more nearly diurnal than any others, the ears are of no great size, and the nose is defended only by long hairs about the nostrils and eyelids; but in all the smaller, insect-eating, nocturnal bats, there arise upon the nostrils leaf-like appendages, sometimes very large and complicated, which resemble the leathery substance of the wings, and in such species, the ears are often several times larger in area than all the rest of the face. These great ears must not only collect sounds far too faint for us to hear, but their membranes are as nervous and sensitive as those of the wings, probably being able to feel degrees of density in the air entirely imperceptible to most other creatures.

Bats are divisible into two groups or sub-orders, the *Megachiroptera*, and the *Microchiroptera*. The first group contains the fruit-eating bats whose large size, reddish fur, and fox-like head have given them the name of flying foxes (q.v.). Their chief distinguishing feature, however, is the fact that the molar teeth are not tubercular but are marked with a longitudinal furrow. They live mainly upon fruit and are confined to the tropics of the Old World, and are all included in a single family, *Pteropodidæ*. The *Microchiroptera* have molars with sharp cusps adapted to cutting and crushing the insects upon which they mainly subsist. This group includes all of the ordinary bats, of which those most familiar in North America and Europe belong to the large and typical family *Vespertilionidæ*, of which nearly 200 species are named. Among the most numerous and widespread of the North American bats, are the large hoary bat (*Lasiurus cinereus*) of the north eastern States: but it keeps to the woods and is not often seen; it migrates to the southern States in winter. It is about 5.50 inches long. Another common bat of the woods is the smaller, silver-haired (*Lasionycterus noctivagans.*) The red bat (length 4.40 inches) is numerous in the Alleghanian region, inhabiting caves in great companies; but the "common" bat of the whole country east of the Rockies, is the little, glossy, brown familiar of our homes and gardens, as well as of the woods, which remains with us the year around, hibernating during cold weather in the hollow trees, caves, and crevices about buildings, where they make their home, and whence they emerge at night, to seek their prey about our farmyards and gardens. As the insects caught are mainly mosquitos and similar pests, and as they do no harm, they should be encouraged, rather than feared and persecuted. "Awake at the most," says Cram, "some four out of every 24 hours of their drowsy little lives, they never make any nests or even attempt to fix over the crannies where they hide, and where the little bats are born. These helpless little things are not left at home at the mercy of foraging rats and mice. When the old bat flits off into the twilight, the youngsters often go with her, clinging about her neck. . . . At times, she deposits them on the branch of a tree, where they hang, sheltered by the leaves."

The lower Mississippi Valley has a yellowish bat, called "big-eared" (*Corynorhinus macrotis*) which differs from the others in that its great ears are joined together by their bases in front.

For a systematic account of the bats of the world consult Dobson, 'Catalogue of Chiroptera in the British Museum' (1878), and his subsequent papers, mentioned in Flower's 'Mammalia' (1891). For North American forms consult H. Allen, 'Bats of North America' (Smithsonian Institution, Washington, 1893). For habits, etc., see the writings of Harlan, Audubon, Baird, Godman, E. A. Mearns, C. L. Herrick, G. S. Miller, and especially C. H. Merriam, 'Mammals of the Adirondacks' (Linnæan Society, New York, 1893); Stone and Cram, 'American Animals' (1902); Gosse, 'A Naturalist's Sojourn in Jamaica' (1851). See also Fox-bat; Fruit-bat; Leaf-nosed Bats; Vampire, and similar titles.

Bat-parasites. Besides bugs (see Bed-bug) certain very strangely modified wingless flies are in rare cases found living on bats in Africa and the East Indies. They are somewhat spider like, with a narrow eyeless head, though four ocelli are present in some species, which rests on the back of the thorax, while the legs are large, long, and sprawling, ending in large claws. They are only a line or two in length.

The larva is, like that of the sheep-tick (q.v.) and horse-fly (*Hippobosca*), very peculiar, the maggot being probably nourished in the dilated oviduct of the fly, then attaining its full growth, when it is expelled in the shape of a broad, short puparium, the skin being hardened by the excretion of chitin.

Batabano, bạ-tä-bạ-nō′, Cuba, a town in the province of Havana near the south coast, 37 miles from Havana, by rail. San Cristobal de la Habana was founded on the site of the modern Batabano by Diego Velasquez in 1514. Pop. (1899) 1,025.

Batac, bạ-täk′, or **Batag,** Philippines, an island about one and a half miles off the northeast coast of Samar, the most northerly of that portion of the Philippine islands which goes under the designation of Visaya, or Bisaya. Area 18 square miles.

Batac, or **Batag,** Philippines, a town of Luzon in the province of Ilcos Norte, founded in 1587. It is situated 10 miles south of Laoag. Pop. (1898) 17,625.

Batak, bä′tạk, Bulgaria, a district and town southwest of Philippopolis. The region became prominent in European history in the time of the Bulgarian insurrection against Turkey in 1876. In May of that year the villagers of Batak were preparing to take part in the insurrection, when the place was attacked by a force of Bashi-Bazouks under the command of Achmet Agha of Dopat. After a short struggle, the village was surrendered and the inhabitants gave up their weapons, on the assurance of the Turkish commander that «not a hair of their heads should be touched.» On 9 May 1876 the Turks began one of the most cruel massacres recorded in history; the inhabitants of the unfortunate village were butchered and those who took refuge in the church were burned to death by the Turkish soldiers. Mr. Baring, the English commissioner, visiting the place two months later, found but one survivor, an old woman. The Turkish government rewarded Achmet with a decoration of honor. The news of the massacre at Batak and of other «Bulgarian atrocities,» aroused all Europe and furnished Russia with an excellent pretext for declaring war against Turkey in 1877. See also BULGARIA; SAN STEFANO, TREATY OF; TURKEY.

Bataleur, bạ-tạ-lėr′, a large, voluminously crested eagle of Africa, named *Helotarsus ecaudatus* with reference to the unusual shortness of its tail. It has the handsomest plumage of all the eagles, presenting bold contrasts of rich maroon, black, and gray, with bronzy reflections from the wings. It feeds mainly on lizards and snakes, attacking the latter, even when venomous, by blows of its powerful beak. Its breeding season, which is at the commencement of the hot weather when other birds are busy at other things, seems to be placed with reference to the greater ease with which snakes can then be captured, when the grass dies down or burns off, exposing them to view.

Batalha, bä-täl′ya, a village in Portugal, 69 miles north of Lisbon, famed for its Dominican convent, founded by King John I., in commemoration of a victory over the king of Castile in the year 1385. This convent is one of the most splendid buildings in Europe and is 576 feet long and 443 wide. Its church, in which lie the remains of the founder and the following three kings of the house of Aviz, as well as those of Prince Henry the Navigator, is a beautiful edifice, adorned with many art treasures.

Batan, bä′tạn, Philippines, a province of the island of Luzon, forming the peninsula between the bay of Manila and the China Sea; area, 450 square miles; chief town, Bolanga. It is noted for many excellent varieties of marble, which are extensively used in the churches and public buildings of Manila and other towns of the Philippines. The inhabitants of the towns and coasts of this province are of the Tagalog race, but, besides these, the mountain fastnesses are inhabited by numerous tribes of Negritos.

Batan, Philippines, a town on the island of Panay, in the province of Capiz, 31 miles from Capiz. Pop. (1898) 12,908.

Batan, or **Bashi Islands,** a group of small islands in the Chinese Sea, discovered by Dampier in 1687, and now forming a dependency of the Philippines, north of which they are situated, midway between Luzon and Formosa. American control was established over these islands in March 1900, with Teofilo Costillejo as first governor. The Batans are bounded on the north by Bashi Channel, which divides the Philippines from the Japanese insular territory, and have an area of 125 square miles and a population estimated at 9,500. The principal islands in the group are Itbayal, Basay, Saptan, and Hujos. Santo Domingo de Basco, the principal town and port, is about 500 miles from Manila, and has a population of about 3,000. The other large towns are San Bartolome de Calayan, San Carlos de Marigatao, San José de Ibana, Santa Maria de Mayan, and San Vicente de Saptan. Under Spanish rule Santo Domingo was the residence of a political military governor, a judge and an attorney-general.

Batangas, bạ-tän′gạs, Philippines, a town on the island of Luzon, 58 miles south of Manila. It was founded in 1581, and it situated on the large bay of Batangas, opening into the Strait of Mindoro. It is well-built, containing several spacious streets, in which are many elegant mansions. The city has an excellent harbor, and prior to the war between the United States and Spain was the seat of a large commerce. The province is one of the richest sugar growing districts in the Philippines; but the industry is far inferior to its possibilities owing to the lack of proper machinery and modern methods of treatment. It is also notable for its large production of cocoanut oil, the larger part of which is used for domestic purposes, chiefly lamp oil and lubricating machinery. Such of it as is exported to Europe, after being solidified, is manufactured into soap and candles. Pop. 39,358.

Batatas, bạ-tā′tạs. See SWEET POTATO.

Bata′vi, an old German nation which inhabited a part of the present Holland, especially the island called Batavia, formed by that branch of the Rhine which empties itself into the sea near Leyden, together with the Waal and the Meuse. Their territories, however, extended much beyond the Waal. Their bravery was commended by Tacitus. According to him, they were originally the same as the Catti, a German tribe which had emigrated from their country on

account of domestic troubles. This must have happened before the time of Cæsar. When Germanicus was about to invade Germany from the sea, he made their island the rendezvous of his fleet. Being subjected by the Romans, they served them with such courage and fidelity as to obtain the title of their friends and brethren. They were exempted from tributes and taxes, and permitted to choose their leaders among themselves. Their cavalry was particularly excellent. During the reign of Vespasian they revolted, under the command of Civilis, from the Romans, and extorted from them favorable terms of peace. Trajan and Adrian subjected them again. At the end of the 3rd century the Salian Franks obtained possession of the island of Batavia. See BATAVIAN REPUBLIC.

Bata'via, properly the name of the island occupied by the ancient Batavi, became at a later date the Latin name for Holland and the whole kingdom of the Netherlands. The name Batavian Republic (q.v.) was given to the Netherlands on their new organization, 16 May 1795, and they continued to bear it till the establishment of the kingdom of Holland, under Louis Bonaparte, 8 June 1806.

Batavia, Java, a city and seaport on the north coast of the island, near the west end, and the capital of all the Dutch East Indies; lon. 106° 50′ E.; lat. 6° 8′ S. It is situated on a wide, deep bay, in which are interspersed many low, green islets, within which ships find safe anchorage, the roadstead being sheltered from the northwest monsoon. The largest of these islets is Onrust, at which all ships above 300 tons burden have to anchor. The town consists of two portions. The old is situated in a low, marshy plain near the sea, and intersected by the Great River and sundry canals, is exceedingly unhealthy, and subject to an intermittent fever, very fatal to strangers. Much has been done, however, to diminish the unhealthiness by draining the marshes, and letting currents of water into the stagnant canals. The old is still the business quarter and contains the principal warehouses and offices of the Europeans, the Java Bank, and the exchange. On the west side of the Great River is the Chinese quarter, inhabited entirely by Chinese. Batavia is the chief mart among the islands of the Asiatic Archipelago for the products of the Eastern seas and the manufactures of the West, and its commerce is correspondingly important. Batavia was founded by the Dutch in 1619, and attained its greatest prosperity in the beginning of the 18th century, when it had about 150,000 inhabitants. The most important edifices are the Stadt-house, Calvinistic, Lutheran, and Portuguese churches, some Mohammedan mosques and Chinese temples. Pop. (1900) 115,567. The inhabitants are chiefly of Malay extraction, with a considerable admixture of Chinese, and a small number of Europeans (Dutch, English, and Portuguese). A United States consul resides here. See JAVA.

Batavia, Ill., a town in Kane County, on the Fox River, and on the Chicago & N. W. and Chicago, B. & Q. R.R.'s; 37 miles west of Chicago. Here is the State Asylum for the Insane, and 9 churches, public schools and public library. Among the industries are stone quarries, farm implement works, and wagon factories. Batavia was settled in 1834 and incorporated in 1856. Pop. (1900) 3,871.

Batavia, N. Y., a town and county-seat of Genesee County, on Tonawanda Creek and several railroads; 37 miles east of Buffalo and 32 miles west of Rochester; on the New York C. & H. R., the Lehigh Valley, and Lake Erie & W. R.R.'s. It is in an agricultural region; has manufactories of plows and harvesters, carriage wheels, and shoes, and contains the State institution for the Blind, the Dean Richmond Memorial Library, national banks, daily and weekly newspapers. Batavia was the home of William Morgan, made famous through the Anti-Masonic excitement in 1826. Pop. (1900) 9,180.

Batavian Republic, the name adopted by the Seven United Provinces of the Netherlands soon after the French Revolution, and acknowledged by the powers of Europe. The whole republic was declared one and indivisible; all members of society were declared equal in the eye of the law, without respect to rank or birth; all religious societies, acknowledging a Supreme Being, equally protected by law. Feudality was abolished, all fiefs declared allodial, and possessors of lordships to be indemnified. In 1806 the form of government was changed into that of a kingdom, under the name of Holland; and the Batavian republic fell nominally under the sway of Louis Bonaparte as its sovereign, but really under that of his brother Napoleon. See NETHERLANDS.

Batbie, bä-bē, **Anselme Polycarpe,** French jurist and politician: b. Seissan, 31 May 1828; d. Paris, 30 June 1887. He first belonged to the faculties of law at Dijon and Toulouse, but, in 1862, he became professor of constitutional law at Paris. Elected to the National Assembly (February 1871), he became one of the leaders of the Monarchist party. In Broglie's reactionary cabinet (1873) he was made minister of public instruction. After 1876 he was a member of the Senate. He wrote 'Turgot, Philosopher, Economist, and Administrator' (1860); 'Course of Political Economy' (1864); 'New Course of Political Economy' (1865); 'The Public Credit' (1865); 'Summary of the Course of Public and Administrative Law' (1885), and 'Theoretical and Practical Treatise on Public and Administrative Law' (1885).

Batchelder, Richard Napoleon, American military officer: b. Lake Village, N. H., 27 July 1832. He entered the Union army at the beginning of the Civil War; and was brevetted brigadier-general, United States Volunteers, 13 March 1865; became brigadier-general and quartermaster-general, United States Army, 26 June 1890; and was retired 27 July 1896. He was awarded a Congressional medal of honor for most distinguished gallantry in action during the Civil War.

Batcheller, George Sherman, American jurist: b. Batchellerville, N. Y., 25 July 1837. He was admitted to the bar in 1858; entered the Union army at the beginning of the Civil War; was taken prisoner at Harper's Ferry, and exchanged in 1863; was then appointed deputy provost-marshal-general of the Department of the South; and, in 1865–70 was inspector-general on the staff of Governor Fenton of New York. In 1883 he became president of the International Tribunal of Egypt; in 1889, assistant secretary of the United States Treasury; in 1890,

United States minister-resident and consul-general to Portugal; and in 1897, again a member of the International Tribunal of Egypt. In the last-named year he received from King Humbert the decoration of the great cordon of the Order of the Crown of Italy, in recognition of his services as president of the Universal Postal Congress which met in Washington in May 1897.

Batchelor, George, American Unitarian clergyman: b. Southbury, Conn., 1836. He was secretary of the American Unitarian Association 1893–7, and has since been editor of the 'Christian Register,' published in Boston. He has also been secretary of the National Unitarian Conference 1870–80, and its chairman 1893–4. He is the author of 'Social Equilibrium.'

Batchian, bạt-shyän', or **Batian,** one of the Moluccas, west of the southern peninsula of the large island of Halmahera or Gilolo. Area, 835 square miles; pop. about 11,000. It belongs to the Dutch residency of Ternate, consists of two peninsulas joined by a narrow isthmus, and has many mountains. Batchian produces gold, copper, much coal, sago, cocoanut trees, rice, cloves, and fine timber.

Bate, William Brimage, American legislator: b. near Castalian Springs, Tenn., 7 Oct. 1826; d. Washington, D. C., 9 March 1905. He served as a volunteer through the Mexican war; was graduated at the Lebanon Law School in 1852; elected attorney-general of the Nashville district in 1854; and was presidential elector in 1860. In the Civil War he rose from private to the rank of major-general in the Confederate army, and was three times dangerously wounded. He was an elector-at-large for Tennessee on the Democratic ticket in 1876; was elected governor in 1882 and 1884; and a United States senator in 1887, 1893, and 1899.

Bateman, Kate Josephine, American actress: b. Baltimore, Md., 7 Oct. 1842. About 1851 she and her sister Ellen began to act, being known as the Bateman Sisters. Kate began, in 1861, to play Juliet, Pauline, etc., but was especially successful in Leah. She became rich and famous, and, having married George Crowe, an English physician, identified herself with the management of a London theatre.

Bateman, Newton, American educator: b. Fairfield, N. J., 27 July 1822; d. Galesburg, Ill., 21 Oct. 1897. He graduated from Illinois College, 1843, and studied at Lane Theological Seminary, but began to teach instead of entering the ministry. He was professor of mathematics at St. Charles College, 1847–51; State superintendent of public instruction, 1858–63; member of the State board of health, 1877–97; and president of Knox College, 1875–92, when ill-health caused his retirement. His official reports are of high value in educational literature, and much of the excellence of the Illinois school laws is due to his widom and foresight. He published 'School Laws of Illinois' (1865; 12th ed. 1866); 'School Laws and Common School Decisions of the State of Illinois'; revised by W. L. Pillsbury (1888).

Bates, Alfred E., American military officer: b. Monroe, Mich., 15 July 1840. He graduated at the United States Military Academy in 1865; commissioned a second lieutenant in the 2nd Cavalry; promoted to first lieutenant, 19 Oct. 1865; transferred to pay department with the rank of lieutenant-colonel, 7 Jan. 1897; promoted colonel and assistant paymaster-general, 31 March 1899; and brigadier-general and paymaster-general, 12 July following. He served for several years as military attache to the United States Embassy in London, and was a brigadier-general of volunteers in the war with Spain in 1898.

Bates, Arlo, American author: b. East Machias, Me., 16 Dec. 1850. He graduated from Bowdoin in 1876, when he engaged in literary work in Boston, editing the *Sunday Courier*, 1880–93; and afterward became professor of English Literature in the Massachusetts Institute of Technology. He is author of poems and novels, including 'The Pagans' (New York 1884); 'A Lad's Love'; 'The Wheel of Fire' (1885); 'The Philistines' (1888); 'Berries of the Brier' (1886), poems; 'Told in the Gate' (1892); 'Talks on Writing English'; 'Talks on the Study of Literature' (1897); 'The Puritans' (1899); 'Under the Beech Tree' (1899); 'Diary of a Saint' (1902).

Bates, Barnabas, American clergyman; an active promoter of cheap postage in the United States: b. Edmonton, England, 1785; d. Boston, Mass., 11 Oct. 1853. He came to America at an early age, became a Baptist preacher in Rhode Island, and was, for a time, collector of the port of Bristol. In 1825, having become a Unitarian, he established a weekly journal in New York, called the *Christian Inquirer*. During Jackson's administration he received an appointment under Samuel Gouverneur, postmaster of New York, and for some time performed the duties of postmaster himself. The information gained in this capacity, first interested him in the question of cheap postage. He investigated the subject for years, wrote, published pamphlets, and lectured throughout the country, and finally effected a material reduction in the rates of land postage. He was endeavoring to obtain a corresponding reform in ocean postage at the time of his death.

Bates, Blanche, American actress: b. Portland, Oregon, 1873. She made her first appearance in 1894 in San Francisco, taking a part in Brander Matthews' one-act play 'This Picture and That.' Her first success was as Mrs. Hillary in 'The Senator,' and she has played the leading comedy roles in 'The Last Word,' 'The Railroad of Love,' 'Transit of Leo,' and 'The International Match.' Her acting of Nora in 'A Doll's House' (the first Ibsen play presented on the Pacific coast) was a distinct artistic triumph. She has also taken leading parts in 'The Charity Ball,' 'Sweet Lavender,' 'The Dancing Girl,' and others. Her phenomenal success in 'The Great Ruby' (1899); as Miladi in 'The Three Musketeers' (1899); and in Long and Belasco's 'Darling of the Gods' (1902–3), has given her a place of assured prominence on the American stage. See Strang, 'Famous Actresses of the Day' (1899).

Bates, Charlotte Fiske, American poet and miscellaneous prose-writer: b. New York, 30 Nov. 1838. She was educated in Cambridge, Mass.; assisted Longfellow in compiling 'Poems of Places'; edited the 'Cambridge Book of Poetry and Song' (Boston, 1882); 'The Longfellow Birthday Book'; and 'Seven Voices of Sympathy'; has contributed to magazines; and

has published 'Risk and Other Poems' (1879). She was married in 1891 to Adolphe Rogé.

Bates, Clara (Doty), American author: b. Ann Arbor, Mich., 1838; d. 1895. She lived in Chicago and published many juvenile books; also 'From Heart's Content' (1892).

Bates, David, American poet: b. 1810, d. Philadelphia, 25 Jan. 1870. He was the author of the well-known poem 'Speak Gently.' In 1848 his poems were published under the title, 'The Eolian.'

Bates, Edward, American lawyer: b. Belmont, Va., 4 Sept. 1793; d. 25 March 1869. Having settled in Missouri, he served in the legislature and constitutional convention, and in Congress in 1827–9. He was attorney-general of the United States in Lincoln's first administration; and had been a candidate for the presidential nomination in 1860.

Bates, Harriet Leonora (Vose), better known as Eleanor Putnam, American story writer, wife of Arlo Bates: b. 1856; d. 1886. She wrote 'A Woodland Wooing'; 'Old Salem' (1886); with her husband, 'Prince Vance,' etc.

Bates, John Coalter, American military officer: b. St. Charles County, Mo., 26 Aug. 1842. He entered the regular army as a lieutenant in the 11th United States infantry, 14 May 1861; served on the staff of General Meade from the battle of Gettysburg to the close of the war. On 4 May 1898 he was appointed a brigadier-general of volunteers; on 8 July was promoted to major-general for his services in the Santiago campaign. In February 1899 he was appointed military governor of the province of Santa Clara, Cuba, and in April following, was ordered to duty in the Philippines. In March 1900 he was assigned to the command of the department of southern Luzon, and for his eminent services there and on the Sulu group was promoted major-general, 9 June 1902.

Bates, Joshua, American financier: b. Weymouth, Mass., 1788; d. 24 Sept. 1864. In 1828 he became a member of the house of Baring Brothers & Company, in London, and subsequently its senior partner. In 1854 he was appointed umpire to the joint British and American Commission for the settlement of claims arising from the War of 1812. He was the principal founder of the Boston Public Library, and in 1852, the first year of its existence, he made it a gift of $50,000, and later gave it 30,000 volumes. Its main reading room is named "Bates Hall" in his honor.

Bates, Katharine Lee, American story writer, poet, and educator: b. Falmouth, Mass., 12 Aug. 1859. She was called to the chair of English literature in Wellesley College in 1891; and has edited collections of ballads, etc.; and written juvenile stories, including 'Rose and Thorn' (1889); also 'The English Religious Drama' (1893); and 'The College Beautiful (1887); 'History of American Literature' (1898); 'Spanish Highways and Byways' (1900).

Bates, Samuel Penniman, American historian: b. Mendon, Mass., 29 Jan. 1827. He has been principal of Meadville Academy, Pa.; superintendent of schools in Crawford County, Pa., 1857–60; deputy state superintendent of schools, 1860–6; and State historian, 1866–73. Among his publications are the 'Lives of the Governors of Pennsylvania' (1873); 'Lectures on Mental and Moral Culture' (1859); 'History of the Battle of Gettysburg' (1878); 'History of the Battle of Chancellorsville' (1882).

Bate's Case, an English historical incident of much significance as marking the opening of the struggle of Parliament with the Stuart kings. John Bate, a London merchant, having refused to pay certain duties levied without consent of Parliament, was sent to prison by the royal officers. The Commons supported Bate, but the king's authority to levy impositions on exports and imports was sustained by the Court of Exchequer.

Bates College, Lewiston, Me., was opened in 1863 and chartered in 1864. It grew out of Maine State Seminary, a secondary school opened in 1857. The college was founded by its first president, Rev. Oren Burbank Cheney, D.D. (1863–94), and bears the name of its chief benefactor, Benjamin Edward Bates, a merchant of Boston, and one of the founders of the city of Lewiston. Bates was the first eastern college to afford collegiate education to women, and her first woman graduate (1869) became a professor in Vassar College. Established in the interest of the Free Baptist denomination, she has been notably free from sectarianism — her faculty having been drawn from seven religious denominations and her students representing Protestants, Catholics, and Hebrews. Bates places primary stress upon character, does not tolerate hazing and makes abstinence from intoxicating drinks a condition of student membership. Her courses of instruction cover the range of undergraduate studies as pursued in progressive colleges of to-day. The unusual excellence of her courses in English, including argumentation, is indicated by her eleven victories in twelve intercollegiate debates held with five colleges and universities. To these results her three flourishing literary societies are believed to have contributed. Alone among New England colleges, Bates has no secret fraternities. She has chemical, physical, and biological laboratories, libraries containing 28,000 volumes, and a spacious athletic field. Her campus of 50 acres is of rare natural beauty, and with her nine buildings, has a value of $350,000. Her invested funds amount to upwards of $400,000. Of her 1097 graduates 475 have become educators, 60 of them teachers in colleges and universities. For the last 15 years the number of her graduates at the head of city high schools in New England is believed to have exceeded those of any other college. Bates has 71 scholarships, affording free tuition to their recipients, and she so shapes her entire policy as to help students of small means to meet their own expenses. The college has 22 officers and instructors, and 353 students — an increase of more than 100 per cent. during the last decade. Cobb Divinity School is a department of Bates College, having its own building, faculty, and administration.

George C. Chase, *President.*

Batesville, Ark., a town and county-seat of Independence County: situated on the White River and on a branch of the St. Louis, I. M. & S. R.R. It is the seat of Arkansas College, a Presbyterian institution. The river is navigable for steamboats to this point and the United States government is providing a system of locks and dams to insure navigation for 100 miles above the town. It contains immense

quarries of marble and other stone, and there are woolen mills, flouring mills, furniture factories, etc. Pop. (1900) 2,327.

Batfish, a sea-fish (*Malthe vespertilio*) of low organization, constituting the family *Maltheidæ,* allied to the goosefishes (*Lophiidæ*), which creeps about the bottom like a huge toad and feeds upon whatever comes within its reach. It is numerous in all warm seas, and some related forms inhabit the deeper parts of the ocean. See GOOSEFISH.

Bath, England, a city in Somersetshire, 107 miles west of London. It is beautifully situated on the Avon, in a narrow valley bounded on the northeast and southwest by hills, and widening on the northwest into rich and extensive meadows. The Avon is navigable from Bath to Bristol. Bath is noted for its places of amusement, its fine streets, and the magnificence of its public buildings. The houses are of superior construction, built of freestone, obtained from the hills about the town. The Abbey Church ranks as one of the finest specimens of perpendicular Gothic architecture. Bath is remarkable for its medicinal waters, the four principal springs yielding no less than 184,000 gallons of water a day; and the baths are both elegant and commodious. The temperature of the springs varies from 109° to 117° F. They contain carbonic acid, chloride of sodium and of magnesium, sulphate of soda, carbonate and sulphate of lime, etc. Bath was founded by the Romans, and called by them *Aquæ Solis* (waters of the sun). Among the Roman remains discovered here have been some fine baths. The height of its prosperity was reached, however, in the 18th century, when Beau Nash was leader of the fashion and master of its ceremonies. Since then, although it still attracts large numbers of visitors, it has become the resort of valetudinarians chiefly. Jointly with Wells it is the head of a diocese, and returns two members to the House of Commons. Pop. (1901) 49,817.

Bath, Me., city, port of entry, and county-seat of Sagadahoc County, on the Kennebec River, and the Maine C. R.R.; 12 miles from the ocean and 30 miles south of Augusta and 36 miles northeast of Portland. It is admirably situated as a commercial port; has regular steamboat connections with Boston and Portland; is principally engaged in shipbuilding, both wood and iron; and has manufactories of brass and iron goods, oil cloth, shoes, and lumber. The Bath Iron Works have built the gun-boats Machias and Castine, the ram Katahdin, and several of the modern torpedo boats for the United States navy. Bath has a large coastwise and foreign trade in ice, coal, lumber, hay, iron, and steel; and contains four national banks, public library, a costly system of waterworks, and property valued at $7,000,000. Pop. (1900) 10,477.

Bath, N. Y., town and county-seat of Steuben County, on the Cohocton Creek, 36 miles west of Elmira, on the Buffalo branch of the Erie, and the Delaware, L. & W. R.R.'s. It is the seat of the New York State Soldiers and Sailors' Home, the Davenport Home for Orphan Girls, and Haverling Academy; is principally engaged in agriculture; and has manufactories of shoes, sash and blinds, harness, etc. It is governed by a mayor, annually elected, and a town council. Pop. (1900) 4,994.

Bath and Bathing. The use of the bath is primarily for purposes of cleanliness, but it also subserves various other useful ends. Bathing undoubtedly took place first in rivers and in the sea, but men soon learned to enjoy this pleasure in their own houses. Even Homer mentions the use of the bath as an old custom. When Ulysses enters the palace of Circe, a bath is prepared for him, after which he is anointed with costly perfumes, and dressed in rich garments. In later times, rooms, both public and private, were built expressly for the purpose of bathing. The public baths of the Greeks were mostly connected with the gymnasia, because a bath was taken immediately after the athletic exercises. The Romans imitated the Greeks in this matter, and built magnificent baths in which both males and females could bathe (in separate divisions), and warm or cold baths could be taken; such establishments, indeed, were so extensive that even their ruins excite admiration.

The Cold Bath.— The first effect of the cold bath (at a temperature say from 50° to 70°) is to produce a shock to the nerves of the skin. In the case of the cold bath as ordinarily used, the application is short, and the more near to the temperature of 50° F. the water is the shorter it should be. Following the first action is reaction, during which the blood returns to the skin, the blood vessels of which relax, and a pleasant sensation of glow, spreading rapidly over the surface, is experienced. This reaction is aided by rapid friction of the skin, as by towels, and if, after drying, the body is quickly clothed and exercise engaged in, the total effect of the bath is stimulating, inducing a feeling not only of warmth but also of vigor. The length of time the cold may be applied without interfering with the setting in of a proper reaction depends on the individual. A mere instant's immersion is sufficient for some, others can bear several minutes, while some could not bear complete immersion of the body at all, a feeling of coldness and shivering lasting for hours after it. Obviously for such persons the full cold bath is not suitable, and the cold wet towel, cold wet sponge, wet sheet, etc., may be used instead, and may gradually lead up to the full cold plunge, which may thus be made tolerable and enjoyable. The cold bath is not usually suitable for the old and the delicate. The action of the cold water may be intensified by showering it or spraying it on the body by means of various arrangements of pipes, etc. The morning or early part of the day is the suitable time for all such kinds of baths. Persons who are thus habituated to the use of cold water are less susceptible to the influence of cold and can stand longer exposure than others.

Tepid Baths (temperature 85° to 95°) produce neither depression nor excitement, and are therefore suited for all. They are the best when prolonged immersion is desired, as in the treatment of chronic skin and nervous diseases.

The Warm Bath (temperature 96° to 104°) is particularly serviceable in removing feelings of fatigue. It should quicken only slightly

the circulation, and bring an additional quantity of blood to the skin. It is by this means that it removes the tired feeling from exhausted muscles, for it promotes the removal from the tissues of the waste products, which have accumulated during the period of activity, and whose presence in the muscles is the cause of the feeling of weariness. After prolonged labor, or a long fatiguing walk, or prolonged exposure to damp and cold, or after, for example, the exertion of much dancing, nothing is so restorative and refreshing as a warm bath. When employed for such purposes, the person should end with a spray or douche, or simple sponge of tepid water (70°) if he is about to go to bed, or with a warm spray, quickly reduced to cold, before dressing to go out. Warm baths are largely employed in feverish affections of children for promoting the action of the skin; and they are a safe resort in the convulsions of children, cold being at the same time applied to the head.

The hot bath (temperature 102° to 110°) acts in a more pronounced way upon the heart and nervous system than the merely warm bath. If very hot it powerfully excites the heart, whose action, indeed, it may stimulate to violence. The brain is also influenced by the more copious flow of blood through it, due to the vigorous action of the heart. These effects, however, are largely counterbalanced by the increased flow of blood to the skin. But the prolonged use of hot baths is weakening, and the temporary strain thrown upon the heart and blood-vessels and brain would be hurtful to many. The bather should be immersed to the chin; the hair is damped with cold water, and a thin cold cloth is wrapped about the head. Cold water may be drunk if desired. The bath should last 20 minutes, or less if oppression is felt. It should conclude, as directed for warm bath, with tepid douche or sponging, or with warm spray quickly reduced to cold. The hot bath should not be used in the morning or early part of the day, or at any time except before going to bed, unless the person is properly cooled down before dressing and going out.

The Hot-air Bath is one of the most powerful ways of stimulating the activity of the skin. The person, unclothed, is placed in an apartment which is heated by means of furnaces, the air being dry. In a longer or shorter time, according to the heat of the air and the condition of the bather, the perspiration bursts out upon the skin, becoming very copious, so that the whole body is bathed in sweat. A very high temperature may be borne so long as the air is quite dry, for the sweat passes rapidly off from the body in the form of vapor, removing a large quantity of heat, and thus the temperature of the body does not rise, unless the air is very hot, when the heat of the body usually increases by two or three degrees. The same high temperature could not be borne if the air were moist, as in the case of a vapor bath, for then the air is saturated or nearly so with moisture and cannot take up more, or can take up very little. Marked oppression, difficulty of breathing, fullness in the head, faintness, etc., would then speedily arise. When the air is quite dry, however, a high temperature, for example, that of 180° F., can usually be endured with ease, and even above 212°. Not only the activity of the skin, but the action of the heart and of breathing are greatly increased. It is thus not suited for everyone, certainly not in its full form for anyone with weak heart or vessels, and for very full-blooded persons.

The Turkish Bath.— The hot-air bath is usually obtained with other accessories in the form of the Turkish bath. This bath was adopted by the Turks from the Romans, who derived it from the Greeks. The bather enters the dressing-room (Rom. *vestiarium*) which is heated to an ordinarily comfortable temperature. Beyond this room there are, in the fully-equipped Turkish baths, three rooms, separated from the dressing-room by well-padded doors. The first of these corresponds to the Roman *tepidarium*, the warm room, in which the temperature is from 115° to 120°; beyond this and separated from it by heavy curtains is the hot room, or *calidarium*, in which the temperature ranges from 120° to 140°; and still beyond is the hottest room, called also the flue room, corresponding to the Roman *laconicum*. Here the temperature is not below 150°, usually 175° to 180°, but may be 200° and upward. Every Turkish bath has at least two rooms beyond the dressing-room, one in which the temperature may readily be raised to 140° or thereby, and one beyond it in which the highest temperatures may be obtained.

When a full Turkish bath is taken the following is the usual course: The bather undresses in one of the curtained recesses of the dressing-room, girds a towel or similar cloth round his loins, and carrying a bath-towel over the arm passes into the warm room. Here he stays only long enough to wet the hair with cold water, and perhaps drink of it, and then passes on through the hot room, into the hottest room. Spreading his towel over a chair he reclines on it, wets his head with cold water, and drinks at his pleasure, but not too copiously, of cold water, which the attendant will bring him. Here he remains 5 or 10 minutes. By this time the whole body will be bedewed with perspiration; and the bather passes out into the room next in temperature, the hot room, where he reclines for another 10 or 15 minutes. Then he passes to the warm room, lower in temperature than the former, and here he reclines till the attendant is ready for him, when he proceeds to the washing room. Here he lies on a table and the attendant goes over the whole body, rubbing the surface, and thus removing all loose effete skin, grasping and kneading the muscles, bending joints and so on. He is then rubbed over with soap, scrubbed and washed down, and lastly douched with warm and then tepid and cold water. From this room the bather passes out quickly, plunges through a cold bath, and regains the dressing-room, where he is quickly dried down with warm dry towels. He is then enveloped in a dry bath-towel, and so attired he lies down on his couch in the dressing-room, covered over with a light rug or blanket, till his skin assumes its natural degree of warmth. When the skin is cool and dry, usually in 15 or 20 minutes, the bather dresses deliberately, and may then go out. The ordinary duration of the full bath, from the flue room to the washing room, is from 40 minutes

to an hour. The full bath, however, is suited chiefly for those accustomed to it, for the healthy and robust.

The vapor bath acts upon the body much as the hot-water bath does, but it acts more powerfully, though the effect of the heat is not so quick since vapor is a slower conductor of heat than water. This bath can, therefore, be borne hotter than a water bath, but the high temperature cannot be borne long, for the vapor does not permit of the loss of heat from the body as hot air does. The temperature of the vapor bath cannot be comfortably endured above 120° F. The vapor bath is characteristic of the Russian baths. It is taken in a chamber filled with vapor, which is thus not only applied to the surface of the body but also inhaled. This makes it still more oppressive. It may be used, however, in a simple form, in which the vapor is not breathed, by the person sitting on a chair, surrounded from the neck downward by blankets, which envelop the chair also and hang to the ground. Under the chair is placed a shallow earthenware or metal dish, containing boiling water to the depth of 3 or 4 inches. In the water are placed a couple of red-hot bricks. Or under the chair may be placed a spirit-lamp, supported above it being a shallow pan containing boiling water. Such baths are very useful for catarrh, for rheumatic and neuralgic pains, sciatica, etc., as well as for cases where excessive action of the skin is desired to relieve deeper organs, for example the kidneys. Ten to fifteen minutes are long enough for exposure in the vapor bath.

Sea-Bathing.—Ordinary sea-bathing is of course cold, and produces the stimulating effects described in regard to the cold bath. There is besides the additional stimulus due to the salt, so that sea-bathing acts as an invigorating tonic. It is not, however, suited for everyone, and is taken much too indiscriminately. It is also indulged in without due precaution. It is a very common error for persons to remain in the sea too long, the result being shivering, blueness of the skin, difficulty in recovering warmth, headache, etc. Persons who are anæmic,—that is, of deficient quality of blood,—ought not to indulge in sea-bathing without advice, and failing advice had better try first a salt-water bath at home. Persons who have suffered from any internal complaint ought also to refrain. The best time for sea-bathing is in the morning. It should never be indulged in immediately after a meal, when the business of digestion is going actively forward. A good time is before lunch or early dinner, for which the brisk walk home after the bath will prove an excellent appetizer. Neither should sea-bathing be engaged in immediately after very active exercise, when the body is in a state of very active perspiration or in a condition of fatigue. At the same time, moderate exercise before the bath is unobjectionable, and the body ought to be comfortably warm. The person should undress quickly and plunge in bodily, wetting the whole body at once. During the bath exercise should be active, as in continued swimming. Children, because of the little resisting power of their bodies are readily depressed by sea-bathing. They may be gradually accustomed to it; but they ought not to be forcibly immersed to their aversion and terror. Sea-baths may be imitated at home by the addition of common salt or sea salt to water. The benefits of open-air bathing,—sea or river,—are not limited, of course, to the action of the water, but are increased by the action of the fresh air, the respiration of which is stimulated by the bath, and by the exercise in the open air invariably indulged in afterward.

There are many kinds of medicated baths, which have, or are supposed to have, special properties, valuable for diseased conditions, because of containing various saline substances dissolved in them. Such baths may be artificially prepared by the addition of the salts to the water, or natural mineral waters may be used for the purpose. Mud-baths are recommended for special reasons.

Various arrangements are employed for accentuating the effect of the water, whether used hot or cold, or for applying it to particular parts of the body. The spray is one well-known variety of bath. The douche is a jet of water directed upon some part of the body through a 1½ inch pipe, the force of the water, quantity discharged, and temperature being capable of modification. It at first lowers the vitality of the part to which it is applied, but reaction sets in quickly, so that its whole effect is stimulating, quickening tissue change. The douche may be used hot or cold, or one after the other in rapid succession, a change which is most stimulating of all. In old-standing complaints, thickenings about joints, stiff joints, etc., it is a very useful application. In the case of the descending douche, the pipe is 10 to 15 feet above the floor level, and for the horizontal douche the pipe is 4 feet above floor level. In the former case it is played first on the spine, and then shoulders, hips, arms and legs in succession. At the close it is directed on to the chest and head, the force of the water being broken by the hands. In the latter case the back, chest, arms, and legs are douched in the order named, while the patient rubs himself vigorously. Before beginning the head is wet with cold water, and is douched last, the force of the water being broken. The process should last scarcely two minutes.

The sitz-bath or hip-bath is a means of limiting the application of the water to the hips and neighboring parts. The form of the bathing-tub is such that the person has the bath in the sitting posture, the limbs and upper part of the body being out of the bath. The sitz-bath, hot or cold according to circumstances, is in much use for abdominal and liver complaints, and specially for feminine ailments. Its soothing effects used hot in such disorders are marked. Altogether the use of the bath, in association with treatment by medicine, is of the highest value in numerous disorders, rheumatic, gouty, digestive, febrile, etc. In particular, the Turkish bath, under due superintendence, may produce surprising results, from checking a simple cold upward. See also HYDROTHERAPY.

Bath Brick, or **Bristol Brick,** an artificially manufactured brick, of the usual form, but formed of calcareous earth. It is used for cleaning various kinds of metal work, and in England is manufactured from the silt left in the river Parret in Somersetshire after high tides.

Bath Bun, an English bun, or sweetened cake or biscuit, made generally without currants.

Bath Chair, a small carriage or chair on wheels, drawn by a chairman, and intended for the conveyance of individuals or others for short distances. It is so called because either originally or principally used at Bath, where the steepness of many of the streets rendered such conveyances especially useful.

Bath, History of the. As the most ancient records of the human race refer to the use of the bath it is probably safe to surmise that the prehistoric peoples early discovered the cleansing effect of water and were eager to enjoy it. To the ancient Egyptians, as to the more modern Mohammedans, it is a part of their religious service, while among the early Hebrews it was not only one of the first purificative duties but it was positively prescribed by the Mosaic law in certain specified cases of uncleanness. Thus the Jew who had no bath in the court yard of his house, bathed in the streams, or, later, in the mixed, or public baths, while, besides water, bran was often used for ceremonial cleansing, especially by the women, just as the modern Arabs, when unable to obtain water, rub themselves clean with sand. See ABLUTION.

The earliest and most common form of bathing was, of course, that of swimming in rivers, and bathing in such rivers as the Nile and the Ganges was supposed to possess a religious significance which tended to make the practice a very popular one. The use of oils and the greater luxury of perfumes became customary on occasions of sanitary bathing at a very early period. In later times the more wealthy Romans possessed many kinds of oils and pomades which they brought to the baths, that their bodies might be anointed with them, while even the poorest classes rubbed their bodies with flour of lentils after the bath.

The first reference to such a convenience as that of a public bath occurs in the Bible, where it is stated that the bathing "pools" were sometimes sheltered by porticoes, but this was a simple invention when compared to the perfect bathing facilities which were afterward provided by the Greeks and Romans, while the praise lavished upon the baths of Darius by Alexander the Great indicates that the Persians must also have possessed beautifully appointed bathing facilities.

The public baths, which began to be built in Rome shortly after Clodius had succeeded in supplying the city with water from Praeneste, soon became one of the most popular institutions of the nation and emperors vied with their predecessors to construct the largest and most elaborate establishments. As the result, enormous buildings were erected and these contained not only the bathing apartments but the gymnasia and libraries, or even theatres, and the most able writers of that time admit their inability to describe the magnificence and luxurious appointment of many of these palaces of cleanliness and pleasure. For example, Seneca says, "To such a pitch of luxury have we come that we are dissatisfied if we do not tread on gems in our baths." These baths, or *thermæ,* as they were called, contained swimming baths, warm baths, vapor baths, and baths of hot and cold air.

Wherever the Romans settled they built public baths, and wherever they found hot springs or natural stufæ, they made use of them, thus saving the expense of heating, as at Baiæ and Bath. The charge made at a public bath was only a quadraus, or about one quarter cent.

The delicacy of feeling concerning the bathing together of sexes which is said to have existed in early times certainly did not extend to the days of the Empire, when it was not at all uncommon for men and women to make use of the same bath and it was probably due to this practice that the public baths came to be condemned by the early Christians as places of unbounded license. While admitting the usefulness of the bath from the standpoint of cleanliness and health, the Church fathers insisted that baths should be taken for such purposes only and not for pleasure. It was at this time when the bath reached the height of luxuriousness; when rich citizens had magnificent private baths of their own attached to their villas, and when elaborate private bathing houses might be had for hire in all the cities; conditions which continued until about the 5th century, when the destruction of Rome's water supply by the Huns and the many disasters which accompanied the downfall of the Empire tended to turn popular attention from the delights of the *thermæ.* How thoroughly the bath afterward fell into disuse, however, is a matter which historians have been unable to determine. In the East, of course, where the heat and dust make its use obligatory, there has never been any diminution in the practice, and while in Europe, for a time at least, perfumes were used to offset any disagreeable odors that might arise from uncleanliness of the person, this condition could not have existed for many centuries, for, by the latter part of the 12th century, the popularity of the bath had become so well re-established that there was scarcely any large city in Europe which did not possess well patronized hot air bathing houses. Again in the 17th century, when the Turkish bath was introduced, there was another revival of interest in the matter of personal cleanliness, and people of all classes flocked to the baths, or Hummuns, as they were called, to enjoy the new luxury that had been imported from the East.

While the Turkish bath, not to mention the Russian and Egyptian baths, are so similar to the hot air baths of the Romans that many authorities have regarded them as nothing more or less than an outgrowth from the latter, the fact that the principle of the vapor bath has been known to many nations, and has even been found among savages, or races in an early stage of civilization, has led to the more recent and counter theory that the hot air boxes of the Mexicans, the "medicine sweats" of the American Indians, the small baths of the ancient inhabitants of Scotland and Ireland, and the larger vapor baths of Japan, like those of Turkey and Russia, are of just as independent origin as those of the more ancient Rome. However that may be it is at least certain that, while this luxurious form of bathing was largely responsible for the neglect of the cold

bath and the sea-bathing, the virtues of which have been appreciated only within comparatively modern times, it is largely due to the pleasureable sensations resulting from this form of bath that the various nations of the world have not neglected those principles of cleanliness upon which the good health of a people so vitally depends.

J. R. MEADER,
Editor of 'American Year Book.'

Bath Houses, Public. The public bath-house was a matter of course in the cities of southern Europe down to the end of the Roman empire; one of the chief objects of public expenditure and private munificence. The Romans borrowed it from the Greeks, but vastly improved it, connecting it with a general system of public recreation. Mæcenas under Augustus was the first private citizen to build a splendid specimen and give it to the city of Rome; and after him each succeeding emperor strove to outdo the others in enormous buildings of magnificent architecture and sumptuous fittings, containing not only all kinds of baths,—cold, hot, swimming, vapor, hot air, and shower,—but gymnasia, theatres, and libraries. Private persons also founded them in provincial cities. But after the barbarian deluge, both money and water supply failed, and till very modern times general cleanliness ceased to be a municipal concern. The system first revived in Germany, but only in cold swimming baths; the first enclosed bath houses with hot and cold water were established in Liverpool, in 1842. The movement spread but tardily in Great Britain,—the first legislation of 1846 being little acted on,—till about 1890, when city councils began to take it up energetically with authorization from Parliament; but it then increased so rapidly that almost every town or borough of 50,000 people now has its public bath open the year round, as do very many smaller ones. In Germany about 50 cities have them. On the Continent generally and in Scandinavia, only the large cities are thus provided; but in Russia they are almost universal in places of any size.

In the United States, though public baths have existed for some 40 years in a few great water-side cities, they were till a few years ago confined to cold swimming-baths sunk in the sea or river near the shore, and open only during warm weather; of excellent service for the comfort of those not too far off, but too limited in scope to be of the highest value to the general public. Not only were they closed for more than half the year, but to those who must walk more than half or three quarters of a mile to obtain a bath (their utility being for the poor), their value as refreshment in hot weather was neutralized by the needful exertion to reach them. Their use, therefore, depended on their distribution and relation to the water system. Thus, in Boston, where six were established in 1866, with 300,000 patrons during the first season, and extended to 14 in 1897, they were so located on the Charles River, at City Point, and on South Bay, that a considerable part of the poorer population were within fairly easy distance of them. Only about a dozen United States cities, however, had even these bathing facilities till a few years since, and the first general movement in favor of year-round hot and cold baths was a reflex from Germany, about 1891. In that year the People's Baths were built in New York by a private philanthropic association, and maintained by a small fee; and in 1893 Chicago opened a small municipal bath house. The first compulsory legislation was by New York state in April 1895 (though a bathing and washing association was incorporated there in 1849); it obliged all cities of over 50,000 people to establish public baths and comfort stations, kept open the year round, with both hot and cold water, and 14 hours a day, and under such conditions as the local board of health judged proper; river, lake, or sea baths not to be deemed a compliance with the act. Cities under 50,000, though not compelled, were permitted to use their funds or credit for the same object. The first city to comply, and perhaps the first in the United States to furnish such conveniences in their full extent, was Yonkers, N. Y., not within the compulsory section. This town opened one on Labor Day, 1896; and another of brick, fireproof, in 1898, with accommodations for 400 daily baths. Within the act, Buffalo opened its first in 1897; Albany, Rochester, Syracuse, and Troy, have since complied; and in New York the first one, five years after the act was passed, was opened in Rivington Street in a closely packed quarter, during 1900, at a cost of $100,000. It furnishes 3,000 baths a day of 20 minutes each, from 67 spray baths. In Philadelphia the Public Baths Association was organized in 1895; but the first to be opened was in 1898, in a crowded quarter between Fourth and Fifth streets. It is a building of 2½ stories, 40 by 60, constructed of brick and iron, with concrete floors and iron partitions. It cost about $30,000. It has no swimming pool, but only shower baths — a system rapidly coming into favor from its economy of space and water; the People's Baths and the Baron de Hirsch Fund Baths in New York adopt the same plan. The Philadelphia establishment has a public laundry in connection with its own suit and towel laundry, where women and men in separate compartments can wash their clothing for a small fee, and single men make much use of it to wash their underclothing. Pittsburg, Pa., has recently erected a permanent public bath. Some of the old warm-season baths have since been made permanent, as in Newark, N. J., which so extended two in 1898, and in 1900 voted a third. Boston from 1897 to 1899 increased its public baths to 33 — 14 floating, 10 beach, and 9 others; 17 south of the common and 16 north; and prepared to erect permanent structures in each industrial section of the city. The first of these was opened at Dover Street in 1898 — a fine brick and granite structure, with marble partitions and staircases, the whole with land costing $86,000. It has gymnasiums also, and medical directors for each sex to give courses of training, and for cases of accident or sudden illness. The intention is ultimately to make these baths places of public recreation, corresponding to the summer playgrounds; thus reaching in the 20th century the point at which the Romans had arrived in the first. Brookline, adjoining Boston, has a handsomely appointed permanent municipal bath house and so have Worcester, Mass., and Providence, R. I. St. Paul, Minn., through the public spirit of Dr. Ohage, a German physician, now has a public playground, pavilion, etc., connected with permanent bath

houses on what was till recently a waste island in the middle of the Mississippi, near the business centre of the city and between two main bridges. Like most of the other bath establishments, it is free, save a small charge for soap and towels; has free instruction in swimming, and is open every day, including Sundays. The donor calls it an experiment in municipal socialism, being himself a socialist. A very recent phase of the movement is the connection of the system with the public schools. It began in Germany, Göttingen leading the way in 1885 under the headship of the mayor and a professor in the university. Thus far, in the United States it is nearly confined to Boston and its suburbs; in 1900 a number of baths were put into the Paul Revere school in the North End, and in Brookline swimming is a regular part of the school curriculum. As a means of public sanitation, preventing the spread of disease and purifying the air, where the rooms are full of children from the poorer quarters, it has much to commend it.

Bath, Knights of the, an English order concerning the origin of which antiquaries differ. Henry IV., on the day of his coronation, conferred the degree upon 46 knights. From that time the kings of England have bestowed this dignity previous to coronations, after births and marriages of the royal issue, etc. Charles II. created several Knights of the Bath, but after his time the order fell into neglect, till 1725, when George I. revived it. By the book of statutes then prepared, the number of knights was fixed at 38, namely, the sovereign, and 37 knights companions. The king allowed the chapel of Henry VII., in Westminster Abbey, to be the chapel of the order. The limits of the order were greatly extended by the prince regent in 1815, to reward the distinguished services of officers during the wars; and again in 1847, when it was also opened to civilians. It was further enlarged in 1861. It now consists of three classes, each of which is subdivided into (1) military members; (2) civil members, and (3) honorary members, consisting of foreign princes and officers. The first class consists of Knights Grand Cross (G.C.B.); the second of Knights Commanders (K.C.B.); and the third, of Companions (C.B.). The dean of Westminster is dean of the order. The ribbon of the order is crimson, and its motto, "Tria juncta in uno." The name is conjecturally derived from the initiatory ceremony of bathing once practised at the installation of a knight, as symbolical of the purity thereafter required of him.

Bathom'eter, an instrument for measuring the depth of the sea or any large body of water without a sounding line, the name being derived from *bathos,* depth. It was invented by Dr. C. W. Siemens after 1859 as an adjunct to the laying of submarine telegraphic cables, so as to keep a continuous record of the sea depth below a moving ship. The principle of the instrument is based upon the gravitation of the earth, total gravitation being represented by a column of mercury, which rests upon a thin steel diaphragm embossed in such a way that its centre can move within a small range freely up and down under the influence of the mercury column without encountering any frictional resistance. The column ends in a cup, and mercury is poured into both cup and pipe up to a certain point, the space above being filled with water, alcohol, or a liquid of less density, this latter terminating in a spiral tube laid upon a scale at the top of the instrument. The centre of the diaphragm which supports the column of mercury is carried by two or more carefully tempered steel springs, so adjusted that their elastic pressure balances exactly the dead weight of the column of mercury resting upon the diaphragm, the result being that the diaphragm retains its horizontal position. Inclosed in an air-tight casing closed by a disc of plate glass, the instrument records by an ingenious compensating arrangement the natural balance of the elastic and gravity forces on the scale, from which readings are made. Consult Siemens, 'The Bathometer' (1879).

Bathori, bä'tō-rē, or **Battori,** a celebrated Hungarian family which in the 15th century became divided into two branches, one of which gave Transylvania five princes, and Poland one of its greatest kings:

1. Stephen: b. 1532; d. Grodno, 1586. He entered the army, and so distinguished himself that when the death of John Sigismund Zapolya, nephew of Sigismund II., king of Poland, in 1571, left a vacancy in the sovereignty of Transylvania, Stephen Bathori, without courting the honor, was unanimously elected. When the throne of Poland became vacant by Henry of Valois quitting the country in order to mount the throne of France, Stephen Bathori was elected to succeed him in 1575, and was crowned along with his queen, Anne, daughter of Sigismund Augustus, at Cracow, in 1576. He found the kingdom torn asunder by faction, the people enervated by long peace, the treasury exhausted, and the army without discipline. He therefore gave his first attention to internal improvement, but had no sooner effected it than he determined to recover the Polish territories of which the czar of Muscovy had managed to possess himself by fomenting dissensions. He accordingly declared war against him, beat him at all points, and compelled him to accept a disadvantageous peace. Under Stephen Bathori, Poland enjoyed a comparative tranquillity to which it had long been a stranger, and he was meditating important constitutional reforms, which promised to make that tranquillity permanent, when he died suddenly.

2. Sigismund, nephew of Stephen: d. 1613. He became waiwode or prince of Transylvania in 1581, shook off the Ottoman yoke, and, by the great talents he displayed, had begun to give hopes of reigning gloriously as an independent sovereign, when, from mere fickleness and eccentricity of character, he voluntarily resigned his dominions to the Emperor Rudolph II. in return for two principalities in Silesia, a cardinal's hat, and a pension. With the same fickleness, however, he immediately repented of the act, and, availing himself of an invitation by the Transylvanians, returned, and placed himself under the protection of the Porte. The talent which he had displayed, and the good fortune which had followed him in early life, appeared now to have forsaken him; the Imperialists defeated him in every battle, and he was obliged to throw himself on the mercy of the emperor, who sent him to live out the rest of his days at Prague.

Baths of Agrippa, the earliest of the Roman thermæ; erected by Marcus Agrippa in the reign of Augustus. They stood in the Campus Martius, about 20 feet behind the Pantheon. In 1881, on the removal of some houses, ruins were found of a great hall paved with marble and lined with fluted columns.

Baths of Caracal'la, one of the most magnificent of the Roman thermæ, in the southeast part of the city, in which 2,300 men could bathe at the same time. They were begun in 206 A.D. by Caracalla, and completed by Severus. There were stadia for the athletes, galleries for the exhibition of paintings and sculpture, libraries, conversation halls, lecture-rooms, etc. The mechanical skill displayed in their construction was very great. The ruins which still remain are among the most remarkable in Rome.

Baths of Diocletian, the most extensive of the Roman thermæ; in the northeast part of the city, and covering most of the ground between the Porta Collina and the Porta Viminalis. Over 3,000 persons could bathe in them at the same time. They contained a library, picture-gallery, odeum, etc. Michael Angelo transformed the great hall of the Tepidarium into a nave for the Church of S. Marie degli Angeli. One of the *laconica* (hot rooms) forms the vestibule of the church.

Baths of Titus, a structure on the Esquiline Hill in Rome; built by the Emperor Titus. Considerable ruins are found northeast of the Coliseum.

Bathsheba, băth-shē'bä, or băth'shĕ-ba, wife of Uriah, the Hittite, whose story is told in 2 Sam xi. David committed adultery with her, then caused her husband to be slain, and afterward took her to wife. These sins displeased Jehovah, who sent the prophet Nathan to David with the parable of the ewe lamb. David bitterly repented, but yet was punished. Bathsheba was the mother of Solomon, whose succession to the throne she took pains to secure. She is afterward mentioned in the history of Adonijah, in the title of Psalms li., and among the ancestors of Christ (Matt. i. 6).

Bath'urst, Allen, (Earl), English statesman: b. 1684; d. 1775. He was a zealous opponent of the measures of Sir Robert Walpole's ministry, and the intimate friend of Bolingbroke, Pope, Addison, and other great writers of the time.

Bathurst, Henry (2d Earl), son of the preceding, English statesman: b. 1714; d. 1794. In 1771 he was made lord high chancellor of England. He wrote 'Theory of Evidence,' etc.

Bathurst, Henry (3d Earl), son of the second earl, English statesman: b. 22 May 1762; d. 1834. In 1807 he became president of the board of trade; in 1809 secretary for foreign affairs; and in 1812 secretary for the colonies, a post held by him for 16 years. He was also president of the council under Wellington, 1828–30.

Bathurst, Ralph, English clergyman: b. 1620; d. 14 June 1704. He was dean of Wells, and wrote some elegant Latin poems, and was one of the founders of the Royal Society of London (q.v.), which was incorporated in 1660.

Bathurst, Africa, a town on the island of St. Mary's, near the mouth of the Gambia, and capital of the British colony Gambia. Its trade is chiefly in gum, bees'-wax, ground-nuts, hides, ivory, and gold, bartered for cloths and cutlery. Pop. 6,000.

Bathurst, Australia, the principal town in the western district of the colony of New South Wales, on the south bank of the Macquarie River, 144 miles west of Sydney, 2,153 feet above sea-level, and surrounded by hills. It has wide, well-laid-out streets crossing each other at right angles, with a central square planted with trees. The public buildings include the Anglican and Roman Catholic cathedrals, and churches for the Baptists, Congregationalists, Wesleyans, Presbyterians, and others; court-house, jail, and town-hall; post and telegraph offices; a hospital, numerous schools, a school of arts, etc. There are several tanneries, a coach factory, railway workshops, breweries, and flour mills. Soap, candles, glue, boots and shoes, and furniture are also extensively manufactured. Pop. (1900) 9,069.

Bathurst Inlet, an inlet of the Polar Sea, projecting due south about 75 miles out of Coronation Gulf. It is in a direct line between the magnetic pole and Great Slave Lake, and about 300 miles from each.

Bathurst Island, the name of two islands: (1) An island off the northeast coast of Australia, just west of Melville Island, and separated from the mainland of Australia by Clarence Strait on the south, and from Melville Island by Apsley Strait; (2) an island in the Arctic Ocean, discovered by Parry in 1819, lying due south of Grinnell Land, and the most eastern of the group called Parry Islands. It is separated from North Somerset on the south by Barrow Strait, and from North Devon on the east by Wellington Channel.

Bathyb'ius, the name given by Huxley, in 1868, to a supposed organism, a bit of unorganized protoplasm, found at the sea-bottom at great depths. It was structureless, and contained numerous calcareous concretions. Huxley abandoned the idea that it was a living organism. Afterward Bessels gave the name «protobathybius» to a similar slimy moss dredged in Smith's Sound in 92 fathoms, possibly the remains of protozoa or sponges. Bathybius was not rediscovered by the Challenger expedition, and Sir John Murray suspected that the substance was only a gelatinous precipitate of sulphate of lime from sea water mixed with alcohol.

Bath'ycles, Greek artist, supposed to have flourished in the time of Solon, in the 7th century B.C. He was a resident of Magnesia, in Thessaly, on the Mæander, and constructed for the Lacedæmonians the colossal throne of the Amyclæan Apollo, at Amyclæ, near Sparta. Quatremère de Quincy, in his 'Jupiter Olympien,' has given an interesting view of the splendid god and his superb throne, designed from the description of Pausanias.

Bathym'etry, the art of measuring depths in the sea, especially for the purpose of investigating the vertical range of distribution of plants and animals. An extensive series of such bathymetric measurements was made by H. M. S. Challenger (1872–6), the deepest sounding being 4,575 fathoms. In February 1900 the United States surveying ship Nero reported that in surveying for a proposed telegraphic cable line between Honolulu and Manila by way

of Guam and Yokohama, she encountered the greatest ocean depths on record; two casts showing 5,160 and 5,269 fathoms respectively.

Batiste, bä-tēst, a fine, white, very compact linen, distinguished by its delicate, firm, and uniform threads from every other linen texture. The name is derived either from the Indian material *bastas,* or from one of the early manufacturers of it, Baptiste Chambray, who lived in the 13th century, and from whom it was also called the cloth of Chambray, or Cambray; hence the English word cambric.

Batjan, bät-yän', one of the Molucca Islands, lying southwest of Gilolo. It is governed by a native sultan under Dutch suzerainty. The chief industry is the cultivation of spices. Area, 835 square miles; population from 12,000 to 13,000, of which the majority are Malays or Alfores.

Batley, England, a municipal and parliamentary borough, in the West Riding of York, eight miles south of Leeds, and just north of Dewsbury, with which it is united for parliamentary purposes. The houses are chiefly of stone, and rather irregularly built. Batley has an ancient parish church in the Early English style, a town-hall, a grammar and a technical school, mechanics' institute, etc. The principal manufactures are heavy woolen cloths, Batley being the chief seat of the manufacture of heavy woolens. There are also iron foundries, machine-works, collieries, etc. Pop. (1901) 30,300.

Batlle, Lorenzo, Uruguayan statesman: b. Montevideo, 1812. He commanded a body of infantry in the nine years' siege of Montevideo; was minister of war in 1866–8; president of the republic from 1868 to 1872, when he resigned the office and resumed his place as general in the army.

Batna, bät'na, Algeria, a town of the department of Constantine, situated at the foot of Mount Tugurt. It is an important military and trading post. Pop. 8,381.

Baton, bät-on, or bä-tŏn, a short staff or truncheon, in some cases used as an official badge, as that of a field marshal. The conductor of an orchestra has a baton for the purpose of directing the performers as to time, etc. In heraldry, what is usually called the bastard bar, or bar sinister, is properly a baton sinister.

Baton Rouge, La., city, parish-seat of East Baton Rouge, and capital of the State. The name is derived from the French, meaning red baton or stick. The city is situated on the eastern bank of the Mississippi River, 90 miles northwest of New Orleans, and is on the Texas and Pacific and the Yazoo and Mississippi Valley Railroad. It is picturesquely built on a bluff commanding an excellent view of the surrounding country. The houses are mostly of French and Spanish architecture. The river below the city is bordered by sugar-cane plantations, orchards of tropical fruits, private gardens, and villas. It was the capital of the State from 1847 to 1864, when the seat of government was removed to New Orleans. On 1 March 1882, Baton Rouge was again selected as the capital city. The State capital building here was completed in 1852 at a cost of $246,000. It was partially burned during the Civil War but was rebuilt in 1882. The Louisiana State University was organized here in 1860. The city also contains various State institutions, orphan asylum, penitentiary, deaf and dumb, and blind asylums, State agricultural and mechanical college, and agricultural experiment station. There are among other public buildings, the Court House, City Hall, Post Office, Collegiate Institute, High School building, and a National Soldiers' Cemetery.

There are varied and extensive manufacturing interests, including cotton seed products, lumber, sugar, molasses, brick, artificial ice, and agricultural implements. The city has National and State banks, several daily and weekly newspapers. There is a large and growing trade with the surrounding cotton and sugar growing regions. The city has a real property assessed valuation of $2,000,000, actual valuation $3,500,000, exclusive of the valuable City, Parish and State property which is exempt from assessment. In addition to above the personal assessed property is $1,000,000, making a total assessment of $3,000,000, real value $5,000,000.

Baton Rouge is governed under a charter of 1898, by a mayor, elected every four years and a city council, elected every four years. A majority of the municipal officers are selected by the council. The city was one of the earliest French settlements in Louisiana. A convention which met here 21 Jan. 1861, adopted the ordinance of secession on the 26th; the city was taken by the Federal army 7 May 1862. On 5 August the same year a Confederate force numbering 5,000 under command of General John C. Breckenridge, attacked the Federal garrison under General Thomas Williams, but was repulsed after a fierce contest lasting two hours. Gen. Williams was killed and both sides lost heavily. The city was shortly afterward evacuated but a month later was re-occupied by the Federal troops who remained until the close of the war. A former government arsenal here was destroyed during the war. Pop. (1900) 11,269; (1903 est.) 12,500.

W. H. Bynum,
Mayor of Baton Rouge.

Batoni, bä-tō'nē, **Pompeo Girolamo,** Italian painter: b. Lucca, 1708; d. Rome, 1787. The manner in which he executed his paintings was peculiar. He covered his sketch with a cloth, and began to paint the upper part on the left hand, and proceeded gradually toward the right, never uncovering a new place until the first was entirely finished. Boni, who compares him with Mengs, calls the latter the painter of philosophy; the former, the painter of nature. Batoni painted many altar-pieces and numerous portraits, including those of the Emperor Joseph and the Empress Maria Theresa in the imperial gallery. His greatest work is his 'Fall of Simon the Sorcerer,' which was ordered by Cardinal Albani for the church of St. Peter's at Rome, and was intended to be executed in mosaic. His 'Magdalene,' in Dresden, and his 'Return of the Prodigal Son,' in Vienna, are celebrated.

Batrachia, the frogs and toads of the *Anura* order of *Amphibia* (q.v.), comprising the *Ranidæ* frogs, the *Bufonidæ* ordinary toads, the *Hylidæ* tree frogs, the *Pipidæ* Surinam toads, and similar reptiles with the distinguishing characteristic of development from the tailed and gilled tadpole state to a tailless, but leg and lung provided adult condition.

Bat'ta, Africa, a province of the Congo Free State, formerly independent. Its principal towns are Batta and Cangon.

Batta, Sumatra, a district in the northern part of the island, stretching between Sinkell and Tabuyong, on the west, and the Bila and the Rakan on the east. The soil is fertile, and produces chiefly camphor, gum, benzoin, cassia, cotton, and indigo. The language of the Battas is a settled one, and extensively written. Bark or bamboo staves are used in place of books, being written on from bottom to top. Their literature consists chiefly of tales of witchcraft, riddles, stories, etc. There are three dialects. Pop. about 300,000.

Battalion, the tactical unit of command in infantry — that is, the first body that is, as a rule, used independently, and commanded by a field officer (major or lieutenant-colonel). In the United States army eight companies of cavalry and artillery and 10 of infantry constitute a battalion; each infantry regiment has one battalion and those in the **cavalry** and artillery have two.

English battalions are formed of 10 companies for administrative, and eight for tactical purposes. The first 25 regiments have two battalions, the remainder, originally of one battalion each, are linked in pairs according to their territorial derivation. Linked battalions are interchangeable as regards officers, and each shares the honors and advantages of the other. Two regiments of rifles have four battalions each, and the three regiments of the Guards seven battalions in all. The peace strength of a battalion is about 400 men, but varies; its war strength in the field is 1,000, with one lieutenant-colonel, two majors, eight captains, 16 subalterns, four officers of the regimental staff (adjutant, paymaster, quartermaster, and medical officer), and 50 sergeants. The corporals and lance-corporals fall in with the privates in the ranks, and therefore number among the rank and file.

The French infantry is divided into (1) infantry of the line; (2) regiments of zouaves; (3) regiments of *tirailleurs Algériens;* and (4) battalions of *chasseurs à pied.* The 144 regiments of infantry of the line have each four battalions; a battalion (which is divided into four field companies), consisting of 12 commissioned officers, 54 non-commissioned officers, and 264 soldiers — in all 330 men, raised in time of war to 1,000. The regiments of zouaves have in peace 612 men in a battalion, and in war 1,000. The *tirailleurs Algériens,* who in time of peace are stationed in Algeria, have in peace 652 men in a battalion, and in war 1,000. Finally, the *chasseurs à pied* have in peace 468 men, and in war 1,000.

In Germany, with the exception of the 116th (Hesse) regiment, the 148 line regiments have three battalions. The yägers are formed into 26 separate battalions. To each line regiment is attached a landwehr regiment of two battalions, and these latter bear the same number as the regular regiments to which they are affiliated. The five Prussian Guard regiments have 22 officers and 678 men per battalion in peace time, the remaining regiments having 18 officers and 526 men per battalion, and the yägers 22 officers and 526 men. On mobilization for war all battalions are raised to a strength of 22 officers and 1,000 men, with a regimental staff of one commandant, one extra field officer, and one aide-de-camp. Pioneer battalions are practically field engineer bodies, and are divided into pontoniers (for bridging), and sappers and miners (for siege operations, demolition or construction of artificial defenses). They have each three field and one depot company; the former comprising 15 officers and 650 men.

Battenberg, bät'ĕn-bärg, **Alexander, Prince of,** Bulgarian ruler: b. 1857; d. 17 Feb. 1893. He was the second son of the morganatic union between Prince Alexander of Hesse and the Countess von Hauke, who in 1851 received the title of Countess of Battenberg. In 1879 he was chosen Prince of Bulgaria, and in 1885, without consulting Russia, proclaimed the union of eastern Rumelia with Bulgaria. This action exasperated both Russia and Servia, and the latter took up arms against Bulgaria, but was easily defeated by Alexander in the space of two weeks. In August 1886, however, Russian partisans overpowered Alexander in his palace at Sofia, forced him to abdicate, and carried him off to Reni, in Russian territory. Set free in a few days, he returned; but after a futile attempt to conciliate the czar he abdicated in September, and, assuming the title of Count Hartenau, retired to Darmstadt.

Battenberg, Henry Maurice, British soldier: b. Milan, 5 Oct. 1858; d. 20 Jan. 1896. He was the third son of Prince Alexander of Hesse (see BATTENBERG, ALEXANDER, above), and in 1885 married the Princess Beatrice of England, youngest daughter of Queen Victoria. He joined the British expedition of 1895 against Ashanti, and while on his way home died at sea of a fever contracted during his military service.

Battenberg, Louis Alexander, British naval officer: b. Gratz, 24 May 1854. He was the eldest son of Prince Alexander of Hesse (see BATTENBERG, ALEXANDER, above), and in 1884 married the eldest daughter of the Princess Alice Maud Mary, grand duchess of Hesse-Darmstadt, and second daughter of Queen Victoria.

Battenberg, a village in the Prussian province of Hesse-Nassau, from which the sons of Prince Alexander of Hesse (see BATTENBERG, ALEXANDER, above), derive their title of princes of Battenberg.

Battens, pieces of timber of different lengths, used for making floors, and also, after being divided so as to be 2¼ inches wide and 1¼ thick, placed against walls to separate the laths on which plastering is to be put from the walls. In nautical affairs, battens are (1) strips of wood nailed down over the tarpaulins which cover the hatches; (2) similar strips fastened to portions of the rigging to prevent injury from chafing; (3) light frameworks placed on dining tables to keep the dishes from sliding off by reason of the ship's motion, also called fiddles; (4) thin strips of wood placed in pockets on the leach of a sail to prevent wrinkling or bagging.

Battering Ram (Lat. *aries*), the earliest, simplest, and, until the improved usage of artillery, the most effective machine for destroying stone walls and the ordinary defenses

of fortified towns. Its primitive form was a huge beam of seasoned and tough wood, hoisted on the shoulders of men; who, running with it, at speed, against the obstacle, wall, gate, or palisade, made what impression they might against it. The ancients employed two different machines of this kind — the one suspended, and vibrating after the manner of a pendulum, and the other movable on rollers. The swinging ram resembled in magnitude and form the mast of a large vessel, suspended horizontally at its centre of gravity, by chains or cords, from a movable frame. Ligatures of waxed cord surrounded the beam at short intervals, and cords at the extremity, opposite to the head, served for the purpose of applying human force to give the oscillatory motion. Other cords, at intermediate distances, were also sometimes employed. The rolling ram was much the same as the above in its general construction, except that instead of a pendulous motion, it received only a motion of simple alternation, produced by the strength of men applied to cords passing over pulleys. This construction seems to have been first employed at the siege of Byzantium. These machines were often extremely ponderous. Appian declares that, at the siege of Carthage, he saw two rams so colossal that 100 men were employed in working each. Vitruvius affirms that the beam was often from 100 to 120 feet in length; and Justus Lipsius describes some as 180 feet long, and two feet four inches in diameter, with an iron head weighing at least a ton and a half. In contrasting the effects of the battering-ram with those of the modern artillery, we must not judge of them merely by the measure of their respective momenta. Such a ram as one of those described by Lipsius would weigh more than 45,000 pounds, and its momentum, supposing its velocity be about two yards per second, would be nearly quadruple the momentum of a 40-pound ball moving with a velocity of 1,600 feet per second. But the operation of the two upon a wall would be very different. The ball would probably penetrate the opposing substance, and pursue its way for some distance; but the efficacy of the ram would depend almost entirely upon duly apportioning its intervals of oscillation. At first it would produce no obvious effect upon the wall; but the judicious repetition of its blows would, in a short time, give motion to the wall itself. There would first be a barely perceptible tremor, then more extensive vibrations; these being evident, the assailants would adjust the oscillations of the ram to that of the wall, till at length a large portion of it, partaking of the vibratory impulse, would, by a well-timed blow, fall to the earth at once. This recorded effect of the ram has nothing analogous in the results of modern artillery.

Battersea, a district of London, in Surrey, forming, with Clapham, a parliamentary borough, on the right bank of the Thames, across which there is communication by several bridges. There is a fine public park in Battersea, extending over 185 acres, and containing a considerable sheet of water. There is a Church of England training college for schoolmasters and a Wesleyan for schoolmistresses. Clapham and Wandsworth Commons are fine areas of unenclosed ground. Battersea and Clapham send two members to Parliament — one for each division. Battersea parish is a borough under the London Government Act (1899).

Battershall, Jesse Park, American chemist: b. Troy, N. Y., 26 May 1851; d. Poughkeepsie, N. Y., 12 Jan. 1891. He studied chemistry at the Columbia School of Mines, Göttingen, Leipsic, Geneva, and Tübingen. In 1879 he became head of the analytical department of the United States laboratory in New York, a position held until his death. He has published a translation of Naquet's 'Legal Chemistry' (1876); 'Food Adulteration and Detection' (1887).

Batterson, Hermon Griswold, American clergyman: b. Marbledale, Conn., 28 May 1827; d. New York, March 1903. He was ordained to the ministry of the Protestant Episcopal Church in 1866, and held rectorships in San Antonio, Texas; Wabasha, Minn.; Philadelphia, and Church of the Redeemer, New York, 1891. He published 'Missionary Tune Book' (1868); 'Christmas Carols, and Other Verses' (1877); 'Sketchbook of the American Episcopate' (1878, 2d ed. 1884); 'Pathway of Faith'; 'Vesper Bells.'

Batterson, James Goodwin: b. Bloomfield, Conn., 23 Feb. 1823; d. Hartford, Conn., 18 Sept. 1901. He was educated in the public schools of Litchfield, Conn., and in 1845 became an importer of and dealer in granite and marble, with headquarters in Hartford. His business grew into one of the most extensive of its kind in the United States, controlling large granite quarries in Westerly, R. I. He took important contracts for public and private buildings and supplied the stone for the State capitol and Connecticut Mutual buildings in Hartford, the Mutual Life, Equitable Life Insurance Companies' buildings, and Vanderbilt residence in New York. He was the first to use machinery for polishing granite and devised many other improvements. In 1863 he founded the Travelers' Insurance Company, and was its president until his death. Throughout his life, though never holding political office, he was one of the foremost public figures of his city and State. He was an enthusiastic student of political economy, and wrote numerous articles and pamphlets on the money question. He taught himself Greek and became an acknowledged master of it; and he was equally accomplished in several of the modern European languages, his versatility and capacity for work being extraordinary. In the last year of his life he wrote a poem of some length, 'The Beginnings,' dealing with the origin of the universe and life. Publications: numerous articles in 'The Traveler's Record'; 'Gold and Silver as Currency' (1896).

Battery, The, a park of 21 acres forming the southernmost point of New York, occupying the site of the original Dutch fortifications. In the early days of the city the vicinity of the Battery was a very aristocratic quarter, and some of the old houses are still standing. The park now contains the Barge Office and the Aquarium, formerly Castle Garden (q.v.).

Bat'tery, in electricity, an apparatus for the production of voltaic (or dynamic) electricity, by chemical means, or by the direct transformation of heat energy (as in the thermopile). It is admitted that the first electric battery was constructed by the Italian physicist Volta, about the year 1800. Some 20 years before, Galvani, a professor of anatomy at Bologna, had observed the convulsive twitching of frogs' legs, when their muscles and lumbar nerves were simultaneously touched by different metals that were themselves elsewhere in contact, and he had rightly attributed the phenomenon to electricity. Galvani, however, was of the opinion that the electricity was of physiological origin, its seat being within the frogs' legs. Volta, on the contrary, believed that the electricity was generated by the contact of the dissimilar metals, and in this belief he constructed the apparatus which is known as his *couronne de tasses,* or "crown of cups." Placing a series of cups in a circle, he partially filled them with a solution of salt and water, and introduced into each a pair of metallic plates, one of these being zinc, and the other either copper or silver. He connected the zinc plate of each cup with the copper plate of the next, completing the entire circle in this way except at one place, where he attached wires to the terminals, to lead away the electricity generated. Very shortly afterward he constructed the "voltaic pile" on the same general principle, except that he formed it of disks of copper, zinc, and wet cloth, which he piled up in the order: copper, zinc, cloth, copper, zinc, cloth, etc., the lowest plate of all being copper, and the highest zinc. The wires for leading off the electricity were then connected at the top and bottom of the apparatus. It is commonly believed that the "pile" of zinc and copper disks was the first form of his battery; but according to Niaudet this is an error, the column battery being an afterthought, made with a view to produce an instrument that might be easily transported into hospitals for medical purposes. The phenomena exhibited by Volta's "crown of cups" were remarkable enough to attract the attention of the entire scientific world, and improved forms of battery were soon devised. Cruikshank, Wollaston, Muncke, Young, Faraday, and others contributed in this way, but the most of the changes that were made related to the mode of arranging the plates and other similar details, and, save for the substitution of dilute sulphuric acid for the salt solution, no advance of a fundamental nature was made until 1836, when John Frederick Daniell, an English physicist, invented the battery that bears his name, and which, in some respects, has never been surpassed.

The earlier forms of battery, in which the plates were immersed in a salt solution or in dilute sulphuric acid, gave an electrical current for a short time; but hydrogen gas was deposited upon the copper electrode by the passage of the current, thereby lessening the area of the plate in contact with the liquid, and so increasing the internal resistance of the cell. It was found, too, that the products of decomposition cut down the electromotive force of the cell, by tending to establish an electromotive force in the opposite direction from that in which the battery current first flowed — a discovery that has since been put to good use in the storage battery (q.v.). To remove the hydrogen film that was deposited upon the copper electrode, various artifices were adopted, such as agitating the solution, or vibrating the copper plate so as to disengage the bubbles of gas and allow them to rise to the surface of the liquid and escape into the air, or rubbing the plate with a brush to achieve the same end, or roughening it in some way so that the hydrogen bubbles would not cling to it so closely. All these methods were troublesome, and it was reserved for Daniell to devise a form of cell in which the hydrogen is removed, automatically and very perfectly, by chemical means. Within the usual containing vessel of glass, he placed a smaller one made of unglazed earthenware, and known as the "porous cup." The outer compartment was filled with dilute sulphuric acid, and contained the zinc plate. The copper plate was placed within the porous cup, and the space around it was filled with crystals of copper sulphate, water or dilute sulphuric acid being added until the liquid stood at the same level on both sides of the porous wall of the cup. When the electric current passes in a battery of this type, the chemical action may be described in the following way: The sulphuric acid, H_2SO_4, is decomposed into hydrogen, and the radical SO_4 (known as "sulphion"), the sulphion going to the zinc plate, with which it combines to produce zinc sulphate, $ZnSO_4$, a salt which dissolves as fast as it is formed, leaving a fresh surface of zinc constantly exposed. The hydrogen of the primary decomposition goes to the copper plate, but instead of being deposited there, as in earlier forms of battery, it combines with the copper sulphate present, reducing it to metallic copper and sulphuric acid, according to the formula

$$CuSO_4 + 2H = Cu + H_2SO_4.$$

It is evident that the molecule of sulphuric acid that was originally decomposed has now been re-formed again, so that the total quantity of acid present in the cell has not been diminished. The metallic copper that is set free does not interfere in any way with the continued action of the cell, for it is deposited upon an electrode that is already composed of copper. The actual chemical phenomena that occur in the Daniell battery may possibly be more complicated than here indicated, but the final results are the same as those given above.

The valuable feature of the Daniell cell is the remarkable constancy of its electromotive force. In some other respects, however, later forms of battery are superior to it. Thus its electromotive force, although quite constant, is not very great (about 1.07 volts). In 1839 Sir William Robert Grove modified it by substituting strong nitric acid for the solution of copper sulphate, and (since nitric acid will attack copper) platinum plates for the copper ones in Daniell's form. An electromotive force as high as 1.9 volts has been observed with this type of battery, the hydrogen that goes to the platinum electrode being oxidized by the nitric acid, with the formation of nitrous acid and water. The chief objections to Grove's battery are the nitrous fumes that it gives off, and the expense of the platinum required. In 1843 Robert Bunsen found that the latter objection could be readily overcome by

replacing the platinum electrodes by plates of carbon. Except for this substitution, his battery is identical with Grove's, and will give substantially the same electromotive force. It is said that the idea of using carbon instead of platinum occurred to Grove himself, and that he made several public experiments with carbon; but these were not entirely successful, and when Bunsen showed the feasibility of using it, they had been forgotten. Many modifications of the Daniell battery have been proposed. Of these the "gravity battery" is one of the most interesting. It is identical in general theory with the Daniell cell, but contains no porous cup, the liquids being kept separate by their different densities. The copper electrode is placed in the bottom of the cell, and the zinc is suspended near the top. The containing vessel is nearly filled with a solution of copper sulphate, a small quantity of solution of zinc sulphate being floated on the top. The copper sulphate solution, being the denser, remains in the lower part of the cell, and the surface of separation of the two liquids descends, slowly, as the battery is used, owing to the gradual diminution of the quantity of copper sulphate present, and the corresponding increase in the quantity of sulphate of zinc. Gravity batteries, if carefully installed, are quite serviceable, and need but little attention. They are used to a considerable extent for telegraphic purposes, when dynamo-electric currents cannot be had conveniently. Batteries in which the depolarizing agent is a salt of chromic acid are now used very commonly for work in which a large current is wanted for a considerable time. Bichromate of potassium is the salt commonly employed as the depolarizer, its use having been first suggested by Johann Christian Poggendorff, a noted professor of physics at Berlin. Bichromate of potash batteries are made in various forms, some with porous cups and some without. The commoner type has no cup, but consists of zinc and carbon electrodes, immersed in a solution consisting essentially of one ounce of bichromate of potassium and one fluid ounce of concentrated sulphuric acid, to every 10 ounces of water. It is well to add, also, about 1 grain of mercurous sulphate to each ounce of the solution, in order to keep the zincs well amalgamated. A bichromate battery so constructed has an electromotive force of about 2 volts, and can be run on a comparatively low resistance for some time without greatly falling off in its voltage. It is not to be compared for constancy, however, with the batteries of Daniell, Grove, and Bunsen. All the batteries thus far described should have their zincs well amalgamated, by rubbing with dilute sulphuric acid and mercury till a bright, mirror-like surface is obtained. The mercury does not enter into any chemical relations with the other contents of the cell, but it has the power of dissolving zinc in preference to other substances that may be present as impurities in the electrode to which it is applied, and so keeping a fresh surface of the pure metal constantly exposed to the battery liquid.

The sal ammoniac cell invented by M. Georges Leclanché is exceedingly useful for ringing bells, operating telephones, lighting gas jets, and other work where a transient current is desired, though it "runs down" (or loses its electromotive force) rapidly when used for any considerable time on a closed circuit, recovering again in a short time when left to itself. In its original form it contained a porous cup, in which was a carbon electrode, surrounded by a mixture of pulverized carbon and manganese dioxid. The outer compartment contained the zinc electrode, and the liquid used was a solution of sal ammoniac (ammonium chloride). In recent years the porous cup has been commonly omitted, the depolarizing mixture of carbon and manganese dioxid being compressed into blocks and bound directly to the carbon electrode by means of rubber bands. The electromotive force of the Leclanché cell is about 1.48 volts, when it has been left at rest for some time. In the place of the depolarizing compound given above, a mixture of 55 parts of sulphur, 40 of gas-coke powder, and 5 of shellac is also used. So-called "dry cells" have come into favor greatly during the past few years. These cells are not really dry, except in the sense that they do not contain any free liquid that can run out if the cell is inverted. They contain electrodes of carbon and zinc, the space between which is filled with a paste that acts as a depolarizer. Many different compositions have been recommended for the paste, among them the following, which is said to give excellent results: Charcoal, 3 parts; graphite, 1 part; peroxide of manganese, 3 parts; slaked lime, 1 part; "white arsenic" (arsenic trioxide), 1 part; a mixture of glucose and starch, 1 part; all by weight. These are to be intimately mixed while dry, and then worked into a smooth paste with equal parts of a saturated solution of sal ammoniac and a similar solution of common salt, to which one tenth (by volume) of a saturated solution of corrosive sublimate and one tenth (also by volume) of hydrochloric acid have been added. Dry batteries are not intended for continuous service, but (like the Leclanché element, to which they are closely related) for the production of transient currents, at considerable intervals.

A form of battery, devised by Mr. Latimer Clark for use in laboratories as a standard of electromotive force, is now commonly employed for this purpose in all exact electrical researches, where the precise determination of an electromotive force is important. As described in his original paper ('Philosophical Transactions' 1875), the cell contains zinc, sulphate of zinc, sulphate of mercury, and mercury; the zinc and mercury forming the respective electrodes. All the materials used must be chemically pure, both the mercury and the zinc being distilled. The sulphate of mercury used in the cell is the *mercurous* salt, Hg_2SO_4, which is prepared by treating pure mercury with an equal weight of pure concentrated sulphuric acid, the mixture being warmed, but kept well below the boiling point (212° F.). The white solid that is produced should be removed before all of the mercury disappears, in order to avoid the formation of the *mercuric* sulphate ($HgSO_4$), which is detrimental to the battery, and which may be recognized, when present in any considerable quantity, by its transformation, upon addition of water, into a yellow basic salt (perhaps $HgSO_4.2HgO$), and free sulphuric acid. The mercury sulphate should be thoroughly washed, before use,

to remove the last trace of free acid. The zinc sulphate is used in the form of a saturated solution, prepared by dissolving the compound in boiling water, and then allowing it to cool. The sulphate of mercury is made into a thick paste with the zinc sulphate solution, and the whole is then heated to 212° F., to expel any air that may be present. The bottom of the cell that is to be used is then well covered with mercury (which is to serve as the positive electrode), after which the paste is poured in. The zinc is suspended in the paste, and the vessel is finally sealed with melted paraffin. The positive connection is made by sealing a platinum wire into the bottom of the cell, or by running the wire down through the paste to the mercury, protecting it by a glass tube. When great accuracy is desired, numerous minute precautions must be observed in the manufacture of these cells, and also in their subsequent use. Such details are to be found chiefly in papers that have appeared in the various scientific journals. (See, for example, Glazebrook and Skinner, 'Philosophical Transactions, A,' 1892.) There is still some small difference of opinion among the various authorities as to the exact electromotive force of the Clark cell, but it is certainly very close to 1.433 volts at 60° F., and it varies about 0.00061 volt per Fahrenheit degree, being lower at higher temperatures, and *vice versa*. Various attempts have been made to devise an electric battery in which some substance other than zinc shall be consumed, to furnish the electrical energy. Iron has been used with some degree of success, but, for one reason or another, iron-consuming batteries have never come into general favor. Magnesium batteries have also been used to a limited extent; a magnesium-carbon element, with a bichromate of potassium depolarizing solution, giving an electromotive force as high as 2.95 volts. The expense of batteries consuming magnesium is too great, however, to permit them to be used for any but experimental purposes.

The ideal electric battery would be one in which carbon is the substance consumed, and inventors have turned their attention to this particular problem with great energy, but with no very considerable measure of success, although there does not appear to be any theoretical reason why a practical and serviceable battery of this sort may not be ultimately discovered. A quarter of a century ago, M. Jablochkoff constructed a cell in which the liquid was melted nitrate of soda or nitrate of potash, the negative electrode (or electrode to be consumed) being of coke, while the positive one was of platinum or cast iron. The coke electrode is brought to incandescence over a part of its surface, before being immersed in the liquid. Upon immersion the coke then burns fiercely, obtaining its oxygen from the melted nitrate, and sending forth large volumes of carbon dioxid gas. While the combustion continues, the cell is capable of generating quite a sensible electric current; but it does not appear that its electromotive force has been determined with any great precision. M. Jablochkoff's carbon-consuming battery cannot be regarded as more than a scientific curiosity, but it is nevertheless interesting, because it demonstrates the possibility of a carbon-consuming battery. About 1895 Dr. William W. Jacques devised a form of electric battery which was thought, for a time, to obtain its energy from the oxidation of carbon. Each cell consisted of a cast-iron pot, which served as a containing vessel, and at the same time as the positive electrode. The negative electrode was a stick of carbon, suspended centrally in the cell. The liquid was caustic soda or caustic potash, which was kept in a state of fusion by means of a furnace, and through which a stream of air was blown, by means of a kind of rose nozzle entering at the bottom of the pot. The electromotive force of a single cell of this battery is about 0.9 volt. Dr. Jacques' theory of the cell was that the furnace merely served to keep the caustic melted, while the electric energy furnished by the battery had its origin in the oxidation of the carbon rods in the cells, the oxygen needed for this oxidation being furnished by the blast of air. In the course of some tests carried out by Dr. Jacques and others with this idea in mind, the loss in weight of the carbon rods was compared with the output of electrical energy yielded by the battery, the result being that the apparatus showed an efficiency, in one case, of no less than 87 per cent. Unfortunately, investigations made by others do not justify Dr. Jacques' hypothesis as to the origin of the electrical energy in his battery. Thus Mr. C. J. Reed showed that the disintegration of the carbon is merely incidental, and that the carbon can be replaced by iron, brass, copper, german silver, or other metallic bodies, without detriment to the battery. He also found that the cell works much better and lasts much longer, if the caustic potash is replaced by nitrate of potash; and, finally, he proved that a blast of common illuminating gas may be substituted for the air, without lessening the electrical yield of the apparatus. These results established the fact, beyond doubt, that the Jacques battery is not a galvanic battery at all, but a form of the thermo-electric apparatus, drawing its energy from the fuel that is consumed in the furnace below the pots. The chemical energy of the coal in the furnace is first transformed into heat, and only later into electrical energy. The battery is therefore amenable to the second law of thermodynamics (q.v.), which is the great obstacle that the successful carbon-consuming battery must avoid. See ELECTRICITY; STORAGE BATTERY.

In law, the unlawful beating of another, or even the touching him with hostile intent. It is legitimate for a parent or a master to give moderate correction to his child, his scholar, or his apprentice. A person who is violently assailed by another may strike back in self-defense. He may do so also in defense of his property. But to strike anyone in anger, however gently, without these justifications, exposes one to the liability to be prosecuted for assault and battery, the assault being the menacing gesture and the battery the actual blow. Wounding and mayhem are a more aggravated kind of battery.

In military art, any work in which one or more cannon are planted, and which may be permanent or temporary. See FORTIFICATION.

Batteux, ba-tė, **Charles**, French scholar, honorary canon of Rheims: b. Alland'huy, 1713; d. 14 July 1780. He displayed his gratitude to this city, in which he received his education,

by the ode 'In Civitatem Remensem' (1739), which was much admired. In 1750 he was invited to Paris, where he taught rhetoric in the colleges of Lisieux and Navarre. He was afterward appointed professor of Latin and Greek philosophy at the Royal College. In 1754 he became a member of the Academy of Inscriptions, and in 1761 of the French Academy. Batteux left a large number of valuable works. He did much service to literature and the fine arts, by introducing unity and system into the numerous canons of taste, which had gained a standing among the French by the example of many eminent men, particularly in regard to poetry, and must be regarded as a valuable writer on æsthetics, notwithstanding the higher point of view from which this science is now considered. Some of his most valuable works are: 'Les Beaux-Arts réduits à unmême Principe,' (1747); and 'Cours de Belles-Lettres ou Principes de la Littérature' (1774). These works were translated into several other languages.

Batthyanyi, bŏt'yä-nye, **Count Kasimir,** Hungarian statesman, minister of foreign affairs during the Hungarian revolution: b. 4 June 1807; d. Paris, 13 July 1854. From his earliest childhood he took a lively interest in public affairs, and after having, as member of the Hungarian diet, opposed the Austrian government, he became, at the outbreak of the revolution, one of the prominent champions of Hungarian independence, devoting his wealth and influence to the promotion of this cause, and at the same time distinguishing himself on various occasions by his courage and skill on the battlefield. After having officiated as governor of various provinces, he became minister of foreign affairs, under the administration of Kossuth, and subsequently he shared his exile in Turkey until 1851, when he repaired to Paris, where he died. Although sympathizing with Kossuth in some respects, he differed from him in others, and addressed, in 1851, a series of letters to the London *Times,* in which he reflected rather severely upon Kossuth's character as statesman and patriot.

Batthyanyi, Count Louis, Hungarian patriot: b. Pressburg, 1809; d. 6 Oct. 1849. He entered the army as a cadet at the age of 16, and on coming into possession of a large fortune, abandoned a military for a diplomatic career, and in process of time attained the rank of leader of the opposition in the Hungarian diet. Upon the breaking out of the commotions of 1848, Batthyanyi took an active part in promoting the national cause, and with a company of armed vassals came forward to assist it in the field. On the entry of Windischgrätz into Budapest in January 1849, he was arrested in the house of his sister-in-law, the Countess Karolyi. After being conveyed to various places he was finally brought back to Budapest, tried by court-martial, and condemned to be hanged. The execution of this sentence he prevented by inflicting several wounds with a poinard on his neck, and he was accordingly shot.

Batti'adae, a dynasty of Cyrene which reigned from the 7th to the 5th century B.C. The kings of this dynasty were: Battus I., the founder of Cyrene; Arcesilaus I., his son; Battus II., son of Arcesilaus, who greatly increased the power of Cyrene; Arcesilaus II., son of Battus II.; Battus III., son of Arcesilaus II.; Arcesilaus III., son of Battus III., who submitted to the Persian king; Battus IV., son of Arcesilaus III.; Arcesilaus IV., son of Battus IV., the last king of Cyrene, killed in a revolution. He is celebrated in fourth and fifth Pindaric odes.

Battik, an oriental production of the natives of the Dutch East Indies, who decorate their clothing with it; also made in The Hague for local use and export. Upon a piece of linen various designs are outlined with a pencil. When the design is completed, the ornamented parts of the fabric are covered with a liquid which possesses the quality of stiffening after being applied. The parts not ornamented are dyed the desired color. After the entire fabric has been ornamented in this manner, it is boiled in hot water so as to take the hard stuff out of the battik. The dyed parts will then hold the dye and the battik is ready. The Hague people were the first to introduce battik into Europe It is made on linen, silk, velvet, and leather, and is exported to all the principal cities of Europe.

Battle, Cullen Andrews, American military officer: b. Powelton, Ga., 1 June 1829. He was graduated from the University of Alabama; admitted to the bar in 1852 and practised till 1860; was a Breckenridge and Lane Presidential elector, and accompanied William L. Yancy in his canvass of Alabama. At the outbreak of the Civil War he entered the Confederate army, and during the war was wounded seven times, promoted brigadier-general on the field of Gettysburg, and major-general in October 1864. After the war he engaged in journalism in Newbern, N. C.

Battle, Kemp Plummer, American educator: b. Franklin County, N. C., 19 Dec. 1831. He graduated at the University of North Carolina in 1849; was a member of the State convention of North Carolina in 1861 that passed the ordinance of secession; State treasurer, 1866–8; president of the University of North Carolina 1876–91; and afterward professor of history there. His works include: 'History of the Supreme Court of North Carolina'; 'History of Raleigh, North Carolina'; 'Trials and Judicial Proceedings of the New Testament'; 'Life of General Jethro Sumner,' as well as numerous writings relating to the history of North Carolina.

Battle, England, a market-town in Sussex. It is situated in a valley nearly encircled by wooded hills, seven miles northwest of Hastings, and consists chiefly of one irregular street, in which there are many old-fashioned buildings; it is well supplied with water, and lighted with gas. The church is ancient, and contains some fine specimens of painted glass and numerous antique monuments. There are places of worship also for Wesleyans, Baptists, Roman Catholics, and Congregationalists, and endowed schools. Battle was long celebrated for the manufacture of gunpowder. The original name of this place was Senlac, and it received its present name from the battle of Hastings which was fought here. In memory of the battle William the Conqueror erected a great abbey, the ruins of which have a circumference of about a mile. This building has almost entirely disappeared, but interesting re-

mains of a subsequent building exist, including the gateway, a beautiful specimen of the decorated English style. One portion of this building now forms a mansion, which until very lately was the residence of Lord Rosebery's mother, the Duchess of Cleveland. See Walcott, 'History of Battle Abbey' (1867); Duchess of Cleveland, 'The Roll of Battle Abbey' (1889). Pop. (1901) 2,996.

Battle. The object of a war may be obtained in two different ways: one party either forces the enemy, by skilful manœuvres, marches, demonstrations, the occupation of advantageous positions, etc., to quit the field (which belongs to the province of strategy); or the hostile masses approach each other, so that a battle becomes necessary to determine which shall keep the field. Troops may either meet by design or by chance. When they meet by chance, and are thus obliged to fight, it is called a rencontre. The rules for insuring a successful issue, whether they respect the preparations for the conflict, or the direction of the forces when actually engaged, belong to tactics, in the narrower sense of the word Strategy also shows the causes which bring armies together, and produce battles without any agreement between the parties. It may be sufficient to say, in general, that armies in their marches (and consequently in their meeting) are chiefly determined by the course of the mountains and rivers of a country. In ancient times and the Middle Ages the battle-ground was often chosen by agreement, and the battle was then a mere trial of strength, a sort of duel; but, in our time, such trifling is done away with. War is now carried on for the real or pretended interest of a nation, or of a ruler who thinks or pretends that his interest is that of the nation. Wars are now undertaken for the purpose of fighting, and battles are merely the consequence of pursuing the purpose of the war. They arise from one party's striving to prevent the other from gaining his object. Every means, therefore, of winning the battle is resorted to, and an agreement can hardly be thought of. In this respect a land battle is entirely different from a naval one. The former is intended merely to remove an obstacle in the way of gaining the object of the war; the destruction of the enemy, therefore, is not the first thing sought for. But the object of a naval engagement is, almost always, the destruction of the enemy; those cases only excepted in which a fleet intends to bring supplies or reinforcements to a blockaded port, and is obliged to fight to accomplish its purpose.

As the armies of the ancients were not so well organized as those of the moderns, and the combatants fought very little at a distance, after the battle had begun manœuvres were much more difficult, and troops, when actually engaged, were almost entirely beyond the control of the general. With them, therefore, the battle depended almost wholly upon the previous arrangements, and the valor of the troops. Not so in modern times. The finest combinations, the most ingenious manœuvres, are rendered possible by the better organization of the armies, which, thus, generally at least, remain under the control of the general. The battle of the ancients was the rude beginning of an art now much developed. It is the skill of the general, rather than the courage of the soldier, that now determines the event of a battle.

Battles are distinguished into offensive and defensive. Of course, a battle which is offensive for one side is defensive for the other. Tacticians divide a battle into three periods — that of the disposition, that of the combat, and the decisive moment. The general examines the strength, reconnoitres the position, and endeavors to learn the intention of the enemy. If the enemy conceals his plan and position, skirmishes and partial assaults are often advisable, in order to disturb him, to obtain a view of his movements, to induce him to advance, or with the view of making prisoners, who may be questioned, etc. Since the general cannot direct all these operations in person, officers of the staff assist him; single scouts or small bodies are sent out, and spies are employed. Every means is made use of for obtaining information regarding the enemy, or the ground on which the battle is likely to take place. According to the knowledge thus acquired, and the state of the troops, the plan of battle, or the disposition, is made; and here military genius has an opportunity to display itself. To the disposition also belongs the detaching of large bodies which are to co-operate in the battle, but not under the immediate command of the chief. The plan of the battle itself, the position of the troops, etc., is called the order of battle (*ordre de bataille*). This is either the parallel, or the inclosing (if the enemy cannot develop his forces, or you are strong enough to outflank him), or the oblique. When each division of troops has taken its position, and received its orders, and the weaker points have been fortified (if time allows it), the artillery placed on the most favorable points, all chasms connected by bridges, villages, woods, etc., taken possession of, and all impediments removed as far as possible (which very often cannot be done, except by fighting), then comes the second period — that of the engagement. The combat begins, either on several points at a given signal, as is the case when the armies are very large, and a general attack is intended, as, for instance, at Leipsic, where three fireballs gave the signal for battle on the side of the allies; or by skirmishes of the light troops, which is the most common case. The artillery endeavors to dismount the batteries of the enemy, to destroy his columns, and, in general, to break a passage, if possible, for the other troops. The forces, at the present day, are brought into action mostly in open order, and not, as formerly, in long but weak lines. Here the skill of the commanders of battalions is exerted. Upon them rests the principal execution of the actual combat. The plans and orders of a general reach only to a certain point; the chiefs of battalions must do the great work of the battle. Before the battle, the general places himself upon a point from which he can see the conflict, and where he can easily receive reports. A few men are near him as his bodyguard; others take charge of the plans and maps; telescopes are indispensable. He often sends one of his aides to take command of the nearest body of cavalry, in order to execute a new movement quickly. He receives the reports of the generals under him; disposes of the troops not yet in action; strengthens weak points; throws his force on the enemy where he sees

them waver; or changes, if necessary, with a bold and ingenious thought, the whole order of battle. The general now uses every means to bring on the third period of the battle—the decisive moment.

In the Austro-German campaign of 1866, and the still more important Franco-German campaign of 1870, great changes were developed both in strategy and tactics. The changes in strategy were due chiefly to the ease with which the general could direct detached bodies of troops over a wide area by means of the telegraph, and the facility with which troops, provisions, and ammunition could be moved from point to point by railway. The changes in tactics, again, arose chiefly from the longer range and quicker firing capacity of modern rifles, and the greater importance attached to the massed firing of long-range breech-loading artillery. Still greater changes in tactics and strategy have been brought about by such recent inventions as those of smokeless powder and lyddite shells, and in the Spanish-American and Anglo-Boer wars these changes were made very manifest. See also STRATEGY; TACTICS.

Battle Above the Clouds, The, the name given to that portion of the battle of Chattanooga fought on Lookout Mountain, Tenn., 24 Nov. 1863. See CHATTANOOGA, BATTLE OF.

Battle Axe, a military weapon much used in the early part of the Middle Ages, particularly by those who fought on foot. It was not uncommon, however, among the knights, who used also the mace, a species of iron club or hammer. Both are to be seen in the different collections of old arms in Europe. The Greeks and Romans did not employ the battle axe, though it was found among contemporary nations. In fact, the axe is one of the earliest weapons, its use as an instrument of domestic industry naturally suggesting its application for purposes of offense; but, at the same time, it has always been abandoned as soon as the art of fencing, attacking, and guarding was cultivated; because the heavier the blow given with this instrument, the more will it expose the fighter. It never would have remained so long in use in the Middle Ages had it not been for the iron armor, which protected the body from every thing but heavy blows. In England, Ireland, and Scotland, the battle axe was much employed. At the battle of Bannockburn, King Robert Bruce clave an English champion down to the chin with one blow of his axe. The Lochaber-axe remained a formidable weapon in the hands of the Highlanders to a recent period, and was used by the old city guard of Edinburgh. A pole axe is a long-handled battle axe.

Battle of the Books, The, a famous work by Jonathan Swift, written in 1697, but remaining in manuscript until 1704. It was a travesty on the endless controversy over the relative merits of the ancients and moderns, first raised in France by Perrault. Its immediate cause, however, was the position of Swift's patron, Sir William Temple, as to the genuineness of the 'Letters of Phalaris.' The work, was not taken with entire seriousness by Swift's contemporaries.

Battle of the Salient. See SPOTTSYLVANIA COURT HOUSE, BATTLES OF.

Battle Creek, Mich., a city of Calhoun County, situated on the Kalamazoo River at its junction with the Battle Creek, and on the Grand Trunk Western, Michigan Central, and Detroit, Toledo & Milwaukee Railroads, 121 miles west of Detroit and 163 miles east of Chicago.

Industries, Banks, Etc.—Battle Creek is located in the midst of the best farming section of the State and agriculture and fruit-growing are carried on extensively. It is as a manufacturing city, however, that Battle Creek is best known, having more than 70 factories in active operation employing about 5,000 people. The weekly pay-roll of factories alone is over $100,000. There are large plants which make more threshing machines, traction engines and steam pumps than are made in any other city in the world. There are also planing mills, boiler works, brick yards, flouring mills, foundries, cigar factories, bot'ling works, ice plants, ironworks, candy factories, a brewery, pipe-organ factory, etc. The city is also noted for the manufacture of cereal foods. The Grand Trunk Western shops are located here, this being the only division between Port Huron and Chicago. There are two national, two State and one private banks, with a combined capital of $450,000, surplus $226,000, and deposits $4,216,000.

Societies, Buildings, Education, Etc.—Battle Creek has over 50 secret and fraternal societies, a Nature Club, a Musical Union, a Woman's Club, a Woman's League which owns a business block and has a noon-day rest and free dispensary, a Y. W. C. A. and Y. M. C. A., a company of State militia and the Athelstan Club, a social organization, composed of business and professional men. The Young Men's Christian Association building is the gift of the late Charles Willard and cost $40,000. The new public library costing $70,000 is also the gift of Mr. Willard. A fine hospital costing $35,000 was presented to the city by the late John Nichols. Other interesting buildings are the Post Theatre (costing $60,000), Post Tavern, the Phelps Sanatorium, and Battle Creek Sanitarium (q.v.). The city has over 20 churches and is known as one of the largest centres of the Seventh Day Adventists (see ADVENTISTS). There are 10 public schools, 100 teachers and over 4,000 children of school age, a Catholic parish school, and three business colleges. Over $90,000 was spent for school maintenance in 1903. There are daily and weekly papers and a number of monthly publications, some of them published in foreign languages.

History, Government, Etc.—Battle Creek was first settled in 1832 by families from New York and New England and has always been noted as a distinctively American city, the percentage of foreign born citizens being relatively small. It was incorporated as a city in 1859 and its government is under a general charter and a council of 10 members, five of whom are elected each year for a term of two years. The city owns its own water system with a capacity of over 1,500,000 gallons of water per day; has paid fire and police departments, electric light and gas plants, and two telephone systems. The city owns a splendid park at Lake Goguac, and is an attractive summer resort on account of the numerous lakes in the vicinity. Battle Creek stands third among the cities of the State in the amount

of post-office business, exceeded only by Detroit and Grand Rapids. Pop. (1904 census) 22,213.

CHAS. E. BARNES,
City Editor 'Journal.'

Battle Creek Sanitarium, The, is a philanthropic and humanitarian institution operating under a perpetual charter which compels the use of all the profits gained to foster the spread of humanitarian work. More than 60 branches of the parent institution have been established in or near large cities in different parts of the world, under the title of The American Medical Missionary Association, and each of these branches conducts a life-saving business on Good Samaritan principles. The organization began its work in the year 1866, with almost no capital and only one patient, in a small two-story frame house, in the then small village of Battle Creek, Mich. The incorporators believed that Christianity should be expressed in works as much as in faith, in curing the sick and healing the wounded, and thus preparing the unfortunate for the reception of moral and spiritual inspiration.

The Golden Rule is the foundation principle of the institution. It has grown from a small beginning to the immense proportions of the present time, with one of its buildings nearly a thousand feet in length and six stories in height and numerous other buildings radiating from the main one and scattered about it in a finely wooded park. Fire destroyed the old building and all its contents, but it was soon rebuilt larger and better than before, and has grown to its present proportions.

Battle Cry of Freedom, The, a patriotic song of the American Civil War by the well-known composer, George Frederick Root (1861).

Battle of Dorking, The, a realistic, matter-of-fact description of an imaginary invasion of England by a foreign power, by Charles Cornwallis Chesney. It appeared first in 'Blackwood's Magazine' in 1871, and has since been reprinted under the title 'The Fall of England.' After the ignominious defeat of the French at Sedan, Col. Chesney, professor of military history at Sandhurst, foresaw a similar fate for his own country unless it should reorganize its army. He urged vigorous measures of reform; and as the necessity for these was not perceived by the country at large, he contributed to the press various articles, both technical and popular, among them 'The Battle of Dorking.' The fleet and army are scattered when war is declared, but the government has a sublime confidence that British luck and pluck will save the country now as hitherto. To universal surprise and consternation, the hostile fleet annihilates the available British squadron, and the enemy lands on the south coast. Volunteers are called out, and respond readily; but ammunition is lacking, the commissariat is unorganized, and the men, though brave, have neither discipline nor endurance. The decisive battle is fought at Dorking, and the British are routed and England, without other alternative, is compelled to submit to the humiliating terms of the conqueror.

Battle of the Bloody Angle. See SPOTTSYLVANIA COURT HOUSE, BATTLES OF.

Battle of the Frogs and Mice, The, an ancient Greek mock epic, written in hexameters. Formerly attributed to Homer. Modern critics are of the opinion that the credit of authorship should be given to Pigres (q.v.). Only 316 lines are now extant.

Battle-Ground, Ind., a town in Tippecanoe County, where the famous battle of Tippecanoe was fought between the United States troops under Gen. Harrison and the Indians under Tecumseh and his brother, "The Prophet," 7 Nov. 1811.

Battle Hymn of the Republic, The, a celebrated poem by Mrs. Julia Ward Howe, published in the 'Atlantic Monthly' in 1862, and sung to the air, "John Brown's Body."

Battle of the Kegs, The. See HOPKINSON, FRANCIS.

Battle, Law of, the contest between male animals for possession of the females, among barbarous nations. Among certain tribes of the North American Indians the men wrestled for any women to whom they were attached. With the Australians the women were the constant cause of war, both between the individuals of the same tribe and between distinct tribes. In mammals the male, says Darwin, appears to win the female much more through the law of battle than through the display of his charms. The most timid animals, even the hare, will fight desperately, the duel only ending by the death of one of the parties. Male moles, squirrels, and beavers have been seen fighting for their mate.

Battle Monument, a monument in Baltimore, Md., erected in memory of those who fell in defense of the city when it was attacked by the English forces in September 1814.

Battle of the Spurs, a battle of Guinegate, 16 Aug. 1513, in which the French cavalry were defeated by the forces of Henry VIII. of England and the Emperor Maximilian. It was thus named on account of the numberless gilt spurs gathered by the victors.

Battle, Trial by, or **Wager of,** an obsolete method of deciding cases, whether civil or criminal, by personal combat between the parties or their champions in presence of the court. A woman, a priest, a peer, or a person physically incapable of fighting could refuse such a trial. This mode of trial ended in Scotland with the close of the 16th century. See Stephen, 'History of the Criminal Law of England' (1883); Neilson, 'Trial by Combat' (1890).

Battledore and Shuttlecock, a popular game invented in the 14th century. The implements are a bat shaped like a tennis racket and strung with gut or covered with parchment, and a shuttlecock consisting of a cork stuck with feathers, which is batted to and fro between the players.

Battleford, the chief town of the Saskatchewan district of the Northwest Territories of Canada, on the river Battle near its junction with the North Saskatchewan, about 100 miles from Prince Albert. The Riel insurrection began near Battleford. It was the capital of the Northwest Territory, 1876–83. Pop. (1901) 797.

Battle-ship. See NAVAL ARCHITECTURE; WARSHIPS, MODERN.

Batwa, bät'wą, a tribe of pygmies living in the Wissmann Falls district of southern-central Africa. They are sometimes less than four feet high, but well shaped and well developed. They live in villages and are under the protection of the Bakuba. Their food consists of meat, wild roots, and a few vegetables which they cultivate. Their weapons are knives, bows and arrows, poisoned with the juice of the root of a species of Euphorbia. Their household furniture is very simple, and they do not make pottery, weave, or work in metals.

Bauan, bow'an, or **Bauang,** Philippines, a town of Luzon in the province of Babangas, 4 miles northeast of the town of Babangas, Pop. 39,659.

Baucher, bō-shā, **François,** French hippologist: b. Versailles, 1796; d. Paris, 14 March 1873. He is remembered because of his method of training saddle horses and his book 'Methode d' Equitation basée sur des nouveaux principes' (1842).

Baucis, in mythology, a Phrygian woman, the wife of Philemon. They received Jupiter and Mercury hospitably, after these gods had been denied hospitality in the whole country while traveling in disguise. A deluge destroyed the remainder of the people, but Philemon and Baucis, with their cottage, were saved. They begged the gods to make their cottage a temple, in which they could officiate as priest and priestess, and that they might die together; which was granted. Philemon and Baucis are, therefore, names often used to indicate faithful and attached married people. See PHILEMON.

Baudelaire, bōd-lār, **Charles Pierre,** French poet: b. Paris, 9 April 1821; d. 30 Aug. 1867. In early life he resided for some time in the East Indies, and on his return devoted himself to literature. He first gained some reputation by translations from the works of Edgar Allan Poe, four volumes of which appeared in 1856–65, regarded as masterpieces in their way. A production, however, that caused greater sensation was a collection of poems designated 'Les Fleurs du Mal' (1857), which had to be expurgated as the result of proceedings on the part of the police authorities. This work gave Baudelaire a high position as a writer of the romantic school, and evidenced at the same time his curious inclination for repulsive subjects. A work of higher tone was his 'Petits Poëmes en Prose'; others being 'Les Paradis Artificiels'; 'Opium et Haschich'; a monograph on Théophile Gautier; and 'R. Wagner et Tannhäuser à Paris.' Apart from his verse, however, Baudelaire's finest work is contained in his 'Little Poems in Prose.' All of these are exquisitely written, and in many of them the beauty of the thought is equal to the beauty of the language. He united a remarkably keen analytic faculty with a powerful, sombre imagination. Brooding melancholy, curiously tinctured with irony, inspires the solemn music and dream-like imagery of his best verses. The writer whom, in many respects he resembles most strongly is Edgar Allan Poe. See James, 'French Poets and Novelists' (1884); Asselineau, 'Charles Baudelaire et vie et son oeuvre' (1889).

Baudens, bō-dăn, **Jean Baptiste Lucien,** French surgeon: b. Aire, 3 April 1804; d. 3 Dec. 1857. He was a surgeon in the French army in Algeria 1830–41 and founded a hospital there in which he taught surgery for nine years. He published 'Nouvelle Méthode des Amputations' (1842); 'La Guerre du Crimée'; 'Clinique des Plaies d'Armes a Feu.'

Baudin, bō-dăn, **Nicolas,** French sea-captain and botanist: b. on the island of Ré, 1750; d. 16 Sept. 1803. He entered the merchant navy at an early age, and in 1786, went on a botanical expedition to the Indies, sailing from Leghorn under the Austrian flag, with a vessel under his own command. His collections in this expedition, and in a second which he made to the West Indies, were presented by him, on his return to France, to the government, which promoted him to the rank of captain, and sent him, in 1800, on a scientific mission to Australia. He failed to penetrate the interior of that country, but made many interesting observations on the coast. Half of his men died of fatigue and exposure, and he himself soon breathed his last at the Isle of France, on his return. Péron accompanied him and wrote an account of the voyage.

Baudin des Ardennes, bō-dăn-dāz-ăr-dĕn, **Charles,** French vice-admiral: b. Sedan, 21 July 1784; d. Paris, 7 June 1854. In 1812 he conducted a small fleet safely into the harbor of St. Tropez, though continually pursued by English cruisers. In 1816, he resigned, and entered the merchant service, but after the July revolution re-entered the navy. In 1838, he was promoted to the rank of rear-admiral, and received the command of the expedition against Mexico. His efforts to effect an amicable settlement with the Mexican government proving fruitless, he bombarded, 27 Nov. 1838, the fortress of San Juan de Ulloa, which surrendered on the following day. Baudin treated the inhabitants with great consideration, and permitted 1,000 Mexican soldiers to remain in the city to maintain order, but on the Mexican government sending re-enforcements, he was compelled to resort again to hostilities, which, on 5 December of the same year, resulted in the disarming of Vera Cruz, in the complete defeat of the Mexican army, and in the restoration of peace between the two countries. On his return to France, he was for a short time minister of marine under Louis Philippe. In March 1848 he was appointed commander of the French fleet in the Mediterranean, and remained stationed for some time during the Italian outbreak off the Neapolitan and Sicilian coast. In the following year he retired from active service.

Baudissin, bow'dĭs-sĭn, **Wolf Friedrich Karl, Count von,** German littèrateur: b. Rantzau, 30 Jan. 1789; d. Dresden, 4 April 1878. After 1827 he resided at Dresden, where he collaborated with Tieck and Schligel in a noted translation of Shakespeare. The translations contributed by Baudissin are those of 'Henry VIII.'; 'Much Ado About Nothing'; 'Taming of the Shrew'; 'Comedy of Errors'; 'Measure for Measure'; 'All's Well that Ends Well'; 'Antony and Cleopatra'; 'Troilus and Cressida'; 'Merry Wives of Windsor'; 'Love's Labor's Lost'; 'Titus Andronicus'; 'Othello'; 'King Lear.' He published 'Ben

Jonson und Seine Schule' (1836); and translations from Molière (1865–7).

Baudissin, Wolf Wilhelm, German theologian: b. Sophienhof, Holstein, 26 Sept. 1847. He was professor at Strassburg, 1876–81, at Marburg, 1881–1900, and at Berlin from 1900. His publications comprise 'Translations Antiquæ Arabicæ Libri Jobiquæ Supersunt' (1870); 'Studien Zur Semitischen Religionsgeschichte' (1870–8); 'Die Geschichte des Alttestamentlichen Priesterthums untersucht' (1889); 'August Dillmann' (1895).

Baudrillart, bō-drę-yär', **Henri Joseph Léon,** French political economist: b. Paris, 28 Nov. 1821; d. there, 24 Jan. 1892. He edited the *Constitutionnel* and subsequently the *Journal des Economistes,* and in 1881 was professor in the Ecole des Ponts et Chausées. He published 'Des rapports de la Morale et de l'Economie Politique' (1860); 'Manuel d'Économie Politique' (1857); 'Publicistes Modernes' (1862); 'Histoire du Luxe' (1878–80); 'Les Populations Agricoles de la France' (1880–8).

Baudry, bō-drę, **Paul,** French painter: b. La Roche-sur-Yon, 7 Nov. 1828; d. 17 Jan. 1886. He studied in Paris and Rome. Among his best known works are 'Punishment of a Vestal Virgin' (1857), and the 'Assassination of Marat' (1867). He was for 10 years employed in decorating the foyer of the Grand Opéra in Paris. His famous 'Glorification of the Law' on the ceiling of the Palace of Justice gained him the medal of honor in 1881 and is generally ranked as his masterpiece. He was elected a member of the Académie des Beaux-Arts in 1870.

Bauer, bow'ĕr, **Bruno,** German philosopher, historian, and Biblical critic of the rational school: b. Eisenberg, 6 Sept. 1809; d. Berlin, 15 April, 1882. Among his works are: 'Critique of the Gospel of John' (1840); 'Critique of the Synoptic Gospels' (1840); 'History of the French Revolution to the Founding of the Republic' (1847); 'History of Germany during the French Revolution and the Rule of Napoleon' (1846); 'Critique of the Gospels' (1850–1); 'Critique of the Pauline Epistles' (1850); 'Philo, Strauss, Renan, and Primitive Christianity' (1874); 'Christus und die Cäsaren' (1877). His work displays equal learning and industry but his conclusions are far from harmonizing with evangelical thought.

Bauer, Caroline, German actress: b. Heidelberg, 29 March 1807; d. Zürich, 18 Oct. 1878. She made her debut in 1822, and had achieved a brilliant success, in comedy and tragedy alike, when in 1829 she married Prince Leopold, afterward king of the Belgians. Their morganatic union was as brief as it was unhappy; in 1831 she returned to the stage, which she quitted only in 1844, on her marriage to a Polish count. An English translation of her 'Posthumous Memoirs' appeared in 1884.

Bauer, Edgar, German publicist, brother of Bruno Bauer: b. Charlottenburg, 7 Oct. 1820; d. Hanover, 18 Aug. 1886. He published various works of an historical and polemical nature strongly tinctured with radicalism, and spent five years in prison on account of his 'Streit der Kritik mit Kirche und Staat.' Other books by him are 'Die Rechte des Herzogtums Holstein' (1863); 'Die Deutschen und ihre Nachbarn' (1870).

Bauer, Louis A., American mathematician: b. Cincinnati, O., 28 Jan. 1865. He was astronomical and magnetic computer for the United States Coast and Geodetic Survey,' 1887–92; docent in mathematical physics in the University of Chicago, 1895–6; chief of division of terrestrial magnetism of Maryland Geological Survey since 1896. He became assistant professor of Mathematics in the University of Cincinnati in 1897. He is an honorary member of the Sociedad Cientifica Antonio Alzate of Mexico, and a member of the Permanent Committee on Terrestrial Magnetism and Atmospheric Electricity of the International Meteorological Conference. He edits and publishes the 'Terrestrial Magnetism.'

Bauer, Wilhelm, German inventor: b. Dillingen, 1822; d. Munich, 18 June 1875. He served as an artilleryman during the Schleswig-Holstein war (1848), and, meanwhile, conceived the plan of a submarine vessel for coast defense. From 1851 to 1855 he vainly sought means from Austria, France, and England to complete his experiment, but Russia finally adopted his scheme. He afterward made improvements in torpedoes and in submarine guns.

Bauerle, boi'ĕr-lĕ, **Adolf,** Austrian dramatist and novelist: b. Vienna, 9 April 1786; d. Basel, 20 Sept. 1859. He cultivated with much success the field of popular comedy and local farce in Vienna, where, in 1804, he founded the *Vienna Theatre-Gazette,* until 1847 the most widely read paper in the Austrian monarchy, and now a valuable source for the history of the stage in Vienna. Of his numerous plays the following became known also outside of Austria: 'Leopold's Day' (1814); 'The Enchanted Prince' (1818); 'The Counterfeit Prima Donna' (1818); 'A Deuce of a Fellow' (1820); 'The Friend in Need.' Under the pseudonym Otto Horn he wrote the novels 'Therese Krones' (1855) and 'Ferdinand Raimund' (1855), full of the personal element and local anecdote.

Bauernfeind, bow'ĕrn-fīnt, **Karl Maximilian von,** German engineer and geodesist: b. Arzberg, 18 Nov. 1818; d. 1894. He was professor of geodesy and engineering in the engineering school at Munich, and long a director of the Technical School there organized according to his plans. He invented the prismatic cross employed in surveying, and named for him, and wrote 'Elemente der Vermessungskunde' (1856–8); 'Zur Brückenbaukunde' (1854); 'Zur Wasserbaukunde' (1866).

Bauernfeld, bow'ĕrn-fĕlt, **Eduard von,** Austrian dramatist: b. Vienna, 13 Jan. 1802; d. Vienna, 9 Aug. 1890. He studied law and entered the government service in 1826, but resigned, after the revolutionary events of 1848, to devote himself exclusively to his literary pursuits. A brilliant conversationalist, he soon became a universal favorite in Vienna society. Intimate from childhood with the genial painter, Moritz von Schwind, and the composer, Franz Schubert, he also kept up a lifelong intercourse with Grillparzer. Among his comedies, distinguished for their subtle dialogue and sprightly humor, particularly the descriptions of

fashionable society have made his great reputation. The best known and most successful were 'Reckless from Love' (1831); 'Love's Protocol' (1831); 'Confessions' (1834); 'Domestic and Romantic' (1835); 'Of Age' (1846); 'Krisen' (1851); 'Aus der Gesellschaft' (1866). His serious dramas were less popular. His collected works were issued (1871–3).

Bauhin, bō-ăñ, **Gaspard,** Swiss botanist and anatomist: b. Basel, 1560; d. 1624. He was at first intended for the Protestant ministry, but having manifested a decided inclination for medicine and botany, was allowed to follow it, and studied first at Basel and then at Padua. After finishing his studies he traveled over many parts of Europe, and in 1580 returned to Basel, bringing with him a reputation which immediately secured him the chair of Greek, and in 1589 that of anatomy and botany. His fame rests chiefly on his two works, 'Pinax Theatri Botanici' and 'Theatrum Anatomicum, Botanicum.' Gaspard and his brother, Jean Bauhin, have been happily commemorated by Linnæus, who gave the name *Bauhinia* to a genus of plants.

Bauhin, Jean John, an eminent Swiss botanist: b. Basel, 1541; d. 1613. He was a brother of Gaspard Bauhin, and distinguished himself by his ardor in natural history pursuits, in prosecuting which he traveled over the greater part of the Alps, Italy, and the south of France, preparing materials for a 'Historia Universalis Plantarum Nova et Absolutissima,' which occupied the larger portion of his life, but was not published till 1650, 37 years after his death. This work, in which he describes 5,000 plants, divided into 40 classes or books, is considered the first in which an attempt was made to give a regular form to systematic botany.

Bauhinia, a genus of more than 200 species of tropical trees, shrubs or climbers of the natural order *Leguminosæ* with beautiful, showy, white to purple blossoms, unlike the usual northern type of legume flower; named in honor of the brothers John and Gaspar Bauhin (q.v.). *B. porrecta,* a West Indian tree, is called mountain ebony from its dark-colored wood; *B. racemosa,* the maloo climber, and several other East Indian climbing species are used for making ropes; *B. variegata,* a Malabar species is used in tanning, dyeing, and medicine, and its flower buds for pickles. In southern Florida and southern California several species are very popular as ornamental plants, but in greenhouses few succeed because of the difficulty of securing a dry enough atmosphere without injury to the plants. *B. natalensis, B. variegata,* and *B. corymbosa,* probably the most satisfactory greenhouse species, may be treated like oleanders during the winter and planted out of doors in spring.

Baum, bowm, **Friedrich,** German military officer in the British service in the Revolutionary war. He arrived in Canada in 1776, and in Burgoyne's expedition acted as lieutenant-colonel of the Brunswick dragoons. He was sent out with 800 men and two pieces of artillery on a foraging expedition. Near Bennington, Vt., he was attacked by the New Hampshire militia under Stark, and utterly defeated. He himself was killed 16 Aug. 1777.

Baum, L. Frank, American writer of popular juvenile books: b. Chittenango, N. Y., 15 May 1856. Among his publications are 'American Fairy Tales'; 'Father Goose: his Book'; 'Songs of Father Goose'; 'The Wonderful City of Oz'; 'Navy Alphabet'; 'Army Alphabet.'

Baumann's bow'mans, **Cavern** (German, *Baumanns Höhle*), an interesting natural cavern in the Harz, about five miles from Blankenburg, in a limestone mountain. It consists of six principal apartments, besides many smaller ones, everywhere covered with stalactites. The earthy ingredients of these petrifactions are held in solution by the water which penetrates the rock, and deposits a calcareous stone. The name of this cavern is derived from a miner, who entered it in 1672, with the view of finding ore, but lost his way, and wandered about for two days before he could find the entrance.

Baumbach, bowm'baн, **Rudolf,** German poet: b. Kranichfeld, Saxe-Meiningen, 28 Sept. 1840; d. 22 Sept. 1905. After studying natural science in Würzberg, Leipsic, Freiburg, and Heidelberg, he lived in Austria and then at Trieste, where he devoted himself exclusively to writing. In 1885 he removed to Meiningen. He most successfully cultivated the poetical tale, based upon ancient popular legends. His epics include 'Zlatorg,' a Slovenic Alpine legend (1875, 37th ed. 1892); 'Horand and Hilda' (1879); 'Lady Fair' (1881); 'The Godfather of Death' (1884); 'Emperor Max and His Huntsmen' (1888). His lyric collections are 'Songs of a Traveling Journeyman' (1878); 'Minstrel's Songs' (1882); 'From the Highway' (1882); 'Traveling Songs from the Alps' (1883); 'Adventures and Pranks Imitated from Old Masters' (1883); 'Jug and Inkstand' (1887); 'Thuringian Songs' (1891). He has also published some excellent prose: 'False Gold' (1878), a historical romance of the 17th century; 'Summer Legends' (1881), a book of fairy tales; and 'Once upon a Time' (1889).

Baumé, bō-mā', **Antoine,** distinguished French chemist and pharmaceutist: b. Senlis, 26 Feb. 1728; d. 15 Oct. 1804. He obtained the professorship of chemistry in the College of Pharmacy at Paris about 1752, was admitted a member of the Academy of Sciences, chiefly in return for some excellent memorials communicated to that body; wrote 'Elements of Theoretical and Practical Pharmacy,' which went through nine editions in France, and was translated into most European languages, and contributed by his discoveries to numerous important improvements in the arts, particularly in the manufactures of sal ammoniac, soap, and porcelain, in gilding, and the bleaching of silk. His name is familiar from the areometer which he invented, and which is still in use.

Baumeister, bow'mīs-tĕr, **Johann Wilhelm,** German veterinarian: b. Augsburg, 1804; d. 1846. In 1839 he was appointed a professor in the Stuttgart School of Veterinary Medicine. His 'Handbuch der Landwirtschaftlichen Tierkunde und Tierzucht,' condensed as 'Anleitung zur Kenntnis des Aussern des Pferdes,' attained a seventh edition in 1891.

Baumgarten, bowm'gär-tĕn, **Alexander Gottlieb,** German philosopher of the school of Wolff: b. Berlin, 1714; d. Frankfort-on-the-Oder, 1762. He studied at Halle, and was for a time professor extraordinary there. In 1740 he

was made professor of philosophy at Frankfort-on-the-Oder. He is the founder of æsthetics as a science, and the inventor of this name. He derived the rules of art from the works of art and their effects. Hereby he distinguished himself advantageously from the theorists of his time. (See ÆSTHETICS.) His ideas of this science he first developed in his academical discussion, 'De Nonnullis ad Poema Pertinentibus' (1735). George Fr. Meier's 'Principles of all Liberal Sciences' (1748–50) originated from his suggestions. Eight years later, Baumgarten published his 'Æsthetica' (1750–8), a work which death prevented him from completing. See 'Schmidt, Leibnitz und Baumgarten' (1875).

Baumgarten-Crusius, bowm'gär-tĕn-kroo'zē-ûs, **Ludwig Friedrich Otto,** German theologian: b. Merseburg, 31 July 1788; d. Jena, 31 May 1843. He studied theology in Leipsic; became the university preacher in 1810; was appointed professor of theology at Jena, in 1817; and became widely known as a foremost champion of religious liberty. He was a learned and original thinker, but his writing is often obscure. His publications include 'Introduction to the Study of Dogmatics' (1820); 'Manual of Christian Ethics' (1827); 'Outlines of Biblical Theology' (1828); 'Outlines of Protestant Dogmatics' (1830); 'Text-book of the History of Doctrines' (1832); 'Schleiermacher, His Method of Thought, and his Value' (1834); 'Considerations on Certain Writings of Lamennais' (1834), etc.

Baumgartner, Alexander, Swiss writer: b. Saint Gall, 1841. He became a member of the Society of Jesus in 1860, and after completing his theological studies in England, made a study of Scandinavian literature in Stockholm and Copenhagen. He has published 'Goethe's Jugend' (1879); 'Longfellow's Dichtungen' (1878) 'Calderon,' a festival play (1881); 'Goethe und Schiller' (1886); 'Der Alte von Weimar' (1886); a translation from the old Icelandic of Eystein Asgninsson; and a history in eight volumes of the world's literature (1897).

Baumgartner, bowm'gärt-nĕr, **Andreas von,** Austrian statesman: b. 23 Nov. 1793, at Friedberg in Bohemia; d. 1865. He was connected for many years with the teaching of mathematics and physics, especially after 1823, at the University of Vienna, until illness forced him to relinquish his academical pursuits. Subsequently he became connected with the direction of the imperial porcelain, tobacco, and other manufactures in 1841, with the establishment of electric telegraphs, and at the end of 1847 with the chief management of the construction of railways. After the revolution of March 1848, he occupied for a third time a seat in the Austrian cabinet as minister of the mining department and of public works. In May 1851, he became minister of finance and commerce, and in 1855 was made president of the Austrian academy of sciences. In 1861 he entered the House of Peers of the Reichsrath. His principal works are on mechanical science applied to art and industry. His most popular work is the 'Naturlehre,' which has passed through many editions, and was a text-book in all the schools of Austria.

Baumgartner, Herman, German historian: b. 28 April 1825; d. 19 June 1893. He was a professor of history in the University of Strassburg, 1872–89, and published 'Geschichte Spaniens zur Zeit der Französischen Revolution' (1861); 'Geschichte Spaniens vom Ausbruch der Französischen Revolution bis auf unsere Tag' (1865–71); 'Karl V. und die Deutsche Reformation' (1889).

Baur, bowr, **Ferdinand Christian,** one of the most celebrated theologians of modern Germany, founder of the "New Tübingen School of Theology": b. Blaubeuren, where his father was pastor, 21 June 1792; d. 2 Dec. 1860. At the University of Tübingen, which he entered in 1809, he devoted five years to theological studies, and in 1817 became professor in the seminary at Blaubeuren. While holding this position he published his first work, 'Symbolism and Mythology, or the Natural Religion of Antiquity' (1824–5), by which his eminent theological abilities were so clearly manifested that in 1826 he received a call to Tübingen as ordinary professor in the evangelical faculty of that university. This position he continued to occupy till his death. His chief works belong to the two departments of the history of the Christian dogmas and New Testament criticism, in both of which his views have had the most powerful effect upon the theology of the present day. His most important works belonging to the first class are: 'The Christian Gnosis, or the Christian Philosophy of Religion' (1835); 'The Christian Doctrine of the Atonement' (1838); 'The Christian Doctrine of the Trinity and the Incarnation' (1841–3); 'Compendium of the History of Christian Dogmas' (1847). To the second class belong 'The So-called Pastoral Epistles of the Apostle Paul' (1835); 'Paul the Apostle of Jesus Christ, His Life and Labors, His Epistles and His Teaching' (1845); 'Critical Inquiries Concerning the Canonic Gospels, their Relation to One Another, their Origin and Character' (1847). He also wrote the 'History of Christian Doctrine from the Origin of Christianity Down to the End of the 18th Century,' a series of volumes between 1853–63.

Baur, Frederick Wilhelm von, Russian military engineer: b. Hanau, Germany, 1735; d. St. Petersburg, 1783. He early adopted a military life, entered the British service in 1755 and in 1757 he obtained the rank of general, and engineer-in-chief. Frederick II. of Prussia ennobled him. In 1769 he entered into the service of Catherine II., empress of Russia, and was employed against the Turks. The empress had a high notion of his talents, and employed him in making the aqueduct of Tsarskoe-Selo, for supplying Moscow with water, and in deepening the canal near St. Petersburg, at the end of which he constructed a large harbor, and completed other important undertakings. Baur had for his secretary the celebrated Kotzebue, who directed in his name the German theatre at St. Petersburg.

Baur, Gustav Adolf Ludwig, German theologian: b. Hammelbach, 1816; d. 1889. He was appointed a professor at Giessen in 1847, and in 1870 at Leipsic. He belonged to the Schleiermacher school and was the author of 'Grundzüge der Homiletik' (1848); 'Boëtius und Dante' (1874); 'Die Vorchristliche Erziehung' (1884).

Bause, bow'zĕ, **Johann Friedrich,** distinguished German engraver: b. Halle, 1738; d. Weimar, 1814. He resided chiefly at Leipsic, where he executed many highly esteemed engravings. He was a member of several academies of fine arts.

Bausman, Benjamin, American Reformed (German) clergyman: b. Lancaster, Pa., 28 Jan. 1824. He founded St. Paul's Reformed Church, Reading, Pa., 1863, and has been its pastor ever since. He has published 'Sinai and Zion' (1860; 7th ed. 1885); 'Wayside Gleanings in Europe' (1876); 'Bible Characters' (1893); 'Catechetics and Catechetical Instruction' (1863); and edited *The Guardian* (1867–82), and *Reformirte Hausfreund* (1882).

Bausset, bō-sā, **Louis François** (Cardinal), French ecclesiastic: b. Pondicherry, India, 14 Dec. 1748; d. Paris, 21 June 1824. His father, who held an important position in the French Indies, sent young Bausset to France when he was but 12 years of age. He was educated by the Jesuits, and became bishop of Alais in 1784. Having signed the protest of the French bishops against the civil constitution of the clergy, he emigrated in 1791, but in the following year returned to France, was soon arrested, and imprisoned in the old Convent of Port Royal, where he remained until after the fall of Robespierre. After the restoration of Louis XVIII., in 1815, he entered the Chamber of Peers; the following year he became a member of the French Academy; and, in 1817, he received the appointment of cardinal. He wrote the 'History of Fénelon' (1808–9), at the request of the Abbot Emery, who had in his possession the MSS. of the illustrious Archbishop of Cambray. The work had great success, and its author was awarded, in 1810, the second decennial prize of the Institute, for the best biography. His 'History of Bossuet' (1814) was less favorably received.

Bautain, bō-tăn, **Louis Eugene Marie,** French philosopher: b. Paris, 17 Feb. 1796; d. 18 Oct. 1867. He entered the Church, and became a priest in 1828; resigned his professorship in 1830; and later was suspended as a priest because of his work, 'La Morale de l'Evangile comparee a la Morale des Philosophes'; but was reinstated in 1841. He was made dean of the Faculty of Letters at Strassburg in 1838, and subsequently director of the College of Juilly. At a still later period he was transferred to Paris, and made vicar-general of the Metropolitan Diocese. He was also appointed a member of the theological faculty of Paris. His writings include 'Philosophie-psychologie Experimentale' (1839); 'Philosophie Morale' (1842); 'Philosophie du Christianisme' (1835); 'La Religion et la Liberte considerees dans leurs Rapports' (1848); 'La Morale de l'Evangile comparee aux divers Systemes de Morale' (1855), etc.

Bautzen, bowt'sĕn, or **Baudissin,** bow'desen, a manufacturing town in Saxony, noted for its production of textile fabrics, leather, paper, etc. It overlooks the River Spree, 30 miles northeast of Dresden, and is encircled by a wall and moat. The cathedral church of St. Peter is used by both Protestants and Roman Catholics, it being divided into two portions for the purpose. The town contains many schools, a museum, art gallery, and three libraries. At Bautzen Napoleon, with 130,000 men, defeated the allied armies of Russia and Prussia, 20–21 May 1813. Pop. (1900) 26,000.

Bauxite, or **Beauxite,** bo'zīt (from Baux, or Beaux, near Arles, France, where it occurs), a native, hydrated oxide of aluminum, having the formula $Al_2O_3.2H_2O$. It has a specific gravity of about 2.5, and its hardness ranges from 1 to 3. It occurs massive, in concretionary grains showing a concentric structure, and in clay-like deposits. Sesquioxide of iron is usually present in considerable quantity,— sometimes to the extent of 50 per cent,— part of it replacing aluminum, and part occurring merely as an impurity. Bauxite is found in many parts of the world. One of the most important deposits is at Irish Hill, near Larne, County Antrim, Ireland, where it occurs in the iron measures together with lignite. At this place three layers of it are known, having an aggregate thickness of about 50 feet. The finest grade from Irish Hill is almost free from iron, containing as little of that metal as good china clay. Analyses have shown that the color of bauxite is no criterion of the freedom of the mineral from iron, since a white variety containing 3.67 per cent of Fe_2O_3 is known, while a certain strongly red variety showed, upon analysis, but 3.75 per cent, and a yellow specimen contained 14.39 per cent. In the United States bauxite occurs in considerable quantities in Saline and Pulaski counties, Arkansas, and in a deposit extending from Calhoun County, Alabama, eastward into Georgia. Bauxite forms the principal ore of the metal aluminum, which is obtained from it by the electrolysis of a solution of bauxite in melted cryolite (see Aluminum). The American deposits of bauxite are well suited to the production of aluminum, as ore can be had in quantity that contains as little as 1 per cent of iron oxide, and 3 per cent of silica. Bauxite, in some localities, is undoubtedly an alteration product of basaltic rocks, while in other localities (especially in the United States) it has very likely been deposited by hot springs. In addition to its use as an ore of aluminum, bauxite forms an important source of alum. Its clay-like form is known as wocheinite, on account of its occurrence at Wochein, in Styria. (C. Willard Hayes, 'Bauxite,' 'Sixteenth Annual Report of the United States Geological Survey,' Part 3 (Washington, 1896); Branner, 'The Bauxite Deposits of Arkansas,' 'Journal of Geology,' Vol. V., 1897, p. 263).

Bava'ria (German, *Bayern;* French, *Bavière*), a kingdom in the south of Germany, the second largest state of the empire, composed of two isolated portions, the larger comprising about eleven twelfths of the monarchy, bounded on the east by Bohemia and Upper Austria; on the south by Salzburg and the Tyrol; on the west by Würtemberg, Baden, Hesse-Darmstadt, and Hesse-Nassau; and on the north by Hesse-Nassau, Weimar, Meiningen, Reuss, Coburg, and the kingdom of Saxony. It lies between lat. 47° 19′ and 50° 41′ N., and lon. 8° 53′ and 13° 50′ E. The smaller portion, the Pfalz or Palatinate, lies west of the Rhine, which forms its eastern boundary, and is separated from the main body by Würtemberg, Baden, and Hesse-Darmstadt. It is included between lat. 48° 57′ and 49° 50′ N.; and lon. 7° 6′ and 8° 31′ E.; and is bounded south by Alsace-Lorraine,

west by the Prussian Rhine provinces, and north by Hesse-Darmstadt. Bavaria is estimated to contain an area of 29,286 English square miles, and is divided into eight circles (*kreise*), which were formerly named after the rivers that watered them; but an edict of 29 Nov. 1837, gave the circles new names and new boundaries. The following table shows their names, areas, and populations:

Circles	Area, Sq. M.	Pop. 1900
Oberbaiern (Upper Bavaria)....	6,456	1,323,447
Niederbaiern (Lower Bavaria)..	4,152	678,584
Pfalz (Palatinate).....	2,288	831,533
Oberpfalz (Upper Palatinate) and Regensburg (Ratisbon)...	3,728	553,857
Oberfranken (Upper Franconia)	2,702	607,903
Mittelfranken (Middle Franconia)	2,925	815,556
Unterfranken (Lower Franconia) and Aschaffenburg.....	3,243	650,758
Schwaben (Swabia) and Neuburg	3,792	713,515
Total.....	29,286	6,175,153

The capital is Munich (q.v.), and the other principal cities are Nuremberg, Augsburg, Würzburg, and Regensburg or Ratisbon (qq.v.).

Mountains.— Bavaria is a hilly rather than a mountainous country. A large portion, more especially south of the Danube, is a plateau country of considerable elevation, and indeed, the whole of the main portion of the kingdom may be described as an upland valley, averaging about 1,600 feet above the sea-level, intersected by numerous large streams and ridges of low hills. On all sides it is surrounded by hills of a greater or less altitude, either quite upon the frontier or only at small distances from it. The whole southern frontier is formed by a branch of the Noric Alps, offsets from which project far into the southern plateau of Bavaria. Besides numerous peaks which this range contains, varying from 4,000 to 8,000 feet high, the following may be named as being above the latter number: The Zugspitze, 10,394 feet; the Watzmann, 9,470 feet; the Hochvogel 8,460 feet; the Madeler Gabel, 8,650 feet. Passing along the valley of the Inn and across the Danube, we come to the Bohemian frontier, formed by the Böhmerwald mountains running south-east to northwest and lowering down at the valley of the Eger. The highest peaks in this range are the Rachel, 5,102 feet, and the Arber, 5,185 feet. Crossing the Eger we meet with the Fichtelgebirge, presenting the Schneeberg, 3,750 feet high, and the Ochsenkopf, 3,633 feet. West from this range, and along the frontier of the Saxon ducal territories and Hesse-Cassel, run hills of moderate elevation, under various names, Frankenwald, Rhöngebirge, etc., no peaks of which attain an elevation of more than 3,327 feet. The western mountain boundary of the Bavarian valley is formed north of the Main by the Spessartwald range, and in the kingdom of Würtemberg by the Alb or Alp. The only noteworthy interior ranges are, in the northwest the Steigerwald; and in the northeast, running in a southwesterly direction from the Fichtelgebirge, the Franconian Jura; a low limestone range, containing numerous remarkable stalactitic caves. The Pfalz or Palatinate is traversed by the northern extremity of the Vosges, the highest peak in this locality being the Königstuhl, 2,162 feet.

Lakes.— The lakes of Bavaria are neither very numerous nor of very great extent, though many of them present exceedingly picturesque scenery. The larger are all situated on the upper part of the southern plateau; the smaller within the range of the Noric Alps. The most remarkable of the former are, Lake Ammer, about 10 miles long by 2½ broad, 1,736 feet above the sea; Lake Würm or Starnberg, about 12 miles long by 3 broad, 1,899 feet; and Lake Chiem, 9 miles long by 9 to 4 broad, 1,651 feet above the sea. Of the smaller, the more remarkable are Lake Tegner, about 3 miles long, 2,586 feet; Lake Walchen, 2,597; and various others upward of 2,000 feet above the sea-level. Most of the lakes are well supplied with fish.

Rivers.— Bavaria belongs wholly to the basins of the Danube and the Rhine, with the exception of a very small portion in the north-east corner, which through the Eger appertains to the basin of the Elbe. The river Danube intersects the main portion of the kingdom west to east nearly in the centre, and before it enters the Austrian dominions at Passau, where it is still 925 feet above the sea, it receives on its right bank the rivers Iller, Lech, and Isar, which have their sources in the Noric Alps, besides numerous smaller streams; and on its left bank, the Wörnitz, Altmühl, Nab, and Regen, besides other lesser streams. The Main traverses nearly the whole of the northern part of this portion of the kingdom from east to west, and is navigable for steam vessels from Bamberg to the Rhine. Its principal affluents are the Regnitz and the Saale. In the Palatinate there are no streams of any importance, the Rhine being merely a boundary river.

Climate.— If we except the valley of the Rhine, and the valley of the Main in lower Franconia, Bavaria, even including the Palatinate, is, in comparison with other German states, a cold country. The average temperature of the year is about 47° F.; winter, 30°; spring, 47°; summer, 63°; and autumn, 47°.

Soil, Vegetation, etc.— Bavaria is one of the most favored countries in Germany in respect of the fruitfulness of its soil, due, no doubt, in a considerable degree, to the undulating nature of the country, to the numerous streams by which it is watered, and to being nearly wholly composed of Jura limestone. In the plains and valleys the soil is capable of producing all kinds of crops, but not till lately were the natural advantages of the country turned to good account. Ignorance and idleness opposed a barrier to improvement, which it took the utmost efforts of an enlightened government, aided by the general spread of education, to remove. Now a spirit of agricultural enterprise pervades the kingdom, improved methods of cultivation have been introduced, and large tracts of waste land have been reclaimed and brought under the plow. The principal crops are wheat, rye, barley, and oats; but in some districts rice, spelt, maize, and buckwheat are also raised. To these productions of the soil may be added potatoes (the cultivation of which is yearly increasing), tobacco, and fruit, of which large quantities are grown in the valleys of the Main and the Rhine. In the circles of Mittelfranken and Schwaben-Neuburg, the hop plant is cultivated to a considerable extent, the quantity varying from 30,000 to 40,000 hundredweight per annum; and the

vine in the circles of Pfalz and Unterfranken. The latter produces the Franconian wines; the best wines of the former are produced near Deidesheim and Wachenheim. The celebrated Steinwein and Leistenwein are the produce of the southern slope of the Marienburg, near the town of Würzburg. The forests of Bavaria, composed chiefly of fir and pine trees, cover nearly a third of its entire surface and yield a large revenue to the state; much timber being annually exported, together with potashes, tar, turpentine, and other products peculiar to these wooded regions. The principal mineral products are salt, coal, and iron. Some of the mining works belong to the state, and contribute something to the public revenue; but the minerals are not wrought to the extent they might be. Coal mining gives employment to between 4,500 and 5,000 hands. Plumbago is found in several places and is principally manufactured into pencils. Porcelain clay of the finest quality likewise abounds in some localities, the best being obtained in the districts of Wunsiedel in the Upper Main. Lithographic stones are another important production. In the rearing of cattle and sheep the Bavarians are somewhat backward. Swine are reared in great numbers in all parts of the country, and poultry and wildfowl are abundant. The wolves and bears with which the forests of Bavaria were at one time infested are nearly extinct.

Manufactures.— The manufactures of Bavaria are singly not very important, being mostly on a small scale and conducted by individuals of limited capital. The principal articles manufactured are linens, woolens, cottons, silks, leather, paper, glass, earthen, iron, and steel ware, jewelry, etc., but the supply of some of these articles is inadequate to the home consumption. Of leather, paper, glass, and ironware rather large quantities are exported. The optical and mathematical instruments made at Munich are the best on the Continent, and are prized accordingly. But the most important branch of manufacture in Bavaria is the brewing of beer — the universal and favorite beverage of the country. There are upward of 5,000 brewing establishments in the kingdom, which have been calculated to supply on an average about 20 gallons a year to every individual of the population. The beer, however, is not consumed only in the country of its production, but is sent to all parts of Germany, and even as far as America and India. Spirits are also largely distilled. A large portion of the industrial population maintain themselves by weaving linen, and by the manufacture of articles in wood (some of which are of beautiful workmanship), and by the felling and hewing of timber. Notwithstanding its favorable geographical position and other natural advantages the trade of Bavaria is comparatively limited. Among the exports are corn, timber, wine, cattle, leather, glass, hops, fruit, beer, iron, and steel wares, machinery, fancy articles, colors, lucifer matches, stoneware, etc. Among the imports are coffee, cacao, tea, cotton, tobacco, drugs, copper, oil, spices, dyestuffs, silk and silk goods, lead, etc.

Transportation.— From its position Bavaria enjoys a considerable portion of transit trade, much facilitated by the good roads that traverse the country in all directions. The means of communication are now very complete. The Danube, the Rhine, the Main, the Regnitz, etc., afford ample scope for inland navigation, besides the König Ludwig Canal, which connects the Main at Bamberg with the Altmühl a short distance above its embouchure in the Danube, thus establishing direct water communication through the Rhine between the German Ocean and the Black Sea. The railway system (now managed as a part of the imperial system of railways) has been carried out on an extensive scale. The lines are partly state property, partly private. The number of miles in operation amounted in 1899 to 4,062, about 3,000 of this total being state railways, the remainder being private enterprises. The amount of debt contracted for railways by Bavaria is $250,000,000, forming over four fifths of the total debt of the country. The receipts from the railways are now generally sufficient to pay the interest and charges on account of this debt. The state also possesses two canals.

Education and Art.— The Department of Education is under the superintendence of the Superior Board of Education and Ecclesiastical Affairs. A complete system of inspection is established throughout the country; the reports of the inspectors including not only the number and proficiency of the scholars, but also the conduct of the teachers, the state of the buildings, and the nature and extent of the funds available. It is necessary in Bavaria, before admission can be obtained into any higher school, to have passed a satisfactory examination in the lower school. Not only must all candidates for offices under the state pass examinations, but examinations are held of apprentices in trade who wish to become masters, and even of officers in the army on promotion. There are over 8,000 schools in Bavaria, attended by more than 600,000 pupils. Attendance on school is compulsory up to 14 years of age. There are three universities in Bavaria — two of which (Munich and Würzburg) are Roman Catholic, and one (Erlangen) Protestant. The University of Munich is attended by about 3,500 students, and has about 170 professors and instructors; that of Würzburg has 80 professors and instructors, and about 1,350 students; and that of Erlangen 67 professors and instructors, and about 1,100 students. There are also several lycea, a number of gymnasia, numerous Latin, normal, and polytechnic schools, besides academies of arts and sciences, fine arts, horticulture, etc. The capital, Munich, contains a library of 800,000 volumes, including 25,000 MSS.; several scientific and literary institutions, academies, and national societies, and extensive collections of works of art.

Bavaria enjoys the honor of having originated a school of painting of a high order of merit, known as the Nuremburg school, founded about the middle of the 16th century by Albert Dürer, a native of that town, whose works are little, if at all, inferior to those of his great Italian contemporaries. Hans Holbein, who excelled Dürer in portrait, though far behind him in historical painting, is claimed by Bavaria, but neither the precise locality nor the date of his birth is known with certainty — Augsburg, Basel, and Grünstadt being severally named as the one, and the dates 1495 and 1498 as the other. To these celebrated names have been added those of the eminent sculptors Kraft and Vischer, both also Bavarians; the former

born about 1435 and the latter about the middle of the same century. The masterpiece of the latter distinguished artist is the bronze shrine of St. Sebaldus in Nuremberg, esteemed a marvel of art for beauty of design and delicacy of workmanship. The most celebrated of Kraft's works is the remarkable tabernacle in stone, affixed against one of the columns of the choir of the Church of St. Lawrence, also in Nuremberg. The restoration of Bavarian pre-eminency in modern times, in connection with the fine arts, is, in a great measure, if not entirely, owing to Louis I., whose love of art and liberal patronage have rendered the capital one of the most celebrated seats of the fine arts in Europe.

Religion.—The religion of the state is Roman Catholicism, which embraces more than seven tenths of the population. The remainder are principally Protestants and Jews. The proportion between Catholics and Protestants has scarcely varied during the last three quarters of a century. All citizens, whatever their creed, are equally admissible to the same public functions and employments, and possess the same civil and political rights. The articles of the concordat concluded with the Pope are subordinate in their application to the fundamental law of the state. By an ordinance of Louis I. females are prohibitied from pronouncing any monastic vow until after having passed their 33d year. The dioceses of Bavaria comprise two archbishoprics, Munich and Bamberg; and six bishoprics, Augsburg, Ratisbon, Eichstädt, Passau, Würzburg, and Spires. The salaries are paid by the government. In Bavaria marriage between individuals having no capital cannot take place without the consent of the principal persons appointed to superintend the poor institutions, who, if they grant such liberty where there are no means of supporting the children that may spring from such marriage, render themselves liable for their maintenance. The law is intended to prevent improvident marriages.

People.—In personal appearance the Bavarians are stout and vigorous, well adapted to bear the fatigues of war, and are generally considered good soldiers. They are accused of being indolent and somewhat addicted to drinking, but are brave, patriotic, and faithful to their word. Their manners and customs toward the close of the 18th century were described as very coarse, and they were said to be deeply imbued with superstitious bigotry; but since the more general diffusion of knowledge a great change for the better has taken place. Many of the peasantry wear long, loose, snuff-colored coats, lined or edged with pink, and studded in front with silver or white metal buttons, thrown open to display a smart waistcoat of various and brilliant colors; their hats are often ornamented with artificial flowers. Many of the Bavarian women are handsome, lively and graceful. They dress smartly and display much taste in their attire. Some of them wear black-silk handkerchiefs, decorated with flowers or ribbons, tied tightly round their heads, some caps of silver or gold tissue, and all have their hair neatly braided. German is the language spoken, with local peculiarities; but they have never been conspicuous for the cultivation of their native tongue.

Constitution.—Bavaria was formerly a member of the Germanic Confederation and now forms part of the German empire. The executive is in the hands of the king. The legislature consists of two chambers—one of senators and one of deputies; the former composed of princes of the royal family, the great officers of state, the two archbishops, the heads of certain noble families, a bishop named by the king, the president of the Protestant General Consistory, and any other members whom the king may create hereditary peers; the latter, of members chosen indirectly, one to every 31,500 persons of the total population. The qualifications are that the candidate shall have completed his 30th year, shall be a free and independent citizen, and shall be a member of the Catholic or the Reformed Church and pay direct state taxes. The members are chosen every six years unless the house is dissolved by the king, and are generally convened once a year, but are bound to assemble at least once every three years. Each of the eight circles or provinces has a provincial government consisting of two boards, one for the management of the police, schools, etc., and the other for the management of financial affairs. The revenue for the financial year 1900–1 was estimated at about $105,000,000, and the public debt, including railway debt, etc., was $350,000,000. The army is raised by conscription,—every man being liable to serve from 1 January of the year in which he completes his 20th year,—and it forms an independent part of the army of the German empire. In time of peace it is under the command of the king of Bavaria, but in time of war it is placed under that of the emperor of Germany as commander-in-chief of the whole German army. The period of service is three years in the active force, four in the reserve, and five in the landwehr; and no Bavarian can settle or marry, or accept of any definite appointment, till he has fulfilled his military liabilities. On a peace footing the Bavarian army consists in all of fully 63,000 men and 2,600 officers; on a war footing, about twice this number.

History.—The Bavarians take their name from the Boii, a Celtic tribe who inhabited the districts which, when conquered by the Romans, became the Roman provinces of Vindelicia and Noricum. After the fall of the Western Empire this territory was overrun by various Germanic tribes who formed themselves into a confederation like that of the Franks and Marcomanni and called themselves Boiarii. The confederacy of the Boiarii was made tributary first to the Ostrogoths and then to the Franks. Finally the sovereignty over them was assumed by Charlemagne, and on the death of that monarch the kings of the Franks and Germans governed it by their lieutenants, who bore the title of margrave, afterward converted into that of duke, and latterly (1623) into that of elector. In 1070 Bavaria passed into the possession of the family of the Guelphs, and in 1180 it was transferred by imperial grant to Otho, count of Wittelsbach. On the extinction of the direct line of that family in 1777, the elector palatine, Charles Theodore, added the Palatinate and the duchies of Juliers and Berg to the Bavarian dominions. In 1799 the Duke Maximilian Joseph of Deux-Ponts came into possession of all the Bavarian territories. The Peace of Lunéville (9 Feb. 1801) essentially affected Bavaria.

While it lost all its possessions on the left bank of the Rhine, and also the lands of the Palatinate on the right bank, it obtained, on the other hand, by an imperial edict, an indemnification by which it gained, in addition to the amount lost, a surplus of 2,109 square miles and 216,000 inhabitants.

In 1805 Bavaria was raised, by the Treaty of Presburg, to the rank of a kingdom, with some further accessions of territory, all of which were confined by the treaties of 1814 and 1815, by which also a great part of the lands of the Palatinate was restored. In 1848 the conduct of the king of Bavaria, in maintaining an open liaison with Lola Montez, had thoroughly alienated the hearts of his subjects, and quickened that desire of political change which had previously existed. The people, early in March 1848, demanded immediate convocation of the chambers, liberty of the press, public judicial trials; also that electoral reform should be granted, and that the army should take an oath to observe the constitution. The king having refused to grant these demands, tumults occurred, and King Louis announced his resignation of the sceptre to his son, Maximilian II., under whom the reforms and modifications of the constitution were carried out. Maximilian died in 1864 and was succeeded by Louis II. In the war of 1866 Bavaria sided with Austria, in consequence of which it was obliged, by the treaty of 22 August in the same year, to cede a small portion of its territory to Prussia, and to pay a war indemnity of $12,150,000. Soon after Bavaria entered into an alliance with Prussia, and in 1867 joined the Zollverein under Prussian regulations. In the Franco-German war of 1870–1 Bavaria took a prominent part, and since 1871 it has been one of the constituent states of the German empire, represented in the Bundesrath by 6, in the Reichstag by 48 members. In 1886 King Louis II. committed suicide through alienation of mind. His brother Otto succeeded, but he being also insane, his uncle, Leopold, became regent.

Ba'viad and Mæviad, The, two satires, by William Gifford. It was through these that the author, who later was the first editor of the 'Quarterly Review,' became known. 'The Baviad' (1792) is an attack on a band of English writers, who had formed themselves into a kind of mutual admiration society. It is an imitation of the first satire of Perseus, and in it the author not only attacks the "Della Cruscans," but all who sympathize with them. The 'Mæviad' (1795) is an imitation of the 10th satire of Horace, and was called forth, the author says, "by the reappearance of some of the scattered enemy."

Bavieca, bą-wyā'ką, the favorite horse of the Cid.

Bavius, Marcus and **Mævius,** still notorious as two miserable poets and presumptuous critics, satirized by Vergil. The words are often used to signify bad or malevolent poets.

Bawbee, bôr-bē' (French, *bas billon,* "low" or "debased billon"), a coin originally minted in Scotland from an alloy of copper with a very small amount of silver, called billon, and having at different times a value varying from 1½ to 3 cents. The coin is no longer issued, but the term is used in Scotland to mean a halfpenny (a cent) or a very small value.

Bax, Ernest Belfort, English socialist: b. Leamington, 23 July 1854. He was educated in London and Germany; followed journalism in Germany as foreign correspondent in 1880–1; and returning to England, became one of the founders of the English socialist movement. In 1885 he aided in starting the Socialist League. He wrote a large number of works on socialistic and historical subjects.

Bax'ter, Andrew, Scotch philosopher and metaphysician: b. Aberdeen, 1686; d. 1750. He was educated at King's College, Aberdeen, and found occupation as a private tutor. About 1733 he published an 'Inquiry into the Nature of the Human Soul; Wherein the Immateriality of the Soul is Evinced from the Principles of Reason and Philosophy.' In 1741 he went abroad with two of his pupils, and remained for some years at Utrecht, where he contracted an acquaintance with some of the Dutch *literati.* He returned to Scotland in 1747, and resided at Whittingham, East Lothian, where he died. He was the author of a Latin treatise on the principles of astronomy, entitled 'Matho sive Cosmotheoria, Puerilis Dialogus,' which he afterward translated into English and published in two volumes, 12mo. He was a staunch friend and correspondent of John Wilkes, then quite a young man.

Baxter, James Phinney, American author: b. Gorham, Me., 23 March 1831. A successful merchant and manufacturer; he has been six times mayor of Portland, Me., to which he presented the land and building for a public library. A devoted student of the history of his native State, he has published: 'George Cleeve of Casco Bay' (1885); 'Journal of Lieut. W. Digby' (1888); 'Sir Ferdinando Gorges and His Province of Maine' (1890); 'The Pioneers of New France in New England' (1894). He edited Vols. III., IV., V. and VI of the 'Documentary History of Maine' (1889).

Baxter, Jere, American lawyer: b. Nashville, Tenn., 11 Feb. 1852. He traveled in Europe, studied law, and reported the decisions of the supreme court of Tennessee, 9 volumes He was prominent in railroad enterprises, particularly in schemes devoted to the opening up of the mineral and timber resources of his State. He was president of the Memphis & Charleston R.R. before reaching the age of 30, and he organized and built the Tennessee Central R.R., of which corporation he was president He was instrumental in the founding and extension of industrial towns, and was a member of the Tennessee Senate..

Baxter, Lucy E. (BARNES), English art writer: b. Mere, Wiltshire, about 1835; d. Florence, Italy, 10 Nov. 1902. She was the daughter of William Barnes, the Dorset poet, and wrote over the pen name of LEADER SCOTT. After her marriage to Mr. S. T. Baxter in 1867, she resided in Italy, where she was made an honorary member of the Accademia delle Belle Arti. She was the author of 'The Painter's Ordeal'; 'A Nook in the Apennines' (1879); lives of Fra Bartolommeo, Andrea del Sarto, Fra Angelico, and Lucadella Robbia; 'The Renaissance of Art in Italy' (1882); 'Messer Agnolo's Household, a Unique Cento Florentine Story' (1882); 'Ghiberbi and Donatello' (1882); 'A Bunch of Berries' (1883); 'Sculpture, Renaissance and Modern' (1886);

'Tuscan Studies and Sketches' (1887); 'Life of William Barnes' (1888); 'Vincigliata and Mariano' (1891); 'The Orti Orcellari' (1893); 'Echoes of Old Florence' (1894); 'The Castle of Vincigliata' (1897); 'The Cathedral Builders,' her most important work (1899); 'Filippo di Ser Brunellesco' (1901).

Baxter, Richard, English divine: b. near Shrewsbury, 1615; d. 8 Dec. 1691. After receiving a somewhat desultory and defective education he was sent to London under the patronage of Sir Henry Herbert, master of the revels; but he soon returned to the country to study divinity, and in 1638 received ordination in the Church of England. In 1640 he refused to take the oath of universal approbation of the doctrine and discipline of the Church of England, usually known as the *et cætera* oath, and in the following year he became minister at Kidderminster, with the best results to the morality of the town. When the civil war broke out he sided with the Parliament, and after the battle of Naseby accepted the appointment of chaplain to Col. Whalley's regiment. He is said to have been, the whole of this time, a friend to the establishment, according to his own notions. In 1647 he retired, in consequence of ill health, from his military chaplainship, and when he recovered preached against the Covenant. He even endeavored to persuade the soldiery not to encounter the Scottish troops who came into the kingdom with Charles II., and did not hesitate to express an open dislike to the usurpation of Cromwell. The fact is that Baxter held civil liberty to be of secondary consequence to what he esteemed true religion, and appears, from a sermon preached before Cromwell, to have deemed the toleration of separatists and sectaries the grand evil of his government. After the Restoration he was made one of the king's chaplains and a commissioner of the Savoy Conference to draw up the reformed liturgy. The active persecution of the Nonconformists soon followed; and upon the passing of the act against conventicles he retired, and preached more or less openly as the act was more or less rigidly enforced. After the accession of James II., in 1685, he was arrested for some passages in his 'Commentary on the New Testament' supposed to be hostile to Episcopacy, and was tried for sedition. The violence of Jeffreys, who would hear neither the accused nor his counsel, produced a verdict of guilty on the most frivolous grounds. He was sentenced to two years' imprisonment and a heavy penalty, which, after a short confinement, the king remitted. Henceforward Baxter lived in a retired manner till his death. His wife cheerfully shared all his sufferings on the score of conscience, both in and out of prison. The character of Baxter was formed by his age; his failing was subtle and controversial theology; his excellence, practical piety. In divinity he sought to establish a resting place between strict Calvinism and high-church Arminianism, by the admission of election and the rejection of reprobation. Christ, he considered, died for some especially and for all generally; that is to say, all possess the means of salvation. A body called Baxterians long acknowledged these distinctions; and the Nonconformist clergy, after the Revolution, were divided between this body, the pure Calvinists, and the high-church passive-obedient Arminians. Baxter was a voluminous writer; his 'Saints' Everlasting Rest,' and the 'Call to the Unconverted,' have been extraordinarily popular. In 1830 an edition of his 'Practical Works' appeared in 23 octavo volumes. The chief authority for the facts of his life is the 'Reliquiæ Baxterianæ' of Sylvester, consisting of autobiographical matter.

Baxter, Robert Dudley, English political economist: b. Doncaster, Yorkshire, 1827; d. May 1875. He was educated at Trinity College, Cambridge, and in 1866 became a member of the Statistical Society of London. He wrote and published 'Railway Extension and Its Results' (1866); 'National Income of the United Kingdom' (1868); 'Taxation of the United Kingdom' (1869); 'English Parties and Conservatism' (1870); 'National Debts of the World' (1871), etc.

Baxter, Sylvester, American journalist: b. West Yarmouth, Mass., 6 Feb. 1850. While on the staff of the Boston *Herald* he was prominent in pushing the metropolitan park system and advocating a "Greater Boston." He has written: 'The Cruise of a Land Yacht, a Boy's Book of Mexican Travel'; 'Berlin: a Study in Municipal Government' (1890); 'The Boston Park Guide.'

Baxter, William, American clergyman and author: b. Leeds, England, 1820. He was president of Arkansas College, Fayetteville; when it was burned in the Civil War, he removed to Cincinnati. He has written 'The Loyal West in the Time of the Rebellion' and 'Pea Ridge and Prairie Grove, or Scenes and Incidents of the War in Arkansas' (1864). His 'War Lyrics,' originally published in 'Harper's Weekly' were very popular at the time of their publication.

Baxterians. See BAXTER, RICHARD.

Bay, in *architecture,* a term used to signify the magnitude of a building. Thus, if a barn consists of a floor and two heads, where they lay corn, they call it a barn of two bays. These bays are from 14 to 20 feet long, and floors from 10 to 12 broad, and usually 20 feet long, which is the breadth of the barn. It is also used to denote the divisions of a church or cathedral from floor to roof, as indicated by the pillars or arches; as, a church of eight bays.

In *botany,* the name of several trees and shrubs, as sweet bay (*Laurus nobilis*) the laurel (q.v.) of the poets, used for crowning heroes in ancient times and for church decoration at the present. It has stiff, dull-green leaves sometimes used to flavor culinary dishes. Its sweet, fragrant, aromatic, cherry-like, purple fruits are edible. This tree is widely cultivated for ornament in Europe and America, and is probably the most popular tub-plant used in open-air restaurants, esplanades, etc., on account of its ability to withstand neglect, abuse, and shearing. Several hundred thousand specimens are used annually on the two continents. The bay laurel is better known as the cherry laurel (*Prunus laurocerasus*). Its leaves yield prussic acid, and were at one time extensively used as a poison. The loblolly bay (*Gordonia lisianthus*), white bay (*Magnolia glauca*), and red bay (*Persea carolinensis*), are well-known natives of the southeastern United States. The name rose bay is given to divers evergreen rhododendrons, to oleander, and sometimes to *Epilobium angustifolium.* The California bay-

tree is *Umbellularia californica.* The bay-tree from which bay rum (q.v.) is distilled is *Myrcia acris.* See LAUREL; MAGNOLIA.

In *geography,* an arm of the sea, extending into the land. It is generally applied to smaller bodies of water than gulfs, of the same general geographical character, though the terms "gulf" and "bay" are used sometimes interchangeably and much to the confusion of geographical science. The word is of Saxon origin and signifies an angle. It should properly be applied only to arms of the sea which are widest at their departure from the main line of sea coast, or mouth, while "gulf" should be applied to such bodies of water as the Gulf of California, whose width is nearly the same throughout a great part of their extent.

Bay-birds, or **Beach-birds,** a sportsmen's name, in particular use along the south shore of Long Island, N. Y., for snipe, curlews, sandpipers, avocets, and other limicoline birds that frequent the shores and bays of estuaries. Compare SHORE-BIRDS.

Bay City, Mich., county-seat of Bay County, is located on the south bank of the Saginaw River, four miles from its mouth on Saginaw Bay, from which it takes its name, and at the head of deep water navigation. It is connected with the Michigan Central, Pere Marquette, Grand Trunk, and Detroit & Mackinac Railway systems, and 108 miles northwest of Detroit. It is the principal market town of a large area of the Saginaw Valley and "Thumb" region of the lower peninsula, the garden of the State in an agricultural sense. The Saginaw River is navigable to this point for the largest lake vessels. West Bay City lies on the north bank of the Saginaw River and directly opposite Bay City. These cities will become one municipality April 1, 1905, an act of the legislature having made this provision.

Manufactures.— Bay City is a large manufacturing town, the principal industries being coal, salt, lumber, sugar, alcohol, beer, machinery, and chemicals. It has the only alcohol plant in the State which produces proof alcohol from the refuse molasses, a by-product of the manufacture of beet sugar, and one of the largest chemical plants in the world, manufacturing alkalis, soda ash, salt, etc. Three large beet sugar factories are located in Bay City and two in West Bay City. The development of coal mining in the Saginaw Valley is of comparatively recent origin, dating back only ten years, but it has attained large proportions in Bay County, a dozen mines, being in operation and others being established. It is the port of entry of 150,000,000 feet of rough lumber imported annually from Canada and Upper Michigan and Lake Superior district. This product is worked up in the planing mills, box factories and other wood working plants of which there are more than a score. A dozen saw mills are in operation and manufacture more than 100,000,000 feet of lumber annually, the logs coming in by rail. The Michigan Central Railroad alone brings to Bay City nearly 100,000,000 feet of saw-logs annually. Large quantities of forest products are distributed by rail, fully 300,000,000 feet of lumber besides vast quantities of shingles, cedar poles, posts, railroad ties and hemlock bark being handled in and out of the city annually. The city has a large shade roller factory, wind mill factory, one of the largest industrial works in the country, turning out machinery, another large machinery plant, maple flooring plants, the largest woodenware factory in the world, a number of breweries, a large flour mill and elevator, two feed mills, and a large marine engine plant, yacht building plant, and a large chicory plant, considerable attention being paid to this industry. The city has 87 incorporated manufacturing and business concerns with a capitalization of nearly $20,000,000.

Trade and Commerce.— The growth of the commerce of Bay City has been steady. It has also changed. Up to 20 years ago the manufacture of pine lumber was the chief industry on the Saginaw River and there was produced in a narrow strip of territory 18 miles long since 1851 an aggregate of 24,000,000,000 feet of manufactured lumber. Of late years the pine industry declined owing to the exhaustion of the pine timber tributary to the mills, and mixed timber is now chiefly manufactured. The lake shipments of lumber which have exceeded 850,000,000 feet in a single season have declined and lumber is now brought in instead of being shipped out by water, the product being worked up in factories and shipped to consuming points by rail and water, these consisting of lumber products, fish, salt, coal, sugar and alcohol. The city also does an extensive business in wholesale groceries, supplies for mills and machinery generally. The total business aggregates $50,000,000 annually.

Railroads and Water Communication.—Bay City is the division headquarters of the Michigan Central Railroad, the Mackinaw, Bay City & Detroit, and Bay City and Jackson divisions centering here. It is also the northern terminal of the C. H. D. & Pere Marquette system, the northern terminal of the Grand Trunk, and the southern terminal of the Detroit & Mackinac Railroad. It has a street railway system of 35 miles and an interurban road extending 14 miles south to Saginaw. Two interurban routes are projected, one to Lapeer, Pontiac and Detroit, the other to Caro, Cass City, Bad Axe and Harbor Beach. It is at the head of deep water navigation on the Saginaw River, and is reached by the largest lake vessels. Opposite Bay City are two large ship-building plants and it has also an extensive dry dock. The chief water exports are lumber products, salt and coal, and the imports are lumber products and merchandise. It is reached by navigation from all ports on the great lakes.

City and County Government.— Bay City is the seat of the county government and contains the county court-house and all county offices. It has a fine city-hall building, erected at a cost of $200,000. The charter election is held on the first Monday in April of each year, the mayor holding office two years, the comptroller four years, and the treasurer and recorder two years. The total expenses of the city government in 1903 were $177,576.18, and the valuation as assessed for taxation purposes in 1904 is $11,797,875. The bonded debt of the city is $600,000, of which $342,000 are waterworks bonds. The rate of taxation on $1,000 valuation in 1904 was $18.19, which includes the school tax of $3.93.

Banks and Loan Companies.—Bay City has five banking institutions with an aggregate capital of $600,000; profits $367,651, and deposits

amounting to $4,784,014, according to the statement of 6 Sept. 1904. There are two building and loan associations, the Mutual Building and Loan Association of Bay County, capital $2,000,000; and the Savings Building and Loan Association of Bay County, capital $1,000,000.

Churches and Charities.—Bay City is well represented in its religious and charitable institutions. It has 36 churches and missions and 12 private and parochial schools. There are three charitable institutions, the Children's Home, Lutheran Children's Home, and Woman's Home; three hospitals — the Mercy Hospital, under the auspices of the Sisters of Mercy; the Lewis Hospital, and the Bishop Hospital. The city also has 66 aid, benevolent, social, and other societies, and 87 secret societies and lodges.

Newspapers.—Bay City has two daily newspapers and several weekly publications.

Education.—Bay City has a fine high school and nine other school buildings, employing in all 127 teachers, including the superintendent and principals of the several schools. The school census of 1904 shows 9,506 children of school age in the city. A county normal training school and kindergarten schools are maintained in connection with the public school system. The city maintains the Bay City Business College, Holy Rosary Academy, conducted by the Dominican Sisters; Mercy Hospital Training School for Nurses; Oral School for the Deaf, and Lutheran and Catholic parochial schools. There are two libraries — the Bay City Public Library, located in the city-hall building, and having 24,000 volumes; the Bay County Bar Library.

Buildings, Parks, Suburbs, etc.—Bay City is noted for its substantial business buildings, its suburban attractions, and the beauty of its homes. The city-hall, Masonic temple, and Federal building are imposing structures. The Bay City Club erected in 1904 a fine club house, the Masonic Club meets in Masonic Temple, the Elks Club owns its own building, as does the Bay City Boat Club, and there are a number of private clubs. Bay City has a board of trade with a membership of over 200. The city has six public parks, and has an abundant supply of good water, obtained from Saginaw Bay.

History.—The Saginaw Valley, in the lower portion of which Bay City is situated, derived its name from the Indian appellation «O-sauge-nong,» meaning «land of the Sauks,» a tribe of red men who inhabited this locality more than 350 years ago. Subsequently the Sauks were nearly exterminated by the Chippewas, and the latter ceded the territory to the United States in 1819. The first settler located here in 1831, he being employed by the government as an Indian farmer, in conformity to the provisions of the treaty. There were two reservations, one of 2,000 and one of 1,000 acres, embraced within what are now the corporate limits of the city, the reservations being to Stephen V. R. Riley, of Schenectady, N. Y., who had resided with the Indians many years, married an Indian woman, by whom he had three sons, the eldest, John Riley, being located on the reservations referred to. In 1836 he sold his land to a number of Detroit business men, who organized the Saginaw Bay Company, which began to lay out the future city. A large hotel was framed and a dock and warehouse built, but, the panic coming on soon, the company suspended and progress ceased for some time. In 1840 three gentlemen purchased the stock of the Saginaw Bay Company and became the proprietors of what was known as Lower Saginaw. There was a steady growth after 1844, due to the development of the white pine lumber industry, the Saginaw River being the outlet for streams that traversed the richest pine forests then known in the United States. The village of Bay City was incorporated in 1859, and retained its village organization until 1865, when it was given a city charter.

Population.—The Federal census taken in 1900 gave the city a population of 27,628, and the State census taken in 1904 gave the city a population of only 27,644, figures which are not accepted as accurate. The population of West Bay City slightly exceeds 13,000, so that when the consolidation becomes effective, 1 April 1905, the greater Bay City will have a population in excess of 40,000.

E. D. Cowles,
Editor 'Bay City Tribune.'

Bay Islands, Honduras, a group of six islands in the Bay of Honduras, 150 miles southeast of Belize, known as Ruatan, Guanaja (or Bonacca), Utilla, Barbareta, Elena, and Morat. They were discovered by Columbus, 30 July 1502, and it was from Guanja that he first sighted the mainland of America. Their ownership was long a matter of dispute between Spain and England, and later between England and the republic of Honduras. In 1852 the group was declared a colony of Great Britain by royal warrant, and this action involved the United States in the dispute, that government claiming that the seizure was a violation of the Clayton-Bulwer treaty (q.v.). Negotiations dragged along slowly for several years, but finally Great Britain recognized the claim of Honduras to the islands. A practical protectorate was, however, maintained by Great Britain over the group, and the inhabitants (who number nearly 6,000) avowed British allegiance. In 1903 Great Britain formally renounced all jurisdiction, and title to the Bay Islands is now clearly vested in Honduras.

Bay Lagoon, Philippines, a freshwater lake in the northern part of Luzon. This lake is connected with Manila Bay by the Pasig River, and from its centre rises a high volcanic island. It is about 20 miles in extent from north to south, and about 47 miles from east to west. In 1899 it was made a naval headquarters for the United States.

Bay Psalm Book, the title of the first book published in the American colonies. It was printed by Stephen Daye at Cambridge, 1640, and was the product of the joint labors of Revs. Richard Mather, Thomas Wilde, and John Eliot. It was revised in 1650 and was long in use in New England.

Bay Salt, the coarse-grained salt found in salt-marshes and along ocean shores, where it is formed by the spontaneous evaporation of sea-water. The name is supposed to refer to the Bay of Biscay, on whose shores extensive deposits of «bay salt» occur.

Bay State, the popular name of Massachusetts, which prior to the adoption of the United States' Constitution had been known as the Massachusetts Bay Colony.

Baya, or **Baya Sparrow,** a sparrow-like weaver-bird (*Ploceus phillippinus*), which the people of India and the Malay countries often keep about their houses, not only in cages, but as a free pet trained to do a variety of clever tricks, even to find small articles, to carry notes to certain places, and to steal ornaments from the hair of visitors. See WEAVER BIRD.

Bayad, a cat fish, *Bagus bayad,* a large edible fish found in abundance in the river Nile; distinguished, however, from the electric catfish of the same waters.

Bayaderes, bä-yạ-dārz, in the East Indies, young girls, from 10 to 17 years of age, who are instructed in dancing, singing, and acting little plays. They are trained under the care of women, who are experienced in all female arts, and particularly in that of pleasing. These procure from the lowest classes of the people the most beautiful girls, of seven or eight years of age, and instruct them in all the arts of their profession (especially dancing and singing), the object of which is to amuse the rich and minister to their passions. Their presence is considered necessary even at the smallest public entertainments, though they are known to be mere prostitutes. After their 17th year, when their first charms have faded, they retire to a pagoda under the protection of the Brahmins, who scruple not to pocket the gains of their prostitution. This word is from the Portuguese word *bailadeira,* from *bailar,* to dance.

Bayamo, bä-yä'mō, Cuba, a town whose name is indissolubly connected with the Ten Years' war and the revolution of 1895. Thus the Cuban national air received the name 'Bayamese Hymn.' The republican movement of 1868 originated here and in the neighboring town of Yara; and here Gen. Garcia received the message that Lieut. Rowan delivered to him before the war of 1898 between the United States and Spain. Bayamo was founded in the early years of the Spanish conquest. It is situated on an affluent of the Canto, Cuba's largest river, in the province of Santiago.

Bayard, bī'ạrd, **George Dashiell,** American soldier: b. Seneca Falls, N. Y., 18 Dec. 1835; d. 14 Dec. 1862. Passing his boyhood in Iowa, he entered West Point, 1852, and became a cavalry lieutenant; then captain in August 1861, colonel of volunteers in September, brigadier-general the following April; and after serving in the Shenandoah and northern Virginia campaigns, was mortally wounded at Fredericksburg.

Bayard, James Asheton (1st), American statesman: b. Philadelphia, 28 July 1767; d. 6 Aug. 1815. He was the son of Dr. James A. (see BAYARD FAMILY); was adopted by his uncle, Col. John (q.v.), graduated at Princeton, 1784; studied law, and settled in Wilmington, Del., permanently. In 1796 he was elected (Federalist) Representative in Congress and became the leader of the party in the House, noted as a constitutional lawyer; and when the peculiar system of presidential elections at that time had tied Jefferson and Burr for the presidency, though Jefferson was the only one really voted for, Bayard threw his vote for Jefferson and elected him as the less obnoxious of the two. John Adams appointed him minister to France, but he declined. He served in the House till 1803; in 1804 he was elected to the Senate, and held the seat till 1813, voting against the War of 1812. He was made peace commissioner in 1813 by Madison, and, declining the ministry to Russia, was one of those who concluded the Treaty of Ghent, December 1814, but died shortly after his return.

Bayard, James Asheton (2d), American statesman, son of the foregoing: b. Wilmington, Del., 15 Nov. 1799; d. there, 13 June 1880. He became a lawyer of high rank in Wilmington, United States attorney for Delaware under Van Buren, and was elected United States senator, 1851, 1857, and 1863, as a Democrat; but on the last occasion the «iron-clad» oath of allegiance being required of public officers at that time, Mr. Bayard entered a protest against it as a violation of State rights, and resigned his seat at once on taking it. His successor, George R. Riddle (q.v.), dying four years later after the war, he accepted an election to fill out his own unexpired term, to March 1869; during most of the time was chairman of the Judiciary Committee, and gained an honorable celebrity for his punctilious sense of public honor in the matter of the Credit Mobilier (q.v.). His son, Thomas F. (q.v.), was chosen to succeed him by the same legislature which had elected himself, the only instance of the kind in American history. He lived quietly at Wilmington during the remainder of his life.

Bayard, John, American patriot: b. Bohemia Manor, Md., 11 Aug., 1738; d. 7 Jan. 1807. (For his descent, see BAYARD FAMILY.) He was a prominent Philadelphia merchant, member of the Sons of Liberty, and later of the Provincial Congress, 1774–5, and of the Council of Safety; colonel of infantry at the battles of Brandywine, Germantown, and Princeton; member of the State board of war, and speaker of its House. He furnished arms to Congress and fitted one of the earliest efficient privateers. In 1785 he was elected to Congress. Somwhat impoverished by his sacrifices in the Revolution, he removed permanently to New Brunswick, N. J., where he was mayor, county judge, and leading magnate. He was a firm Federalist, of high character.

Bayard, Nicholas, American colonial official: b. Alphen, Holland, about 1644; d. New York, 1707. (See BAYARD FAMILY.) He was double nephew of Peter Stuyvesant, by blood and marriage; became his private secretary and surveyor of the province, secretary of it after the English conquest, and mayor in 1685. He was commander-in-chief of the militia of the province, and one of the three resident councilors; and had to flee to Albany for his life on Leisler's usurpation after Andros' overthrow, but was made councilor anew on Leisler's downfall. On Kidd's arrest for piracy in 1699, Bayard, like all Gov. Bellomont's officials, was accused of complicity, and visited London to clear himself; but the old hates of the Leisler time pursued him, and on charge of attempting to introduce popery, piracy, and slavery into New York he was condemned to death for high treason. William's death intervening, however, he was released and restored to his possessions by an order in council.

Bayard, bă-yär, **Pierre du Terrail** (CHEVALIER DE), French soldier: b. Château Bayard, near Grenoble, 1475; d. 30 April 1524. He was descended from one of the most noble families

in Dauphiny, and at the age of 13 became page to the Duke of Savoy, at that time an ally of France. Charles VIII., struck by his skill and grace in riding, asked that he be transferred to his service, and accordingly, as a preparation to being attached to the royal suite, young Bayard was placed in the household of Paul of Luxembourg, Count de Ligny, where he was taught all the feats of arms and niceties of chivalry which were then held necessary to constitute a gentleman and a soldier.

His first experience in war was in the wild and daring march of Charles VIII., with a small unsupported army, through the whole length of Italy, to invade the kingdom of Naples, which was won and lost in a few days with equal ease; and in that campaign, he greatly distinguished himself, taking, with his own hand, a stand of colors in the battle of Verona. After this, while serving in an invading army in Italy, after a battle fought near Milan, in the heat of pursuit he entered that city pell-mell with the fugitives, and was made prisoner, but, in consideration of his astonishing valor, was sent back without ransom by Ludovico Sforza, together with his horse and arms. In Apulia he defeated a Spanish corps commanded by Alonzo de Soto-Mayor, who broke his parole and slandered Bayard, in return for which the latter challenged and slew him in single combat, and afterward covered the retreat of the whole French army, and defended the bridge over the Liris, now the Garigliano, single-handed against half an army. For this feat he received an augmentation of his armorial bearings, a porcupine bristling with spears, with the motto *Vires agminis unus habet.*

A real type of the ideal knight-errant of romance, wherever honor was to be won or danger incurred, Bayard was there. Desperately wounded in the assault of Brescia, he was carried to the house of a nobleman who had fled, abandoning his wife and daughters to the fate which befalls women in a sacked city, and from which the wounded enemy alone preserved them. Half-recovered from his wounds, he joined Gaston de Foix before Ravenna, where with his own hand he took two Spanish standards and converted a retreat of the enemy into a rout. In the subsequent wars with Ferdinand the Catholic of Spain he displayed the same chivalric valor and the same generalship among the Pyrénées which he had displayed in his boyhood among the passes of the Alps and Apennines. In the dark days which clouded the latter years of Louis XII., when Henry VIII. brought his English archers to back the German Maximilian in Flanders, and Térouanne and Tournay went down, with but feeble resistance, before the allies, Bayard was the same in adverse as he had been in prosperous fortunes. Made prisoner at the disgraceful battle of the Spurs, it was again his glory to be taken under circumstances of such honor that, once more, he was dismissed, with his horse and arms, unransomed. It was, however, in his noon of manhood that his glory shone the brightest. When Francis I. invaded Italy after his accession to the throne of France, it was Bayard who was the precursor of his march; who made Prosper Colonna, at the very moment of his belief that he had ambushed and surprised him, his prisoner; who, in a word, paved the king's way to the magnificent battle of Marignano. In that tremendous conflict, he did prodigies, and more than any or all beside to change what once seemed a lost fight into a victory. At its close his sword conferred the accolade on the shoulder of his king, Francis I., who deemed it honor enough to take knighthood at the hand of such a paladin as Bayard. The fortunes of war, proverbially fickle and changeful, were never more so than at this epoch; and when, a short time later, Charles V. invaded Champagne, his wonderful defense of the open town of Mézières alone prevented his penetrating to the heart of France, of which, by this exploit, he deserved, as he obtained, the name of savior. His next war was his last. Genoa, ever an unwilling conquest of the French arms, revolted; and, under the command of Bonnivet, Bayard was sent to reduce the city to obedience and chastise the rebels. In the first instance success attended their advance; but, after the surrender of Lodi fortune again changed, and, foot by foot, the French were beaten out of their conquests. In retreating through the Val d'Aosta the French rear was beaten, Bonnivet was severely wounded, and the safety of the army was committed to Bayard, if he perchance might save it. In passing the river Sesia in the presence of a superior enemy, as Bayard was covering the rear and pressing hard upon the Spaniards, who were fast giving way before his impetuous charge, he was shot through the right side by a stone from an arquebus, which shattered his spine. «Jesu, my God!» he cried, «I am a dead man.» And then commanding that he should be placed erect, in a sitting posture, with his back against a tree, with his face to the Spaniards, and the cross-hilt of his sword held up as a crucifix before him, he confessed his sins to his esquire, sent his adieux to his king and country, and died in the midst of weeping friends and admiring enemies. With his fall the battle was ended. The French lost everything,— standards, drums, baggage, ordnance,— and their retreat to France became a flight. But there was most grief that they had lost Bayard. His body remained in the hands of the Spaniards; but they embalmed and returned it to France unsolicited. A simple bust, with a brief and modest Latin inscription, in the church of the Minorites, in Grenoble, erected in 1823, is the only monument to one of the purest and most beautiful characters in mediæval history, the *chevalier sans peur et sans reproche.*

Bayard's life was written by Symphorien Champier in 1525, and two years later by his secretary, Jacques Joffrey, known as the «loyal servitor.» Other accounts have been translated by E. Walford (London, 1867).

Bayard, Richard Henry, American senator, elder brother of James A. (2d): b. Wilmington, Del., 1796; d. 4 March 1868. He graduated at Princeton, 1814, and became a lawyer in Wilmington. He was United States Senator 1836–45, resigning for a few weeks in 1839 to be chief justice of Delaware, but accepting an immediate re-election; then chargé d'affaires at Brussels 1850–3. Returning, he lived in Philadelphia till his death.

Bayard, Samuel, American jurist, son of Col. John: b. Philadelphia, 11 Jan. 1767; d. 12 May 1840. He was valedictorian at Princeton, 1784, and practised law in Philadelphia till 1791, when he was made clerk of the United States

supreme court. From 1794 to 1798 he was in London as agent to prosecute American claims before the British admiralty court; after his return was presiding judge of Westchester County till 1803, lawyer in New York 1803–6, then removed permanently to Princeton, N. J. He was one of the founders of Princeton Theological Seminary, the American and New Jersey Bible societies, and the New York Historical Society.

Bayard, Thomas Francis, American statesman, son of James A. (2d): b. Wilmington, Del., 29 Oct. 1828; d. 26 Sept. 1898. He was intended for a business career, and was placed in a New York house, his elder brother being designed to carry on the family succession for public life; but, the latter dying in 1848, Thomas returned to Wilmington, studied law with his father, and was admitted to the bar in 1851. He was appointed United States district-attorney, but resigned the next year; removed to Philadelphia 1855 and practised law two years, then returned permanently to Wilmington. He and his father were peace Democrats, unalterably opposed to the war, publicly denounced it, and gave no help to its prosecution. Elected to the Senate to succeed his father, he took his seat 4 March 1869, and served by successive re-elections till 1885. He was one of the leading Democratic figures, member of the Finance, Judiciary, and other important committees, and its president *pro tem.* in 1881; was on the Electoral Commission of 1876; continued to champion the party doctrines, and was one of the most prominent candidates for the presidency before both Democratic national conventions of 1880 and 1884. On 4 March 1885 he was appointed secretary of state in the Cabinet of President Cleveland; and in this position had his share of important and vexatious questions, such as the Bering Sea seal-fishery matter, and treaties with Great Britain and Russia. He was United States ambassador to Great Britain 1893–7, in Cleveland's second term, the first British minister to hold the title of ambassador.

Bayard Family, a remarkable succession of American public leaders, statesmen, and jurists, identified for two and a half centuries with the Middle States from New York to Maryland, and for a century and a quarter almost continuously in public service. They descended from a family of French Huguenot refugees, whose ancestor was a Paris theological professor driven to Holland to escape persecution about 1580. His son Samuel became a wealthy Amsterdam merchant and married the accomplished, energetic, and capable sister (Anna) of Peter Stuyvesant, the last governor of the Dutch New Netherlands, who himself married Bayard's equally accomplished sister Judith, a great lady of her time. Samuel died in Holland; and his widow with her three sons accompanied her brother to Manhattan Island, where she took up an estate of 200 acres, including the site of the Astor Library. Of these sons, Nicholas became secretary of New Netherlands and later of English New York, mayor, commander-in-chief of the colony's militia, and practically the head of the colony — a perilous honor which twice brought him to the verge of destruction. His brother Peter, however, though not personally conspicuous, became the ancestor of the distinguished Bayards of the 18th and 19th centuries. Peter's son Samuel joined the Labadists (see LABADIE, JEAN), a sect of communists otherwise much like the Quakers, and removed to Maryland. Of his grandsons, Col. John was a leading Philadelphia merchant, patriot, and soldier, representative in Congress, a county magnate in Maryland till after the Revolution, later judge and Federalist pillar; his son Samuel, lawyer, clerk of the supreme court, United States claim agent, and judge, was one of the founders of the New York Historical Society and the American Bible Society. Col. John's twin brother, Dr. James A., was father of James A., the noted Federalist statesman of Jefferson's and Madison's time, leader of the Federalists in the House of Representatives, and the one whose vote gave the presidency to Jefferson instead of Burr, senator, and peace commissioner. The two sons of the latter James A., Richard H. and James A. (2d), were both United States senators of distinction from the State of Delaware, the one a Whig and the other a Democrat — the only instance of the kind in United States history; the former also chosen chief justice of Delaware. The son of James A. (2d), Thomas F., was also senator to succeed his father; so that father, two sons, and grandson represented Delaware in the Senate 47 years between 1805 and 1885. Thomas F. was further a member of the Electoral Commission of 1876, and secretary of state under Cleveland. This unique record of distinguished public position is the more notable that it has been on the highest plane of public character as well as capacity — conspicuous for dignity, probity, and scrupulous sense of those official proprieties which shun the appearance of evil and therefore bar out its reality.

Bayazid, or **Bayezeed,** Turkey in Asia, a town in the pashalic of, and 140 miles southeast from Erzeroom, southwest of Mount Ararat, from the base of which it is separated by a lava-covered plain 10 miles wide. It is situated on the declivity of a rugged eminence, the summit of which is fortified and surrounded by a wall and ramparts. The town is in a ruinous state; most of the houses are small and ill built, and the streets are extremely filthy. Besides the extensive palace of the pasha, the town contains two Christian churches, three mosques, and the famous monastery of Kara-Keleeseh, celebrated for its beautiful architecture and antiquity. The inhabitants consist chiefly of Kurds and Armenians. Kurdish is the common language of the place. Some trade is carried on with Persia, on the frontiers of which the town is situated. It was occupied and held by the Russians for a time in 1877. Pop. 5,000.

Bayazid, bä-yä-zēd', **I.** and **II.** See BAJAZET.

Baybay, bāī'bāī, Philippines, a town of the province of Leyte, situated on the west coast, 40 miles southwest of Tanaban. Pop. 17,367.

Bayberry. See CANDLE BERRY.

Bayer, bī'ĕr, Gottlieb Siegfried, German philologist, grandson of Johann Bayer: b. Königsberg, 1694; d. St. Petersburg, 21 Feb. 1738. He displayed from his earliest childhood a singular passion for Chinese and other Eastern languages. He studied the Coptic at Berlin, under La Crosse, Arabic at Halle, under Solomon Negri, and at the same time opened a correspondence with the missionaries in India,

in order to obtain more information about the Sanskrit and Hindustanee. On the foundation of the academy of sciences in St. Petersburg in 1726, he became professor of Greek and Roman antiquities. Besides his extraordinary knowledge of languages, Bayer was an eminent historical and archæological scholar. His monument is his work published in 1730, 'Museum Sinicum, in quo Sinicæ linguæ et literaturæ ratio explicatur,' containing a Chinese grammar, a grammar of the dialect of Shin-Shu, and many interesting notices on Chinese literature.

Bayer, Johann, German astronomer: b. Augsburg, 1572; d. 1660. He is celebrated for a large work published in 1603, under the title of 'Uranometria,' and republished in 1627 under the title of 'Cœlum Stellatum Christianum,' which contains a minute description and a catalogue of the constellations. He changed the name because he had withdrawn the heathen names of the constellations, and supplied their names by others taken from the Bible, taking those of the northern constellations from the New, and those of the southern constellations from the Old Testament, and giving the names of the 12 apostles to the signs of the zodiac. His letters were adopted by Flamsteed and others, and are now universally used, but the heathen names have kept their ground. He contributed much to the simplification of astronomical science, by avoiding the old unintelligible nomenclature and by denoting the stars in every constellation by the letters of the Greek alphabet in their order. Bayer was also a good student of law and an able theologian. He was settled as minister over different parishes, and so zealous in his advocacy of Protestantism that he was called "Os Protestantium." The Emperor Leopold ennobled him.

Bayer, Karl Robert Emerich von, German novelist, who wrote under the pseudonym of Robert Byr: b. Bregenz, 15 April 1835. He is a very popular and exceedingly prolific story-teller, and his voluminous fictions have had a wide circulation. Among his best-known novels are 'The Struggle for Life'; 'Masks'; 'A Secret Dispatch'; 'The Road to Fortune'; 'Meadow Maidenhair'; 'The Ironworm.'

Bayeux, bā-yė, an ancient town of France, department Calvados, about 16 miles northwest of Caen. It possesses many antique houses of singular appearance, and has a beautiful cathedral dating from the 12th to the 15th century, and having a crypt under the choir several centuries earlier. Its noble portal and three towers render it especially noteworthy. The local industries include the manufacture of porcelain and lace, bonnet-making and cotton spinning. There is a public library and museum, in which one of the most interesting relics of the Middle Ages is preserved. See Bayeux Tapestry. Pop (1896) 7,900.

Bayeux Tapestry, a celebrated piece of mediæval embroidery of sewed work originally found in the cathedral of Bayeux, in the library of which town it is still preserved. The fact that such a tapestry existed was brought to light by M. Lancelot, who communicated a description of an illuminated drawing of a portion of it to the Academy of Inscriptions and Belles-lettres in 1724. This led to the discovery of the tapestry itself in 1728, whereupon various speculations arose as to its date, its origin, and its purport. According to tradition it is a contemporary representation of the invasion and conquest of England by the Normans, and the discussions upon it have proved that tradition is right. It is thus not only valuable as a relic of the art of the Middle Ages, but it has also great historical value, inasmuch as it supplies several details of the great event which it portrays which are not found in the chroniclers, and also gives us an exact picture of Norman costumes and manners. It contains 1,512 figures with inscriptions in Latin giving the names and subjects. It is supposed to have been worked by the needle of Matilda, queen of William the Conqueror, assisted by her attendants, and to have been presented by Odo, bishop of Bayeux, the half-brother of William, to the church in which it was found. Whether this be so or not, it is regarded as certain that the tapestry is not later than the 11th century. During the French Revolution the tapestry was in great danger of being destroyed. In 1803 it was removed to Paris by order of Napoleon, and when he was meditating the invasion of Britain he caused it to be carried from town to town and exhibited between the acts in the theatres. It was brought back to Bayeux in 1804, when it was placed in the hôtel de ville, instead of the cathedral, its former resting-place. The length of the tapestry is 230 feet, and its height 20 inches. It is in an excellent state of preservation. There are good representations of it produced photograpically. Consult J. C. Bruce's 'Bayeux Tapestry' (1885). See Tapestry.

Bayfield, Matthew Albert, English clergyman: b. Edgbaston, 17 June 1852. He was educated at the King Edward's School, in Birmingham, and at Clare College, Cambridge; was assistant master in the Blackheath School, 1875–9, and in Marlborough College, 1879–81; headmaster's assistant in Malvern College, 1881–90; headmaster of Christ College, Brecon, 1890–5, and headmaster of Eastbourne College, 1900. He published editions of 'Ion, Alcestis, and Medea,' and also 'Septem contra Thebas' (with Dr. Verrall); 'Iliad' (with Dr. Leaf); 'Latin Prose for Lower Forms,' etc.

Bayle, bāl, **Pierre,** French critic and philosopher: b. Carlat, near Foix (Languedoc), 1647; d. Rotterdam, 28 Dec. 1706. At the age of 19 he entered the College of Puy-Laurens, to finish his studies. All books were eagerly devoured by him; his taste for logic led him particularly to study religious controversies, but Amyot's 'Plutarch' and 'Montaigne' were his favorite works. In Toulouse he studied philosophy with the Jesuits. The arguments of his professors, and still more his friendly discussions with a Catholic priest who dwelt near him, confirmed his doubts of the orthodoxy of Protestantism, so that he resolved to change his religion. His family, however, tried all means to regain him, and after 17 months he returned to his old faith. To escape from the punishment of perpetual excommunication which the Roman Catholic Church then pronounced against apostates, he went to Geneva, and thence to Copet, where Count Dohna intrusted him with the education of his sons, where he studied the philosophy of Des Cartes. But after some years he returned to France and settled in Rouen, where he was employed in teaching. In 1675 he obtained the philosophical chair at

Sedan, where he taught with distinction until the suppression of this academy in 1681. He was afterward invited to discharge the same duties at Rotterdam. The appearance of a comet in 1680 induced him to publish, in 1682, his 'Pensées Diverses sur la Comète,' in which he discussed various subjects of metaphysics, morals, theology, history, and politics. It was followed by his 'Critique Générale de l'Histoire du Calvinisme de Maimbourg.' This work, received with equal approbation by the Catholics and Protestants, and esteemed by Maimbourg himself, excited the jealousy of his colleague, the theologian Jerieu, whose 'Refutation du P. Maimbourg' had not succeeded, and involved Bayle in many disputes. He afterward undertook a periodical work, 'Nouvelles de la République des Lettres,' in 1684.

The death of his father and of his two brothers, together with the religious persecutions in France, induced him to write his 'Commentaire Philosophique' on the words of the Gospel: «Compel them to come in»; which is not equal in merit to his other works. Bayle himself was unwilling to acknowledge it; but Jurieu, who probably recognized its author by the zeal with which toleration is defended in this work, attacked it with violence, and his influence was sufficient to lead the magistrates of Rotterdam to remove Bayle from the office in 1693.

He now devoted all his attention to the composition of his 'Dictionnaire Historique et Critique,' which he published in 1696. This was the first work which appeared under his name. Jurieu opposed him anew, and caused the consistory, in which he had the greatest influence, to make a severe attack upon him. Bayle promised to remove everything which the consistory deemed offensive; but finding the public had other views, and preferring the satisfaction of his readers to that of his judges, he left the work, with the exception of a few trifles, unaltered. He found two new enemies in Jacquelot and Le Clerc, who both attacked his religion: others persecuted him as the enemy of his sect and his new country.

The best editions of his 'Dictionnaire Historique' are that of 1740, in 4 volumes folio (Amsterdam and Leyden), and that in 16 volumes, published 1820–4 at Paris.

Baylen, bī-lān', or **Bailen,** a town of Spain, province of Jaen, at the foot of the Sierra Morena, 22 miles north of Jaen. It commands the road leading from Castile into Andalusia, and derives its celebrity from the events which took place in its vicinity leading to the «Capitulation of Baylen,» signed 20 July 1808, when Gen. Dupont, and about 20,000 French troops under his command, surrendered to the Spaniards on condition of their being conveyed to France by the Spanish government; but the latter stipulation was not carried into effect. The incapacity of Dupont was mainly instrumental in bringing about this result, which inspired the Spaniards with confidence, and was always regarded by Napoleon as the principal source of the French disasters in the Peninsula. Pop. (1887) 8,580.

Bayley, James Roosevelt, American theologian: b. New York, 23 Aug. 1814; d. Newark, N. J., 3 Oct. 1877. He studied at Trinity College, Hartford, and became a minister of the Protestant Episcopal Church; but, in 1842, was converted to the Roman Catholic faith; and, after studying at Paris and Rome, was ordained a priest in 1844. He accepted the chair of belles-lettres at St. John's College, Fordham, and was its acting president in 1846. After serving as secretary to Archbishop Hughes, he was consecrated the first Bishop of Newark, N. J., in 1853. In 1872 he became Archbishop of Baltimore, Md. He was the founder of Seton Hall College and several other institutions. His 'Pastorals for the People,' and 'History of the Catholic Church on the Island of New York,' are his chief writings.

Bayley, Richard, American physician: b. Fairfield, Conn., 1745; d. Staten Island, N. Y., 17 Aug. 1801. After studying medicine in England, chiefly in the London hospitals and under Dr. Hunter, he returned to America in 1776 as a surgeon in Gen. Howe's army, but settled in New York the following year. He was the first professor of anatomy in Columbia College (1792), and for a time health officer of the port of New York, where his vigorous advocacy of proper quarantine laws was finally successful. A careful student of his profession, he suggested a new method of treatment for croup, and maintained (1797) that in its origin, yellow fever was due to local causes and was not contagious. He published: 'Cases of the Angina Tracheatis, with the Mode of Cure' (1781); 'Essay on the Yellow Fever' (1797); 'Letters on Yellow Fever' (1798).

Bayley, William Shirley, American geologist: b. Baltimore, Md., 10 Nov. 1861. He graduated at Johns Hopkins in 1883, and since 1887 has been assistant geologist of the Lake Superior division of the United States Geological Survey, and since 1886 associate editor of the 'American Naturalist.' He is the author (with Prof. C. R. Van Hise) of the 'Report on the Geology of the Marquette Iron District of Michigan' and has been a frequent contributor to scientific journals.

Baylies, bā'lĭz, **Francis,** American statesman, member of Congress from Massachusetts for several sessions: b. 1784; d. Taunton, Mass., 28 Oct. 1852. In the presidential contest which finally resulted in the election of John Q. Adams, he threw the only electoral vote for Jackson that was given from New England. He was for a short time minister to Brazil. He published in 1828 a history of the old colony of Plymouth.

Bayliss, Clara Kern, American author: b. near Kalamazoo, Mich., 5 March 1848. She was married to Alfred Bayliss in 1871, and has published 'In Brook and Bayou' (1897); 'Lolami, the Little Cliff Dweller' (1901).

Bayliss, Jeremiah Henry, American Methodist Episcopal clergyman: b. Wednesbury, England, 20 Dec. 1835; d. Bay View, Mich., 14 Aug. 1889. He was educated at Genesee College, N. Y., and was prominent as pastor of Park Avenue and Trinity churches, Chicago; Roberti Park and Trinity churches, Indianapolis; Central Church, Detroit; and Walnut Hills Church, Cincinnati. He edited the *Western Christian Advocate* in 1884 and 1888.

Bayliss, Sir Wyke, English artist: b. Madeley, 21 Oct. 1835; d. London 6 April 1906. He was educated at the Royal Academy, and was

president of the Royal Society of British Artists from 1888. His paintings include 'La Sainte Chapelle' (1865); 'St. Mark's, Venice' (1880); 'St. Peter's, Rome' (1888); 'The Cathedral, Amiens' (1900); 'The Golden Duomo, Pisa' (1892), etc. His publications include 'The Witness of Art' (1876); 'The Enchanted Island' (1888); 'The Likeness of Christ Rex Regum' (1898); 'Five Great Painters of the Victorian Era' (1902).

Baylor, Frances Courtenay. See BARNUM, F. C. B.

Baylor, Robert Emmett Bledsoe, American lawyer: b. Lincoln County, Ky., 10 May 1793; d. Gay Hill, Tex., 6 Jan. 1874. In the War of 1812 he served under Col. Boswell and took part in the engagement near Fort Meigs. Admitted to the bar in Kentucky, he later removed to Alabama (1820), acquired a large practice, and became prominent in politics, being a representative in Congress, 1829–31. Later he emigrated to Texas, then a republic, and was a district judge for 25 years. A loyal member of the Baptist denomination, he gave largely in money and land to establishing one of its colleges at Independence (1845), and in recognition of his munificence it was named Baylor University (q.v.).

Baylor University, a co-educational institution in Waco, Tex., controlled by the Baptist Church. It was founded in 1845 on a charter granted by the republic of Texas, and named for Robert E. Baylor (q.v.). Its first location was in Independence, Tex.; it was provided with a university course in 1851; in 1861 President Burleson (who had been its head for 10 years) and the entire faculty resigned and organized a university in Waco, Tex., giving it the name of that city. The two institutions were consolidated in 1882, the earlier one being removed to Waco, and President Burleson continuing at the head of the institution. At the close of 1901 the university reported: Professors and instructors, 47; students, 436; volumes in the library, 11,000; grounds and buildings valued at $200,000; benefactions, $82,100; income, $125,000; number of graduates, 660.

Bayly, Ada Ellen, a popular English novelist, best known as EDNA LYALL: b. Brighton, about 1859; d. Eastbourne, 9 February 1903. She has written 'Won by Waiting' (1879); 'Donovan' (1882); 'We Two' (1884); 'In the Golden Days' (1885); 'Knight Errant' (1887); 'Autobiography of a Slander' (1887); 'Derrick Vaughan, Novelist' (1889); 'A Hardy Norseman' (1889); 'Doreen' (1894); 'How the Children Raised the Wind' (1895); 'Autobiography of a Truth' (1896); 'Wayfaring Men' (1897); 'Hope the Hermit' (1898); 'In Spite of All' (1901); 'The Hinderers' (1902), etc. Although her novels are decidedly romantic, their aim is to depict the development of character.

Bayly, Lewis, Welsh prelate: d. 26 Oct. 1631. He was the author of 'The Practice of Piety,' a very popular religious book which had great influence on Bunyan. It not only passed through many English editions, but was also translated into the Indian language by John Eliot, and was used by him in his work among the Indians.

Bayly, Thomas Haynes, English songwriter and author: b. Bath, England, 13 Oct. 1797; d. London, 22 April 1839. He began the study of law under his father, and later went to St. Mary Hall, Oxford, in order to prepare for the Church; but abandoned both and devoted himself to literature. He gained great popularity with some songs, and several dramas and novels by him also hit the public taste. With Henry Bishop he published 'Melodies of Various Nations.' Among his songs some of the best-known are: 'I'd Be a Butterfly'; 'The Soldier's Tear'; 'We Met—'twas in a Crowd'; and 'She Wore a Wreath of Roses.' His best play is 'Perfection'; among his novels are 'The Aylmers'; and 'A Legend of Killarney.' 'Loves of the Butterflies'; and 'Songs of the Old Château,' are volumes of songs and ballads; and his other works include 'Kindness in Women,' a collection of tales; 'Parliamentary Letters and other Poems,' and 'Rough Sketches of Bath.'

Bayly, Thomas Henry, American statesman: b. Accomac County, Va., 1810; d. 22 June 1856. He was admitted to the bar in 1830, and was for several years a member of the General Assembly of his State. In 1842 he was elected judge of the circuit superior court of law, an office which he resigned in 1844, when elected a representative in the national Congress; and by successive re-elections he held the latter position till his death. As chairman of the Committee on Ways and Means, he was the leader of the house during many sessions, and was highly respected by men of all parties, as well for his urbanity and dignity, as for his ability. The family home in which he died was established by his ancestors from England in 1666, and it is remarkable that he held just the same public offices that had been filled by his father.

Baynam, William, American surgeon: b. Caroline County, Va., 1749; d. 8 Dec. 1814. He completed his medical education in London, where he resided for 16 years, and was long assistant demonstrator to the professor of anatomy and surgery in St. Thomas' Hospital. He was probably unsurpassed in his time as an anatomist, and performed many remarkable operations. He furnished some excellent preparations in the museum of Cline and Cooper in London, and wrote various papers for medical journals.

Bayne, Peter, Scottish writer: b. Fodderty, Scotland, 19 Oct. 1830; d. London, 10 Feb. 1896. He studied theology at Edinburgh and philosophy under Sir William Hamilton, and was editor successively of the Glasgow *Commonwealth;* Edinburgh *Witness;* London *Dial;* and *Weekly Review;* and associate editor of the *Christian World.* He was author of 'The Christian Life: Social and Individual' (1855); 'Essays Biographical, Critical, etc.' (1859); 'Life and Letters of Hugh Miller' (1871); 'Testimony of Christ to Christianity' (1862); 'The Days of Jezebel,' a drama (1872); 'The Chief Actors in the Puritan Revolution' (1878); 'Life of Martin Luther' (1887).

Baynes, Thomas Spencer, English philosopher: b. Wellington, Somersetshire, March 1823; d. 29 May 1887. He was educated at Bath, Bristol College, and the University of Edinburgh, where he became (1851–5) assistant to Sir William Hamilton, then professor of logic.

In 1857 he was appointed examiner in logic and mental philosophy in the University of London; became (1857–64) assistant editor of the *Daily News*, to which he contributed many noteworthy articles on the American Civil War, and at this time wrote for several literary journals, such as the 'Athenæum' and the 'Literary Gazette.' In 1864 he was elected professor of logic, rhetoric, and metaphysics in the University of St. Andrews. Besides his contributions to reviews he published a translation of the 'Port Royal Logic,' with notes (1851); and an 'Essay on the New Analytic of Logical Forms' (1852). He was appointed editor of the ninth edition of the 'Encyclopædia Britannica' (being subsequently assisted by Prof. Robertson Smith).

Bayombong, bī-yŏm-bŏng', Philippines, the capital of the province of Nueva Vizcaya, Luzon, situated on the Magat River. It is the centre of a fertile rice and tobacco region. Pop. 3,691.

Bayonet, a straight, sharp-pointed weapon, generally triangular, intended to be fixed upon the muzzle of a rifle or musket, which is thus transformed into a thrusting weapon. It was probably invented about 1640, in Bayonne, though this is doubtful, but was not universally introduced until after the pike was wholly laid aside, in the beginning of the 18th century. About 1690 the bayonet began to be fastened by means of a socket to the outside of the barrel, instead of being inserted as formerly in the inside. A variety of the bayonet, called the sword bayonet, is now quite widely used, especially for the short rifles of the light infantry, the carbines of the artillery, etc. It is a compound of the sword and the bayonet, as its name indicates, having a sword-like blade with only one edge, and being capable of being fastened to the muzzle of the gun like the bayonet. The battle of Spire, in 1703, was the first in which charges of infantry were made with fixed bayonets. Opinions as to the present utility of bayonets differ widely, many authorities considering them of little importance, while others assert just the contrary. While the result of a battle is often determined by the employment of smokeless powder and long-range and rapid-firing rifles in surprises and night attacks the bayonet may be used to advantage as was frequently proved in the Boer war (1889–1902). See also TACTICS.

Bayonne, bā-yōn, a cathedral town in the department of the Basses-Pyrénées, France. It is situated at the confluence of the Nive and the Adour, about four miles from the Bay of Biscay. These rivers form a harbor capable of admitting vessels of considerable size. They divide the town into three parts, namely, Great Bayonne on the left bank of the Nive, Little Bayonne between the rivers, and St. Esprit on the right bank of the Adour. A citadel, built by Vauban, on the summit of an eminence in the suburb, commands the harbor and the city. The cathedral is a beautiful building dating from 1213, restored in the 19th century and furnished with two towers. The arsenal, one of the finest in France, and the mint are among the other buildings of Bayonne. The city has a considerable trade with Spain, Portugal, and South America, and masts and other timber for ship-building, from the Pyrenees, are exported to Brest and other ports of France. The hams of Bayonne are famous. Ships are built, and woolens, chocolate, soap, etc., are manufactured. Among the lower class the ancient Biscayan or Basque language is spoken. Catherine de Medici had an important interview with the Duke of Alva in Bayonne, June 1565, at which it is said the massacre of St. Bartholomew was arranged. The meeting of Napoleon with the king of Spain, Charles IV., and the prince of the Asturias, took place here in May 1808, when the latter transferred their rights to the Spanish territories in Europe and India to the French emperor. Pop. (1896) 22,278.

Bayonne, bā-yŏn', N. J., a city in Hudson County on New York harbor, the Kill von Kull, and Newark Bay, and the Central R.R. of N. J.; seven miles southwest of New York. It was formed by the union of a number of former villages (Pamrapo, Bayonne, Centerville, and Bergen Point), and is principally engaged in coal-shipping and the exporting and refining of petroleum, the works for the latter being connected by pipe lines with New York, Philadelphia, Baltimore, and other cities. Other industries are the manufacture of chemicals, ammonia and colors. The residential part of the city is very attractive, containing fine homes of New York business men. Its public library contains 11,000 volumes. Pop. (1900) 32,722.

Bayonne Conference, a conference held at Bayonne, June 1565, between Charles IX. of France, the queen mother, Catherine de Medici, Elizabeth, queen of Spain, and the Duke of Alva, envoy of Philip II., to arrange plans for the repression of the Huguenots.

Bayonne Decree. On 17 April, 1808, Napoleon directed the capture and sale of all vessels entering the ports of Spain, France, Italy, and the Hanse towns, under the American flag, and by the provisions of this declaration, known as the Bayonne Decree, France is supposed to have confiscated more than 300 American vessels. The decree was issued ostensibly with the view of helping the United States to enforce the embargo of 1807 and on the presumption that all such vessels must be sailing under false colors and thus indirectly benefiting the English cause.

Bayonne, Treaty of, a treaty of peace agreed to 4 May 1808, and signed on the next day, between Napoleon I. and Charles IV., king of Spain. The latter resigned his kingdom, and Napoleon I. engaged to maintain its integrity, and to preserve the Roman Catholic religion. His son, Ferdinand VII., confirmed the cession 10 May.

Bayou, bī'oo, probably a corruption of the French word *boyau,* a «gut» or «channel.» Its strict signification is a stream which is not fed by springs, but flows from some other stream or from a lake; but it is not unfrequently used in America as synonymous with «creek.» The term is very little employed except in the States of Louisiana, Texas, and Arkansas.

Bayou State, the name often given to the State of Mississippi.

Bayreuth, bī'roit. See BAIREUTH.

Bayrhoffer, bīr'hōf-fĕr, **Karl Theodor,** German Hegelian philosopher and radical politician: b. Marburg, 1812; d. Jordan, Wis., 3 Feb. 1888. He was professor of philosophy at Marburg,

taking the chair in 1845, but in 1846 his radical views caused his expulsion. During the brief rule of liberalism in Hesse, he was chosen president of the chamber; but, in 1853, was forced to flee to the United States. Among other works he wrote 'On Catholicism in Germany'; 'Idea and History of Philosophy'; 'Fundamental Problems of Metaphysics,' etc.

Baza, bä'thạ (ancient Basti), a city of Spain, in the province of and 53 miles east-northeast from Granada, in a valley north of the Sierra Baza. The environs yield wine and hemp; sheep, cattle, and mules are reared; and there are some manufactures. Baza is famed in early Spanish history, more especially in that of Granada. In 1489 it was taken from the Moors by the Spaniards, after a siege of nearly seven months. In 1810 the French, under Marshal Soult, here defeated the Spaniards under Generals Blake and Freire. Pop. (1897) 11,992.

Bazaine, bạ-zān, **François Achille,** French military officer: b. Versailles, 13 Feb. 1811; d. 28 Sept. 1888. He entered the army in 1831, served in Algeria, in Spain against the Carlists, and in the Crimean war. He joined the Mexican expedition under Gen. Forey, was present at the siege of Puebla, and shortly afterward was the first to enter the city of Mexico. In 1863 he obtained the chief command, was made a marshal of France in 1864, and remained in Mexico with the Emperor Maximilian. When Napoleon III. abandoned the emperor, Bazaine tried vainly to persuade him to abdicate the throne voluntarily. In 1870, at the outbreak of the Franco-Prussian war, he commanded the 3d army corps, and capitulated at Metz, after a seven weeks' siege, with an army of 170,000 men. For this act he was tried by court-martial in 1871, found guilty of treason and condemned to death. This sentence was commuted to 20 years' seclusion in the Isle of St. Marguerite, off the south coast of France, from which he escaped and retired to Spain. His widow, who had clung faithfully to him in his adversity and had plotted successfully for his escape, died in the city of Mexico, 8 Jan. 1900. She was a woman of aristocratic birth and much beauty. See La Brugère, 'L'affaire Bazaine' (1874); L'Hérisson, 'La légende de Metz' (1888).

Bazalgette, băz-ăl-jet', **Sir Joseph William,** English civil engineer: b. Enfield, England, 1819; d. London, 1 March 1891. As chief engineer of the London board of works he built many miles of sewers and embankments, three of the Thames bridges, and the well-known Thames embankments. He was an expert authority on questions of municipal engineering.

Bazan, bạ-zäñ, **Don Cæsar de.** See Don Cæsar de Bazan.

Bazan, bạ-thäñ', **Emilia Pardo.** See Pardo Bazan, Emilia.

Bazancourt, bạ-zäñ-koor, **Ce'sar** (Baron de), French military historian: b. Paris, 1810; d. there, 25 Jan. 1865. He was official historiographer to Napoleon III., whom he accompanied in several campaigns. He published 'L'expédition de Crimée jusqu'à la prise de Sebastopol' (1856); 'La campagne d' Italie de 1859'; 'Les expéditions de Chine et Cochinchine' (1861–2); 'Histoire de Sicile sous la domination des Normands' (1846); and the novels: 'Georges la Montagnard (1851); 'Noblesse Oblige' (1851); 'La Princess Pallianci' (1852).

Bazancourt, Jean Baptiste Marin Antoine Lecat de, French general: b. Val-de-Molle (Oise), 19 March 1767; d. 17 Jan. 1830. He took an active part in the Italian campaigns; distinguished himself and was wounded at the siege of St. Jean d'Acre; fought in the battle of Austerlitz, and was a member of the court-martial which, on 21 March 1804, pronounced the sentence of death upon the Duke d'Enghien. In 1806 he was appointed commander of the legion of honor, and in 1808 promoted to the rank of brigadier-general, while in the same year he was created baron of the empire, and went as commander to Hamburg with a mission connected with the continental blockade. He withdrew from service in 1815.

Bazar, or **Bazaar,** a market-place in the East, the word being Arabic in origin. Some bazars are open, some covered over. As the Orientals live almost entirely out of doors, the bazars of populous cities, besides their mercantile importance, are of consequence as places of social intercourse. In the Oriental tales,—for instance, in the 'Arabian Nights,'—the bazars occupy a very conspicuous place. The word bazar has also been imported into Europe, where it is used in much the same sense as in the East. Among English-speaking people it is frequently applied to a temporary sale of fancy goods contributed gratuitously, and sold to raise a special fund.

Bazard, bạ-zär, **Saint Amand,** French socialist: b. Paris, 1791; d. 29 July 1832. After the Restoration, he helped to found the Revolutionary Society of the "Amis de la Vérité," and in 1820 an association of French Carbonari. In 1825, impressed with the necessity of a total reconstruction of society, he attached himself to the school of Saint-Simon, and became one of the editors of a journal termed 'Le Producteur.' In 1828 he delivered at Paris a series of lectures, the substance of which was published in the 'Exposition de la Doctrine de Saint-Simon' (1828–30), of which the first part was by Bazard, the second being chiefly the composition of Enfantin. He and Enfantin became the acknowledged leaders of the school. After the July Revolution (1830), a larger scope was afforded to the Saint-Simonians. The masses were attracted by the doctrine that all social institutions ought to have for their end the moral, intellectual, and physical amelioration of the poor. In a short time, Bazard and his friends had created a new society, living in the midst of the old, with peculiar laws, manners, and doctrines. But Bazard's connection with it was of short duration. He differed from Enfantin on the doctrine of the emancipation of women, and in 1831 seceded in disgust. His efforts to found a school of his own proved unsuccessful, and, during a heated discussion with his former friend, Enfantin, he was struck with apoplexy, from the effects of which he died.

Bazarjik, bä-zär-jēk', a town in eastern Bulgaria, situated north of Varna. An important fair is held here annually. It was twice captured by the Russians, in 1774 and 1810. Pop. (1888) 10,717.

Bazigars, bä-ze-gärz', a tribe of nomadic Indians dispersed throughout the whole of Hindustan. They are divided into seven castes;

their chief occupation is that of jugglers, acrobats, and tumblers, in which both males and females are equally skilful. They present many features analogous to the gypsies of Europe.

Bazoche, bą-zōsch, or **Basoche** (a corruption of Basilica), a brotherhood formed by the clerks of the Parliament of Paris at the time it ceased to be the Grand Council of the French king. They had a king, chancellor, and other dignitaries; and certain privileges were granted them by Philip the Fair early in the 14th century, as also by subsequent monarchs. They had an annual festival, having as a principal feature dramatic performances in which satirical allusions were freely made to passing events. The representation of these farces or satires was frequently interdicted, but their development had a considerable effect on the dramatic literature of France. The order was suppressed 13 Feb. 1793.

Baztan, bäz-tän′, or **Bastan,** a Pyrenean valley in the extreme north of Spain; having a length of nine miles, and an average breadth of four miles. It is inhabited by about 8,000 people, who form, under Spanish supervision, a diminutive republic, at the head of which is the mayor of Elizondo. The citizens of this republic rank with the Spanish nobility and hold special privileges, which were granted them for former services to the Spanish crown.

Bdellium, dĕl′lĭ-ŭm, an aromatic gum found in different countries, but brought chiefly from Arabia and India. It resembles myrrh in its appearance, and is hence often fraudulently substituted for it. It is obtained from *Balsamodendron mokul* and *B. roxburgii.* It has a sweet smell but bitter taste, softens readily between the fingers before the fire, and dissolves partially in alcohol and still more in water. A better variety of bdellium is that produced by the west African *B. africanum;* it is used in plasters.

The bdellium mentioned in Scripture, in Hebrew *bedholachh,* is rendered in the Septuagint of Gen. ii. 12, anthrax (literally, "burning coal") = the carbuncle, ruby, and garnet (Liddell and Scott), the red sapphire (Dana); while in Num. xi. 7 it is translated *krystallos* = rock crystal. Some modern writers, following the Septuagint translation, make it a mineral, as are the gold and onyx stone with which it is associated in Gen. ii. 12, while the Rabbins Bochart and Gesenius consider that it was a pearl or pearls.

Beach, Alfred Ely: b. Springfield, Mass., 1 Sept. 1826; d. 1 Jan. 1896. He was a son of Moses Yale Beach, and after receiving an education in the Monson Academy at Monson, Mass., he was associated with his father in the publishing business of the New York *Sun.* In 1846 he formed a partnership with his life-long friend and schoolmate, Mr. Orson D. Munn, of Monson, Mass., and purchased the 'Scientific American' from Rufus Porter, combining with the business of publishing that of soliciting patents. In 1853 he invented the first typewriter which printed raised letters on a strip of paper, intended for the blind, and was awarded a gold medal at the Crystal Palace Exposition. In 1867 he constructed a suspended tube 8 feet in diameter by 100 feet long, through which passengers were carried back and forth in a tightly fitting car, as the air was exhausted from or forced into the tube by a rotating fan. He also devised means for transporting letters through a tube under the street, by which they could be conveyed directly to the post-office when dropped into a street letter-box.

His most important invention,—a shield for tunneling under streets or rivers without disturbing the surface,—was made in 1868, and became known as the Beach shield. It resembled a gigantic hogshead with the heads removed, the front circular edge being sharp, and the rear end having a thin iron hood. This cylinder is propelled slowly forward through the earth by several hydraulic rams forced out from the rear of the shield, by the operation of a single hydraulic pump, against the completed tunnel in the rear. By this method only the amount of earth to be occupied by the tunnel is excavated. After the shield is forced forward the hydraulic rams are pushed back, and in the thin hood at the rear a new section of the tunnel is constructed. In 1869, by means of such a shield, Mr. Beach constructed a tunnel nine feet in diameter under Broadway, New York, from the corner of Warren Street south to a point opposite the lower side of Murray Street, and in 1870 a car was sent to and fro on tracks through this tunnel by pneumatic power — the first underground transit in New York. From 1872 to 1876 Mr. Beach edited an annual publication entitled "Science Record," published by the 'Scientific American.' In 1876 he originated the 'Scientific American Supplement,' devoted to the publication of scientific matters *in extenso,* taken largely from exchanges and foreign publications. He was also instrumental in beginning the publication of the 'Scientific American Builders' Monthly.'

Beach, Charles Fisk, American clergyman and lawyer: b. Hunter, N. Y., 5 Sept. 1827. He studied theology at Auburn Theological Seminary, N. Y., was pastor of Presbyterian churches 1854–73, editor and publisher *National Presbyterian* 1873–95, and was admitted to the bar 1896. He has published 'The Muzzled Ox' (1866); 'The Christian Worker' (1869); 'Commentaries on the Law of Trusts and Trustees' (1897); 'Monopolies and Industrial Trusts' (1898).

Beach, Charles Fisk, Jr., American legal writer: b. Kentucky, 4 Feb. 1854. He was called to the bar in New York 1881, and practised in that city till 1896, but since the last named date has practised in London and Paris. His especial field is railway and corporation law, and he has published treatises on 'Receivers' (1887); 'Wills' (1888); 'Railways' (1890); 'Private Corporations' (1891); 'Modern Equity Jurisprudence' (1892); 'Public Corporations' (1893); 'Modern Equity Practice' (1894); 'Injunctions' (1895); 'Insurance' (1895); 'Contracts' (1897); 'Contributory Negligence' (3d ed. 1899).

Beach, David Nelson, American clergyman: b. Orange, N. J., 30 Nov. 1848. Entering the Congregational ministry he was successively pastor of Congregational churches in Westerly, R. I., 1876–9; Wakefield, Mass., 1879–84; Cambridge, Mass., 1884–96; Minneapolis (1896–8), Denver from 1899. He was active in banishing the saloon from Cambridge and has been prominent in advocating a modified Norwegian liquor system in Massachusetts. He has

written 'Plain Words on Our Lord's Work'; 'The Newer Religious Thinking'; 'How We Rose'; 'The Intent of Jesus.'

Beach, Frederick Converse, American editor: b. New York, 27 March 1848. In 1855 he removed to Stratford, Conn., where he received an education at public and private schools. In 1864, as a pastime, he began the practice of photography with his father, Alfred Ely Beach (q.v.), and has continued his interest in the art ever since. In 1866 he suggested to the commissioner of patents the utility and practicability of photo-lithographing the United States patents, a plan which was subsequently adopted. In 1868 he graduated from the Sheffield Scientific School of Yale University with the degree of Ph.B. In 1869, after engaging in the business of patent solicitor at Washington, D. C., he returned to New York and was appointed assistant superintendent of the construction of the Beach pneumatic tunnel under Broadway, New York. (See Beach, Alfred Ely.) Subsequently he took up the manufacture of electrical instruments. In 1877 he entered the office of the 'Scientific American,' assisting his father, and after the latter's demise he became one of the editors.

He has made extensive experiments in photography and written much relating to the art. In 1884 he founded the Society of Amateur Photographers of New York, the name of which was afterward changed to the Camera Club of New York. In 1885 he assisted in organizing the American Lantern Slide Interchange. In 1889 he was instrumental in establishing a monthly magazine entitled 'The American Amateur Photographer.' In 1902 he was appointed editor-in-chief of the 'Encyclopedia Americana,' the policy of which it was determined should give full credit to all matters pertaining to America and Americans.

Beach, Mrs. H. H. A. (Amy Marcy Cheney), American composer: b. Henniker, N. H., 5 Sept. 1867. She studied music from childhood, and made her first appearance in public as a pianist at the Boston Music Hall when 16 years old. She has composed a mass in E flat; 'The Rose of Avontown,' a cantata for female voices; a Gaelic symphony; a symphony, anthems, songs, and compositions for various musical instruments and full orchestras.

Beach, Harlan Page, American missionary: b. South Orange, N. J., 4 April 1854. He was graduated at Yale in 1878 and at Andover Theological Seminary in 1883. During 1878–80 he taught at Phillips Andover Academy; in 1883 he went to China as a missionary, remaining there seven years. Soon after his return he became head of the School for Christian Workers, Springfield, Mass., and in 1895, educational secretary of the Student Volunteer Movement for Foreign Missions. His publications include: 'Dawn on the Hills of T'ang' (1898); 'Knights of the Labarum; or Four Typical Missionaries' (1898); 'New Testament Studies in Missions' (1899); 'Protestant Missions in South Africa' (1900); 'Geography and Atlas of Protestant Missions' (1902).

Beach, Miles, American jurist: b. 1840; d. 1902. He graduated at Union College, Schenectady, studied law, and practiced in Troy. When 27 years of age he removed to New York and in 1879 was elected judge of the court of common pleas, holding that office till 1894, when he passed to the bench of the supreme court of the State.

Beach, Moses Sperry, American inventor and editor: b. Springfield, Mass., 5 Oct. 1822; d. 25 July 1892. He was the son of Moses Yale Beach (q.v.), and in 1845 he married Chloe Buckingham, of Waterbury, Conn., and in the same year became joint proprietor, with George Roberts, of the Boston *Daily Times*. Soon after this he became associated with his father and brother in the publication of the New York *Sun*, and acquired the sole ownership of it in 1851, transferring it in 1868 to Charles A. Dana. It was while he was conducting the publication of the *Sun* that he invented and made several important improvements in printing-presses, which were patented, a few now being in use. Among them were the feeding of roll paper to the press instead of flat sheets, apparatus for wetting the paper prior to printing, and another improvement for cutting off sheets after printing; also a method of adapting newspaper presses to print both sides of the sheet at the same time, as is now customary. In 1867 he visited the Holy Land, on the steamer Quaker City, in company with the distinguished party of which "Mark Twain" was a member, and whose experiences formed the basis of Twain's book, 'The Innocents Abroad.' Mr. Beach brought back an olive-tree from the Mount of Olives, from which was made a pulpit stand that is at present in Plymouth Church, Brooklyn.

Beach, Moses Yale, American inventor and publisher: b. Wallingford, Conn., 15 Jan. 1800; d. 17 July 1868. He received a common-school education and before he was 21 married, and with a partner opened a cabinet factory at Northampton, Mass. In 1822 he established himself at Springfield, Mass., where he was very successful. He expended considerable money on a stern-wheel steamboat, the first to ply on the Connecticut River above Hartford. A powder engine intended for its propulsion proved ineffective. In 1829 he obtained an interest in a paper-mill and removed to Saugerties, N. Y., where his inventive faculty produced a rag-cutting machine, which he patented and which is still used in all paper-mills. In 1835 he purchased from his brother-in-law, Benjamin Day, the New York *Sun*, the first penny paper (then a comparatively new sheet), and to Mr. Beach was due the subsequent growth and popularity of that newspaper. In 1846 President Polk sent Mr. Beach on a secret mission to Mexico. In 1857 Mr. Beach retired from active business and settled in his native town, where he died.

Beach. See Coast; Dune; Ocean; Lake; Shore.

Beach-flea, one of a group of small amphipod Crustaceans (*Orchestia agilis*) which abound under sea wrack near high-water mark. When the dry weed is lifted they will be seen leaping like fleas, by means of the last three pairs of abdominal legs. They are brown, of the same color as the weed and wet sand beneath, about a quarter of an inch in length or about one half as large as the larger and more southern kind of beach-flea (*Talorchestia longicornis*), which is nearly an inch long. Consult: Arnold, 'Sea Beach at Low Tide.'

Beach-grass. See AMMOPHILA.

Beach-pea, a leguminous plant growing on beaches. See also LATHYRUS.

Beach Plants, the usually sparse vegetation of sea and lake shores above the water-line and below the cliffs or dunes, notable for its resemblance to the vegetation of deserts. The plants of sea beaches are closely similar to those of fresh-water shores, and not, as might be inferred, different on account of the salt content of the soil as an influencing factor. (See HALOPHYTES). Bordering the water is a strip of sand or gravel where, on account of summer wave action, land plants cannot gain a foothold, and where, because of exposure to sun and air, water plants are unable to live. Contiguous to this border is a zone of vegetation almost wholly restricted by winter wave action to annuals. Still farther back from the water is the region of perennials especially characterized by rosette plants and plants with underground storage organs. This region is safe from wave action at all times. Beach plants, like desert plants (see XEROPHYTES) are capable of withstanding more intense heat, cold, and light, and more violent winds than any other plants of ordinary climates. Other common terms for this vegetation are littoral, shore, and strand plants. See DISTRIBUTION OF PLANTS.

Beach-plum. See PLUM.

Beach-robin. See BRANT-BIRD.

Beaches, Raised, terraced, level stretches of land, consisting of sand and gravel, and lying at a considerable distance above and away from the sea, but bearing sufficient evidences of having been at one time sea beaches. They are quite common along the coasts of continents in the higher latitudes. In California such terraces occur as high as 1,500 feet above the present sea-level, while the coasts of Scotland are marked by a series of terraces succeeding each other at distances of from 10 to 25 feet. That the materials composing the beaches were deposited beneath the sea is proven by the marine character of the fossils which are often found in abundance. The existence of raised beaches is of importance to the geologist, as it affords direct evidence of changes of level between the sea and the land in comparatively recent times, and explains the widespread occurrence of sedimentary rocks over continental areas. Many large lakes are also fringed by terraces, but in this case they have resulted from a lowering of the water level and not from coastal movements. See also LAKE; SHORE; etc.

Beachy Head, England, a promontory on the coast of Sussex, about three miles southwest of Eastbourne; height 564 feet. Here a combined Dutch and English fleet, under Lord Torrington was defeated by a French fleet, under Tourville, in 1690. In 1828 a revolving light was erected here, 285 feet above the level of the sea, visible in clear weather from a distance of 28 miles.

Beacon, a conspicuous mark or signal either used to alarm the country in case of invasion, or as a guide to mariners. The alarm beacon was usually fire placed on the tops of high hills, the flames of which could be seen at a great distance by night, and the smoke by day. They were in great use for rousing the Border on an invasion either by Scotch or English. A beacon to mariners is either a landmark erected on an eminence near the shore, or a floating signal moored in shoal water.

Beacon Hill, one of the original three hills of the peninsula of Boston. It is north of Boston Common, and received its name from the fact that the public beacon was fixed upon its summit in the earliest colonial period. It has been much reduced in height, and the State House now occupies its highest position. Beacon Street extends in a westerly direction over the hill, skirting the Common and Public Garden. See BOSTON.

Beaconsfield, bĕk'ŏns-fēld or bē'kŏns-fēld, **Benjamin Disraeli,** (EARL OF), English statesman: b. 21 Dec. 1804; d. 19 April 1881. He was the eldest son of Isaac D'Israeli (see D'ISRAELI, ISAAC), the well-known author of the 'Curiosities of Literature'; his mother also being of Jewish race. Little is known of his early education, though it is certain he never attended a public school or a university. In 1817 he was baptized into the Church of England. He was apprenticed to a firm of attorneys, but did not remain long in this uncongenial occupation. His father's position gained him an easy entrance into society, and before he was 20 he was a frequenter of such salons as those of Lady Blessington.

In 1826 he published 'Vivian Grey,' his first novel, a work which became very popular, and, considering the youth of its author, displays remarkable cleverness and knowledge of the world. He now traveled for some time, visiting Italy, Greece, Turkey, and Syria, and gaining experiences which were afterward reproduced in his books. In 1831 another novel, 'The Young Duke,' came from his pen. It was followed at short intervals by 'Contarini Fleming,' 'Alroy,' 'Henrietta Temple,' 'Venetia,' 'The Revolutionary Epic' (a poem), etc.

His father having acquired a residence near High Wycombe, Buckinghamshire, young Disraeli attempted to get elected for this borough in 1832. He came forward as a Radical or «people's» candidate as against the Whigs, and he was supported by the Tories, as well as by Hume and O'Connell, but was defeated. At the general election after the passing of the Reform Bill he again unsuccessfully contested High Wycombe, and the like ill-fortune attended him on another attempt in 1835, as also at Taunton the same year. On the latter occasion he appeared in the character of a decided Tory, and his change of political opinions naturally occasioned a good deal of comment. To this period belongs the noted passage of arms between him and O'Connell, which was signalized by a strength of language happily rare between public men in these days.

At last, however, he gained an entrance to the House of Commons, being elected for Maidstone in 1837. His first speech was treated with ridicule; he had to stop abruptly and sit down but he finished with the prophetic declaration that the time would come when the House would hear him. In 1839 he married the widow of his colleague in the representation of Maidstone, a lady 15 years older than himself. At the general election of 1841 he was sent to Parliament by Shrewsbury. He had now gained some reputation, and for some years he was an enthusiastic supporter of Sir Robert Peel. About this

time he became a leader of what was known as the "Young England" party, the most prominent characteristic of which was a sort of sentimental advocacy of feudalism. This spirit showed itself in his two novels of 'Coningsby; or, The New Generation,' and 'Sybil; or, The New Nation,' published respectively in 1844 and 1845.

For some years previous to the downfall of Sir Robert Peel in 1846 he was most persistent and bitter in his hostility to this statesman, whom he had so recently supported, being the advocate of protection against the free-trade policy of Sir Robert. His clever speeches of this period greatly increased his reputation, and by 1847 he was recognized as one of the leaders of the Tory party. Having acquired the manor of Hughenden in Buckinghamshire, he was in the above year elected for this county, and he retained his seat till raised to the peerage nearly 30 years later. In 1847 he published his novel of 'Tancred; or, The New Crusade,' a somewhat extravagant production containing enigmatic allusions to the great "Asian mystery."

His first appointment to office was in 1852, when he became chancellor of the exchequer under Lord Derby. The following year, however, the ministry was defeated, and Mr. Disraeli again became leader of a Conservative Opposition. He remained out of office till 1858, when he again became chancellor of the exchequer with Lord Derby as his chief. As on the former occasion his tenure of office was but short; a reform bill which he had introduced causing the defeat of the government and their resignation after an appeal to the country. During the next six years, while the Palmerston government was in office, Mr. Disraeli led the opposition in the lower House with conspicuous ability and courage. He spoke vigorously against the Reform Bill brought forward in 1866 by the Russell-Gladstone ministry; but when, soon after, he came into power along with his chief, Lord Derby, the demand for reform was so urgent that he had to bring in a reform bill himself. Accordingly, in August 1867, a measure by which the parliamentary representation was reformed became law, being piloted through Parliament by Mr. Disraeli with remarkable tact and dexterity.

In February 1868 he reached the summit of his ambition, becoming premier on the resignation of Lord Derby, but being in a minority after the general election he had to give up office the following December. In 1874 he again became prime minister with a strong Conservative majority, and he remained in power for six years. This period was marked by his elevation to the peerage in 1876 as Earl of Beaconsfield, and by the prominent part he took in regard to the Eastern question and the conclusion of the Treaty of Berlin in 1878, when he visited the German capital. In the spring of 1880 Parliament was rather suddenly dissolved, and, the new Parliament showing an overwhelming Liberal majority, he resigned office, though he still retained the leadership of his party. Not long after this, the publication of a novel called 'Endymion' (his previous one, 'Lothair,' had been published 10 years before) showed that his intellect was still vigorous. His physical powers, however, were now giving way, and he died, after an illness of some weeks' duration. His wife had died in 1872 after having been created Viscountess Beaconsfield.

Among others of his writings, besides those already mentioned, are: 'A Vindication of the English Constitution' (1834); 'Alarcos, a Tragedy' (1839); and 'Lord George Bentinck, a Political Biography' (1852). Lord Beaconsfield was one of the most remarkable men of the 19th century. If not possessed of actual genius he was endowed with great intellectual power, and he had astonishing tenacity of purpose and showed remarkable tact and ability in managing men. As a parliamentary speaker and debater he had few rivals, and in wit, sarcasm, epigram, and other rhetorical devices he was a master. His novels are fatally open to criticism on many grounds, and it is doubtful if they will long maintain the place they at present hold. Their popularity has been largely owing to their author having so frequently introduced real persons into them under a more or less penetrable disguise, and presented them in a more or less favorable light.

Beaconsfield, Africa, a town of Cape Colony, in Griqualand West, formerly known as Du Toit's Pan. It lies a little to the east of Kimberley, with which it is connected by tramway, and is, like it, an upgrowth of the diamond fields. It is well supplied with churches, schools, and hotels. Pop. (1891) 10,478.

Beaconsfield, England, a market-town in Buckinghamshire, 24 miles west by north of London. It is situated on high ground, and its name is supposed to have originated from a beacon once set up there. The remains of Edmund Burke, who resided at Gregories in this parish, are deposited in the parish church; and the churchyard contains a monument in honor of the poet Waller, to whom the manor belonged, as it still does to his descendant.

Beadle. (1) An officer in an English university, whose chief business is to walk with a mace in a public procession. The universities of Oxford and Cambridge have each three esquire beadles (or bedels), one being attached to each of the faculties of law, medicine and arts, and divinity. The former university has also three yeomen beadles, and the latter one. (2) An inferior parish officer, whose business is generally to execute the orders of the vestry, by whom he is appointed. These parochial beadles were originally officers given to the rural deans to cite the clergy and church-officers to visitations, and for other purposes.

Beads, small perforated ornaments, generally of a round shape and made of glass, but also of gold, silver, and other metals, paste, coral, gems, etc. The use of them as ornaments belongs to very early times, and this use, still continued, has made them an important article of trade with savage tribes. Glass beads are supposed to have been manufactured by the Phœnicians more than 3,000 years before Christ. Beads have been found in the ruins of Assyrian temples, also as decorations of Egyptian mummies, and in the graves of the ancient Greeks, Romans, and Britons. The manufacture of glass beads was introduced into modern Europe by the Italians, and in the neighborhood of Venice it is still an important branch of industry. On the island of Murano alone several thousand workmen are employed in this manufacture. Birmingham is the chief seat of the manufacture of beads in Great Britain. For their use in religion, see ROSARY.

Beagle, a small hunting dog; in general appearance a diminutive fox hound, solidly built, well set upon straight fore legs, with plenty of bone in proportion to its size, good hard feet, and a broad, deep chest with ample lung capacity. It is of good disposition, and clever and industrious in the field. In color and marking it much resembles the fox hound, black, white, and tan being the more common colors, and these in more or less solid or pied masses. In its original home, Great Britain, there are both rough and smooth varieties, but the typical American beagle is smooth-haired. Beagles vary in height from 12 to 15 inches, and while excellent trackers are not so fast but that they can be followed on foot, a very common sport in Great Britain. Their voices are exceedingly musical and justify the name sometimes given them of «buglers.» They are principally used for rabbit-hunting. In former times a very diminutive breed was in favor; according to one authority, no larger than well-grown kittens — so small, in fact, that it is said a whole pack could be carried afield in a pair of panniers slung across a pony's back.

Beagle, The, a small ship of the British navy which in 1828–34 was employed, under the command of Capt. (afterward Admiral) Fitzroy, in making surveys of the coast of Patagonia and other South American shores and waters, and later making a voyage around the world. The expedition had for its naturalist the famous Charles Darwin.

Beagle Island, an island discovered by Admiral Fitzroy during a voyage in H. M. S. Beagle (q.v.). The channel of the same name is on the south side of the island of Tierra del Fuego.

Beak, or **Bill,** the projecting jaws or snout of a bird or other animal, when prolonged into an instrument for seizing or penetrating objects, and formed of hard materials, as bone, or covered with a rigid envelope, as of horn or chitin. It is most characteristic of birds, where it is called «bill» or «neb,» and forms the principal means for obtaining, as well as devouring food (except in most birds of prey), and where it takes on a great variety of shapes and characteristics adapted to special habits and purposes. (See Birds.) A more or less similar prolongation of mouth-parts occurs in many other animals, however, and receives a similar name. Among mammals, the duckbill (q.v.) is a conspicuous example of a true mammal with the lips formed into a horny bill much like that of a duck, and similarly used. The turtles have horny, projecting, parrot-like jaws of the same sort; and a curious imitation of this occurs among cephalopod mollusks. The prolonged jaws of various fishes, as of gars («billfish»), sturgeons, etc., receive the term (technically *rostrum*), and these are often bird-like, as in the case of the spoon-billed catfish (q.v.). The term is also borrowed by entomologists to describe the elongated mouth-parts of many insects, such as blood-sucking flies; juice-sucking plant-bugs, weevils, and other forms. The prolonged tubular or trough-like parts (canals) of many gastropod shells protecting the siphon, and the prominent umbos of such bivalve shells as the cockles, clams, and fresh-water mussels, are also termed «beaks.»

Beal, bēl, **George Lafayette,** American military officer: b. Norway, Me., 21 May 1825; d. 11 Dec. 1896. When the Civil War broke out he was captain of the Norway light infantry, and with this company was mustered into the 1st Maine regiment for the three months' campaign. At the end of this service he was commissioned colonel of the 19th Maine infantry, which took part in the battles of Cedar Mountain and Antietam and covered the retreat of Gen. Banks from Winchester to Williamsport, Va. He was mustered out with his regiment in May 1863; volunteered again; was made colonel of the 29th Maine, and promoted to brigadier-general of volunteers 30 Nov. 1864, for his services in the Red River campaign. On 15 Jan. 1866 he was mustered out of service with the brevet of major-general of volunteers. In 1880–5 he was adjutant-general of Maine, and in 1888–94, State treasurer.

Beal, Samuel, English Orientalist. He was educated at Trinity College, Cambridge, graduating therefrom in 1847. Some time after, he entered the royal navy as chaplain, and in that capacity saw active service in China and Japan. He made a close study of the Chinese and Japanese languages, and on his retirement from the navy in 1877 was elected professor of Chinese at University College, London. His principal work was tracing the early history of Buddhism in original Chinese records, and the results of his work were given to the world in several volumes, notably: 'The Catena of Buddhist Scriptures' (1872); 'The Legend of Buddha' (1876); 'Buddhist Records of the Western World' (1884); 'Life of Hienen-Fsiang' (1888); etc. He also catalogued a large series of Japanese Buddhist works.

Beal, William James, American botanist: b. Adrian, Mich., 11 March 1833. He graduated at the University of Michigan in 1859; taught in various institutions 1859–70, since which time he has been professor of botany in the Michigan Agricultural College. He is a Fellow of the American Society for the Advancement of Science, and was president of the natural history section of this society in 1883; first president of the Association of Botanists of the United States Experimental Stations in 1888, etc. His works include 'Grasses of North America' (2 vols.); 'The New Botany'; 'Plant Dispersal'; etc.

Beale, Dorothea, English teacher: b. London, 1831. She became mathematical tutor in Queen's College in 1850, and later, Latin tutor in the school; head teacher in the Clergy School, in Casterton, in 1857; and principal of Cheltenham Ladies' College in 1858. Her publications include 'Text-Book of English and General History'; 'Chronological Maps'; 'Report on Girls' Education Commission of 1864'; 'Work and Play in Girls' Schools.' In 1880 she became editor of the 'Ladies' College Magazine.'

Beale, Edward Fitzgerald, American diplomatist: b. Washington, D. C., 4 Feb. 1822; d. 22 April 1893; graduated at the United States Naval Academy 1842, and at the beginning of the Mexican war was assigned to duty in California under Commodore Stockton. After the war he resigned his naval commission and was appointed superintendent of Indian affairs for California and New Mexico. He was commissioned brigadier-general in the army by Presi-

dent Pierce. He served in the Union army in the Civil War, and at its close engaged in stock-raising in Los Angeles, Cal., till 1876, when President Grant appointed him United States minister to Austria.

Beale, Lionel Smith, English physician and biologist: b. London, 5 Feb. 1828; d. 28 March 1906. He was the son of Lionel John Beale, M.R.C.S. He was educated at King's College School and King's College, London, later becoming an honorary Fellow. In 1852 he established a laboratory for chemical and microscopical studies, and in the following year became professor of physiology and general and morbid anatomy in King's College, London. In the same college he held in succession the professorships of pathology and of the principles and practice of medicine, but in 1896 he retired from the latter post. He was a Fellow of the Royal Society, and for some years acted as treasurer of the Royal Microscopical Society. His published works deal with medical, anatomical, physiological, and biological subjects, the microscope, etc. Among the most important are 'How to Work with the Microscope'; 'Protoplasm; or, Life, Matter, and Mind'; 'Life and Vital Action in Health and Disease'; 'The Physiological Anatomy and Physiology of Man' (in collaboration with Dr. Todd and Sir W. Bowman); 'Disease Germs'; 'Life Theories and Religious Thought'; 'The Mystery of Life'; etc.

Beall, John Young, Confederate guerrilla: b. Virginia, 1 Jan. 1835; d. 24 Feb. 1865. He was appointed acting master in the Confederate naval service in 1863. On 19 Sept. 1864 he and a number of followers took passage on the Lake Erie steamer Philo Parsons and at a given signal took possession of the vessel, making prisoners of the crew. They also scuttled another boat, the Island Queen, and tried to wreck a railroad train near Buffalo, N. Y. In spite of a proclamation of Jefferson Davis assuming responsibility for this expedition, Beall was hanged on Governor's Island, N. Y., on the ground that, if acting under orders, he should have shown some badge of authority.

Beam, in architecture, a long, straight and strong piece of wood, iron, or steel, especially one holding an important place in some structure, and serving for support or consolidation; often equivalent to girder (q.v.). In a balance it is the part from the ends of which the scales are suspended. In a loom it is a cylindrical piece of wood on which weavers wind the warp before weaving; also the cylinder on which the cloth is rolled as it is woven. In shipbuilding, one of several strong transverse pieces of timber stretching across the ship from one side to the other, to support the decks and retain the sides at their proper distance, with which they are firmly connected by means of strong knees, and sometimes of standards. They are sustained at each end by thick stringers on the ship's side called shelf-pieces. The main-beam is next abaft the main-mast. The greatest beam of all is called the midship beam. A ship is said to be "on her beam-ends" when she lies entirely on her side, so that the beams are almost at right angles to the surface of the water. An object is said to be "a-beam" when it is in a line with the beams of the ship, and accordingly at right angles to its length.

Beam Engine. See STEAM ENGINE.

Beam-tree, White (*Pyrus aria*), a European and Asiatic tree of the natural order *Rosaceæ,* rarely exceeding 50 feet in height, often cultivated in dry and exposed situations for its ornamental leaves, which are bright dark-green above and light beneath; and for its large terminal corymbs of flowers which appear in late spring followed by showy orange-red or scarlet, acid and astringent fruits which resemble those of the service-berry (q.v.), and which are used to make a kind of beer. Its hard, fine-grained wood is made into cog-wheels. It is closely related to the mountain-ash (q.v.).

Bean, Nehemiah S., American inventor: b. Gilmanton, N. H., 1818; d. 20 July 1896. He learned the machinist's trade, and in the winter of 1857–8 built his first steam fire engine, which he named the Lawrence, and sold it to the city of Boston. In 1859 he took the management of the Amoskeag Locomotive Works in Manchester, where he had been employed in 1847–50. During 1859 he built the "Amoskeag Steam Fire Engine No. 1," the first of a class of engines which now is used everywhere.

Bean, Tarleton Hoffman, American ichthyologist: b. Bainbridge, Pa., 8 Oct. 1846. He graduated at Columbian University, Washington, D. C., 1876. He was editor of the 'Proceedings and Bulletins' of the United States National Museum, Washington, 1878–86, and of the 'Report and Bulletin of the United States Fish Commission,' Washington, 1889–92; was assistant in charge of the division of fish culture in the United States Fish Commission, 1892–5, and curator of the department of fishes in the United States National Museum, 1880–95. In 1893 he represented the United States Fish Commission at the World's Columbian Exposition, and in 1895 at the Atlanta Exposition. In 1895 he became director of the New York Aquarium, and in 1899 was appointed director of forestry and fisheries of the United States Commission to the Paris Exposition of 1900. His works include 'The Fishes of Pennsylvania'; 'The Salmon and Salmon Fisheries'; 'Oceanic Ichthyology' (with George Brown Goode); etc. He has also contributed articles to 'Forest and Stream.'

Bean (M. E. bene, ben; A. S. bean, a "bean"), a plant of the natural order *Leguminoseæ,* or legumes. Originally the smooth kidney-shaped, flat-sided seed of the broad bean, *Vicia faba,* it is now applied to various genera, usually with a specific epithet, as Lima bean, etc.

The broad bean (*Vicia faba*) is the bean of history. Its origin is doubtful, but it is probably a native of southwestern Asia and northern Africa. It is much grown in Europe, especially in England, but the hot dry summers prevent its cultivation in most parts of the United States. It is grown successfully in the maritime provinces of Canada, and in other parts, with corn and sunflowers, to make ensilage. It is an annual plant, growing from two to four feet high, erect, with thick angular stems; flowers usually white with black on the wings. The pods, which contain the thick flattened seeds, vary from two to four inches up to 18 inches long. The common varieties are the Broad Windsor and Mazayan; they are quite hardy and should be sown early. The soils best suited are heavy loams and clays. The green seeds are eaten as a vegetable, or, if allowed to mature, are ground

and used as feed for horses and cattle. The straw is fed to cattle.

The kidney-bean of Europe is known in the United States as the bean *Phaseolus vulgaris;* it embraces all the common field, garden, snap, and string beans, both bush and climbing. The French know it as the haricot. It is probably a native of South America, and was introduced into Europe during the 16th century. Over 150 varieties are in cultivation; the growers usually group them into bush- and pole-beans. The bush-beans embrace the "field beans" grown for dry shelled seeds, also the green-podded and yellow-podded garden, string, or snap beans. The pole-beans are usually grown for use while green. Bush-beans do well on a good warm loam. The yellow-podded varieties and pole-beans require a richer soil. They should not be planted until danger from frost is over, and require constant cultivation while growing. Leading field varieties are white marrowfat, navy or pea bean, medium, and the kidneys: in string-beans, early Valentine, stringless green-pod, refugee, etc.: in yellow-podded beans, black wax, golden wax, kidney, and white: in pole-beans, Limas, large Lima, dreer Lima, etc. See Bulletins 87 and 115, Cornell Experiment Station. For forcing pole-beans under glass, see Bailey's 'Forcing Book'; Bulletin 62, New Hampshire Experiment Station, Durham.

The Lima bean (*P. lunatus*) is the most popular pole-bean. It is of South American origin, but is now grown in various parts of this country, most of the seed being raised in California. The short, flat, slightly kidney-shaped seeds are enveloped in flat, broad pods. The soy-bean (q.v.) (*Soja hispida* or *Glycine hispida*) is a bushy, erect, hairy plant which bears pea-like seeds in small pods. It is a native of China and Japan, where it is largely grown. It is used for forage and soiling. The cowpea (q.v.) (*Vigna catjang*) is generally used for forage, soiling, hay, and green manuring. The scarlet runner (*P. multiflorus*) is a perennial. It is grown largely for ornament, but in England the seeds and pods are eaten as a vegetable. The Adzuki bean (*P. radiatus*) is a native of Japan, and a recent introduction in America. (See Bulletin 32, Agricultural Experiment Station, Kansas). The frijole (*P. spp*) is grown in the southwestern States and in Mexico, where it is a staple food.

Other important Oriental beans, but not very common here, are: Mungo-beans (*P. mungo*); various species of Dolichos, as the asparagus-bean (*D. sesquipedalis*); and the locust or carob bean (*Ceratonia siliqua*), the pods of which are sold by confectioners as St. John's bread. The sweet pulp which surrounds the seed is eaten, especially in the Mediterranean. The pods and seeds are ground and used extensively as feed for cattle and other animals. The velvet-bean (*Mucuna utilis*) is often grown for ornament; also for forage and soil renovation in the southern States. It only ripens seed in the Gulf States and Florida. The beans and pods, when ground, are fed to cattle. The cooked green beans have caused illness in those who have eaten them. The sea-beans of the Florida coast are transported by ocean currents from the tropics. In 1899, 15,004 acres of green beans were grown, yielding 1,512,642 bushels, or an average of 100.8 bushels per acre. The four leading States in bean cultivation are New York, New Jersey, Florida, and Virginia. These furnish about half the supply.

Uses and Feeding Values.— The seeds and sometimes the pods are used, either green or dry, as food for man and animals. Some species are grown for forage, hay, or green manuring. Owing to their nitrogen-gathering propensities they all aid in soil-renovation.

The average percentage composition of:

	Water	Protein	Nitrogen-free extract	Ether extract	Ash	Fuel value of one pound
Dry shelled beans...	12.6	22.5	29.6	1.8	3.5	1605 calories
Fresh shelled beans..	58.9	9.4	29.1	0.6	2.0	740 "
Fresh string beans..	89.2	2.3	7.4	0.3	0.8	195 "

With man, on an average, 90 per cent of the dry matter is digestible; 80 per cent of the protein; 96 per cent of the nitrogen-free extract; and 80 per cent of the ether extract. String-beans or green-shell beans are usually boiled and served in various ways. In composition they compare favorably with other vegetables. Dry beans are baked with salt pork or beef and used for soups and other dishes. They are a cheap, nutritious food, rich in starch and in the proteid, legumin; hence they may be used to replace meat in the diet. If the skins are removed they are easier of digestion and are not so liable to cause flatulence; the latter is due to the production of methane by fermentation in the intestines. Shell- and string-beans are preserved by evaporation or canning. String-beans are also preserved with salt. Cooked dry beans are canned. Bean flour consists of beans ground. Bean meal is used in Europe as feed for horses, cattle, and hogs. Bean cake is the residue after the oil has been extracted; it is fed to cattle in northern China. Bean curd is eaten by the natives of northern China.

Bean Diseases.— Pod-rust; anthracnose (*Colletotrichum lindemuthianum*), a fungus which attacks the stems, leaves, and fruit. The disease may be carried over in the seed, the affected ones may be recognized by the yellow or brown discoloration. A black discoloration with ensuing brittleness marks the progress of the disease on the leaves. The selection of sound seed, immediate removal of infected plants, and spraying with Bordeaux mixture, are recommended. The bean-rust (*Uromyces phaseoli*) appears as small brown, nearly circular, and slightly elevated dots on the leaves. These discharge a brown powder, the spores of the disease. Spraying with Bordeaux mixture is recommended. Blight (*Phytophthora phaseoli*) attacks the Lima bean. Spraying with copper compound is recommended. The bean-weevil (*Bruchus obtectus*) may injure the beans when stored. After harvesting, treat the seed two or three times, at intervals of three or four weeks, with carbon bisulphide.

Consult: De Candolle, 'Nativity of the Bean'; Gray and Trumbull, "Origin of Cultivated Plants," 'American Journal of Science,' XXVI., 130; Sturtevant, 'American Naturalist,' (1887, p. 332; Wittmack, 'Ber. der Deutschen Bot. Gesellschaft,' VI. 374 (1888).

S. Fraser.

Bean-goose (*Anser segetum*), a species of European wild goose, distinguished from the true wild goose (*A. ferus*) by its comparatively small and short bill, which, as far as the nostril, is black, and above it of a reddish flesh color, whereas that of the gray lag, or true wild goose, is orange-red, with a touch of grayish-white. They feed generally on high grounds, considerably inland, selecting particularly young wheat, stubbles sown down for grass, and, in spring, fields sown with beans, their fondness for which is supposed to have given them their name. They breed chiefly within the Arctic Circle, but their nests are often found in large numbers in the Hebrides. The bean-goose being rather less than the common wild goose, but having the same color, is sometimes provincially called the small gray goose.

Bean, St. Ignatius, a seed which yields strychnin.

Bean Weevil, a beetle, *Brunchus obtectus,* which is smaller than the pea-weevil, measuring .15 of an inch in length. Compared with that insect it is lighter and more uniform in color, being of a tawny gray, without the white spots so conspicuous in *B. pisi.* The uniform tawny gray elytra are spotted with a few oblong dark spots, situated between the striæ; tye antennæ also differ in having the four basil joints more reddish than in *B. pisi,* while the terminal joint is red. The legs also are much redder. The eggs are laid on the outside of the bean; the young hatch and bore in, and there may be 8 or 10 grubs in a single bean. The chrysalis lies in a cavity in the bean just large enough to receive its body. The best remedy is to carefully examine the beans in the autumn and before sowing time, when the presence of the weevil can be easily detected by the transparent spots made by the larva. These should be burned and such beans as are apparently uninjured should be soaked for a minute in boiling-hot water, so that no beetles be overlooked.

Bear, or **Bere,** a species of barley (q.v.).

Bear Flag War, a rising against the Mexican government in 1846, by a small body of emigrants from the United States who had settled in California, thought to have been incited by Capt. John C. Fremont. He was then commanding a small detachment of American troops in California and a few Americans having proclaimed a republic in Sonoma and raised a flag on which was a figure of a bear, Frémont joined the insurgents with his troops. The Mexican war began in the following July and the Bear Flag war then became a part of the American scheme for the conquest of California.

Bear Lake, Great, a body of water in Canada, so named on account of its situation directly under the Arctic Circle, and therefore under the constellation Ursa Major. It is of very irregular shape, having five arms projecting out of the main body, and its greatest diameter is 150 miles. The principal supply of the lake is Dease River, which enters it from the northeast. Its outlet is on its southwestern extremity, at the bottom of Keith Bay, through Bear Lake River, which empties into Mackenzie River. The surface of Bear Lake is not more than 200 feet above the Arctic Ocean; consequently, its bottom must, like many of the northwestern lakes, lie considerably below the level of the sea. Great Bear Lake abounds in fish of many varieties, among which the herring-salmon is noted. The second land expedition, under Franklin, in 1825, wintered on the western shore of this lake, near its outlet, where they built Fort Franklin. Dr. Richardson, a member of the expedition, mentions a curious circumstance concerning the singing of birds of this lake, that when they first appeared after the long Arctic winter they serenaded their mates at midnight, and were silent during the day. The waters of the lake are so clear that a white substance can be distinctly discerned at the depth of 90 feet. This lake is situated about 250 miles east of the Rocky Mountains, about the same distance south of the Arctic Sea, and 400 miles northwest of Slave Lake. It is the basin of a water-shed of about 400 miles diameter.

Bear Mountain, the designation of a hill some 750 feet in height, situated in the northeastern part of Dauphin County, Pa. In its vicinity are valuable deposits of anthracite coal.

Bear River, a river in Utah about 400 miles long, which rises in a spur of the Rocky Mountains, about 75 miles east of Great Salt Lake, takes first a northwesterly and then a southeasterly direction, forming nearly a letter V, of which more than half the entire length is in Oregon territory, and finally empties into the Great Salt Lake. Its valley is about 6,000 feet above the sea-level. At the bend of the river in Oregon, and about 45 miles from Lewis River, are found the famous Beer and Steamboat springs, which are highly impregnated with magnesia and other mineral substances.

Bear State, a popular nickname for Arkansas.

Bearberry, the name of the *Arctostaphylos,* a genus of plants belonging to the order *Ericaceæ* (heathworts). It includes the two species, *A. uva ursi* and *A. alpina,* both of which are American. They are sometimes ranked under the genus *Arbutus.* The flowers are rose-colored, the berry of the *Uva ursi* is red, while that of the other is black. The Manzanita of California is *A. manzanita* or *A. pungens.* It reaches a height of 30 feet, and forms dense thickets, impenetrable by man or cattle. By reason of an active glycoside, arbutin, bearberry is a very efficient urinary antiseptic, useful in cystitis, pyelitis, and urethritis. The arbutin is decomposed in the urine into hydrochinon and other bodies. Its antiseptic properties are due to the phenal hydrochinon. The extract of the plant is used for dyeing and tanning leather.

Beard, Charles, English Unitarian clergyman: b. Manchester, England, 27 July 1827; d. Liverpool, 9 April 1888. He was pastor of Renshaw Street Chapel, Liverpool, editor of the *Theological Review,* 1864–79, and author of 'Outlines of Christian Doctrine' (1859); 'The Soul's Way to God' (1875); 'The Hilbert Lectures,' his most important work and one much esteemed (1883); 'The Universal Christ' (1888); 'Martin Luther' (1889).

Beard, Daniel Carter, American artist and author: b. Cincinnati, Ohio, 21 June 1850. He first engaged in civil engineering and surveying; went to New York in 1878 and studied art, and

has since become widely known as a book and magazine illustrator. He founded and became teacher of the department of animal drawing in the Woman's School of Applied Design, believed to be the first class of this character in the world. Besides his illustrative work he has published 'Moonlight'; 'Six Feet of Romance'; 'American Boys' Handy Book'; 'American Boys' Book of Sport,' etc.

Beard, George Miller, American physician and hygienic writer: b. Montville, Conn., 8 May 1839; d. New York, 23 Jan. 1883. He made a specialty of the study of stimulants and narcotics, hypnotism, spiritualism, etc. Among his works were: 'Our Home Physician' (1869); 'Eating and Drinking' (1871); 'Stimulants and Narcotics' (1871); 'American Nervousness' (1881); 'Sea-Sickness' (1882).

Beard, Henry, American painter: b. Ohio, 1841; d. New York, 19 Nov. 1889. He was a son of James Henry Beard, and nephew of William Holbrook Beard; served in the Union army during the Civil War; at its close applied himself to painting, particularly animal life; and, after his removal to New York, in 1877, was chiefly engaged in illustrating books and periodicals.

Beard, James Henry, American painter: b. Buffalo, N. Y., 1814; d. 4 April 1893. He became a portrait painter in Cincinnati, and painted the portraits of Henry Clay and other distinguished men. In 1846 he exhibited his 'Carolina Emigrants' at the National Academy in New York, of which he was elected an honorary member in 1848. In 1870 he removed to New York, and in 1872 was elected a full member of the National Academy. Subsequently he devoted himself to animal painting. Among his better known works are: 'Mutual Friend' (1875); 'Consultation' (1877); 'Blood Will Tell' (1877); 'Don Quixote and Sancho Panza' (1878); 'Heirs at Law' (1880); 'Which Has Pre-emption?' (1881); 'Detected Poacher' (1884); 'Don't You Come Here' and 'The Mississippi Flood' (1885); 'A Barnyard' and ''Ll Yer Gimme Some? Say!' (1886).

Beard, Richard, American theologian: b. Sumner County, Tenn., 27 Nov. 1799; d. Lebanon, Tenn., 2 Dec. 1880. He was graduated from Cumberland College, Princeton, Ky., in 1832; was professor of languages there, 1832-8; president 1843–53. In 1854 he was called to the chair of systematic theology in Cumberland University, Lebanon, Tenn., a position held until his death. He was one of the ablest scholars and most conspicuous figures in the Cumberland Presbyterian Church. He published 'Why I Am a Cumberland Presbyterian' (1874); 'Systematic Theology,' a standard work regarded as the crystallization of the Cumberland Presbyterian form of thought and faith.

Beard, Thomas Francis, commonly known as FRANK BEARD, American artist: b. Cincinnati, 6 Feb. 1842; d. 1905. During the Civil War he served in the 7th Ohio regiment, and acted as a special artist for the Harper publications. As an artist he devoted himself especially to character sketches. From the age of 12 he contributed pictures to the leading American magazines. As a lecturer he had great success before Chautauqua and other audiences. He accompanied his talks by crayon sketches on a blackboard. The title of his first lecture was "Chalk-Talk," whence the word originated. In 1881 he occupied the chair of æsthetics at Syracuse University. He has published: 'The Blackboard in the Sunday-school' (1880); and a number of short stories.

Beard, William Holbrook, American painter: b. Painesville, Ohio, 13 April 1825; d. New York, 20 Feb. 1900; brother of James H. Beard. He was a traveling portrait painter from 1846 till 1851, when he settled in Buffalo, N. Y. After several years of foreign study and travel he settled in New York in 1860. In 1862 he was elected a member of the National Academy. His works include genre and allegorical pictures, but he was most popular in painting animals, especially bears, whose actions he humanized in a satirical and pleasing manner. He made many studies of decorative architecture. Among his most popular works are: 'Power of Death' (1859); 'Bears on a Bender' (1862); 'Bear Dance' (1865); 'March of Silenus' (1866); 'Flaw in the Title' (1867); 'Darwin Expounding his Theories' and 'Runaway Match' (1876); 'Divorce Court' (1877); 'Bulls and Bears in Wall Street' (1879); 'Voices of the Night' (1880); 'Spreading the Alarm' (1881); 'In the Glen' (1882); 'Cattle Upon a Thousand Hills' (1883); 'Who's Afraid?' (1884); 'His Majesty Receives' and 'Office Seekers' (1886), etc. He published 'Humor in Animals,' a collection of his sketches (1885).

Beard, the hair on the chin, cheeks, and upper lip of men. It differs from the hair on the head by its greater hardness and its form. The beard begins to grow at the time of puberty. The connection between the beard and puberty is evident from this, among other circumstances, that it never grows in the case of eunuchs who have been such from childhood; but the castration of adults does not cause the loss of the beard. According to Cæsar, the Germans thought, and perhaps justly, the late growth of the beard favorable to the development of all the powers. But there are cases in which this circumstance is an indication of feebleness. It frequently takes place in men of tender constitution, whose pale color indicates little power. The beards of different nations afford an interesting study. Some have hardly any, others a great profusion. The latter generally consider it as a great ornament; the former pluck it out; as, for instance, the American Indians. The character of the beard differs with that of the individual, and, in the case of nations, varies with the climate, food, etc. Thus the beard is generally dark, dry, hard, and thin in irritable persons of full age; the same is the case with the inhabitants of hot and dry countries, as the Arabians, Ethiopians, East Indians, Italians, Spaniards. But persons of very mild disposition have a light-colored, thick, and slightly curling beard; the same is the case with inhabitants of cold and humid countries, as Holland, Britain, Sweden. The difference of circumstances causes all shades of variety. The nature of the nourishment likewise causes a great variety in the beard. Wholesome, nutritious, and digestible food makes the beard soft; but poor, dry, and indigestible food renders it hard and bristly.

In general the beard has been considered with all nations as an ornament, and often as a mark of the sage and the priest. Moses forbade the Jews to shave their beards. With the ancient Germans the cutting off another's beard was a high offense: with the East Indians it is severely punished. Even now the beard is regarded as a mark of great dignity among many nations in the East, as the Turks. The custom of shaving is said to have come into use in modern times during the reigns of Louis XIII. and XIV. of France, both of whom ascended the throne without a beard. Courtiers and inhabitants of cities then began to shave, in order to look like the king, and, as France soon took the lead in all matters of fashion on the continent of Europe, shaving became general; but it was only from the beginning of the 18th century that shaving off the whole beard became common.

The English clergy by and by, probably in imitation of those of western Europe, began to shave the beard, and until the time of William the Norman, the whole of whose army shaved the beard, there prevailed a bearded class and a shaven class, in short, a laity and a clergy, in England. In forbidding the clergy to wear beards Gregory VII. (1084) appealed to the custom of antiquity. The higher classes indulged in the moustache, or the entire beard, from the reign of Edward III. down to the 17th century. The beard then gradually declined, and the court of Charles I. was the last in which even a small one was cherished. Shaving, among many ancient nations, was the mark of mourning; with others it was the contrary. Plutarch says that Alexander introduced shaving among the Greeks by ordering his soldiers to cut off their beards; but it appears that this custom had prevailed before among the Macedonians. The Romans began to shave about 296 B.C., when a certain Ticinius Mena, a barber from Sicily, introduced this fashion. Scipio Africanus was the first who shaved every day. The day that a young man first shaved was celebrated, and the first hair cut off was sacrificed to a deity. Hadrian, in order to cover some large warts on his chin, renewed the fashion of long beards; but it did not last long. In mourning the Romans wore a long beard, sometimes for years. They used scissors, razors, tweezers, etc., to remove the beard. The public barbers' shops (*tonstrinæ*), where the lower classes went, were much resorted to; rich people kept a shaver (*tonsor*) among their slaves. Army regulations generally prohibit the wearing of beards, while in the navy beards are permitted. Physicians suggest that the beard should be suffered to grow on the chin and throat where tendencies to throat diseases exist.

Beard Moss (*usnea barbata*), a lichen of gray color. See also USNEA.

Beardslee, Lester Anthony, American naval officer: b. Little Falls, N. Y., 1 Feb. 1838; d. near Augusta, Ga., 11 Nov. 1903. Appointed acting-midshipman 5 March 1850, he served in the East Indies in 1851-5, participating in one battle and several skirmishes with the Chinese army at Shanghai. Graduating from the Naval Academy 1856, he passed through all grades of the service to rear-admiral 1895, and was retired 1 Feb. 1898. During the Civil War he commanded the monitor Nantucket in the attack of the ironclad fleet on the defenses of Charlestown Harbor, 7 April 1863, and captured the Confederate steamer Florida at Bahia, Brazil. In 1870 he took the steam-tug Palos to the East Indies, carrying on her the first United States flag through the Suez Canal. In 1879–80 he discovered, surveyed, and named Glacier Bay, Alaska. He is the author of a number of valuable official reports, especially those on 'The Strength of Metals,' 'Resources of Alaska,' and 'Present Condition of Affairs in Hawaii' (1897), published as Senate executive documents; 'The Strength of Wrought Iron and Chain Cables' (1880).

Beardsley, Aubrey, English author and illustrator: b. Brighton, 1874; d. Mentone, France, 16 March 1898. After receiving a grammar school education, he began working for London periodicals and publishers in 1892; and soon became widely known by his striking designs for posters and book covers. In 1894 he became art editor of 'The Yellow Book,' and while supplying it with illustrations, contributed drawings also to the 'Savoy' and 'Le Courrier Française.' He illustrated 'Bons Mots' (1892); Malory's 'La Morte d'Arthur' (1893); Oscar Wilde's 'Salome' (1894); 'The Rape of the Lock' and 'An Album of Fifty Drawings' 1896); and wrote and illustrated 'The Story of Venus and Tannhauser' (1895); and a novel, 'Under the Hill' (1896).

Beardsley, Eben Edwards, American Episcopal clergyman and writer: b. Stepney, Conn., 1808; d. 22 Dec. 1891. He was for many years rector of St. Thomas's Church at New Haven. He wrote 'History of the Episcopal Church in Connecticut' (4th ed. 1883), and lives of 'Samuel Johnson, First President of King's College, New York' (1874); 'William Samuel Johnson, President of Columbia College' (1876); and 'Samuel Seabury, First Bishop of Connecticut' (1881).

Beardsley, Samuel, American jurist: b. Hoosic, N. Y., 9 Feb. 1790; d. Utica, N. Y., 6 May 1860. On leaving the common school he took up the study of medicine, but abandoned it for law. In 1813 he was a member of the militia that defended Sackett's Harbor. Two years later he was admitted to the bar, and became judge-advocate of the militia. In 1823 he was State senator from the Fifth District of New York. He was appointed attorney for the Northern District of New York by President Jackson, and was a member of Congress in 1831–6 and 1843–5. From 1836 to 1838 he was attorney-general of the State of New York. He became associate judge of the supreme court of New York in 1844, and three years later succeeded Judge Bronson as chief justice. On his retirement he devoted himself to the practice of his profession.

Beardstown, Ill., a city in Cass County, 45 miles northwest of Springfield, on the Illinois River. The St. Louis division of the Burlington Route has its repair and other shops at Beardstown. There are manufactures of flour, lumber, and window screens as well as important cooperage works. The city has a fine park and two great bridges across the river. It was settled in 1832 and received a city charter in 1896. Pop. (1900) 4,827.

Bearing, in navigation and surveying, signifies the angle made by any given line with a north and south line. The bearing of an object is the direction of a line from the observer to that object.

In architecture, the space between the two fixed extremities of a piece of timber, or between one of the extremities and a post or wall placed so as to diminish the unsupported length. Also and commonly used for the distance or length which the ends of a piece of timber lie upon or are inserted into the walls or piers.

In mechanics, (a) The portion of an axle or shaft in contact with the collar or boxing. (b) The portion of the support on which a gudgeon rests and revolves. (c) One of the pieces resting on the axle and supporting the framework of a carriage. (d) One of the chairs supporting the framework of a railway carriage or truck.

In heraldry, a charge; anything included within the escutcheon. Generally in the plural, as armorial bearings.)

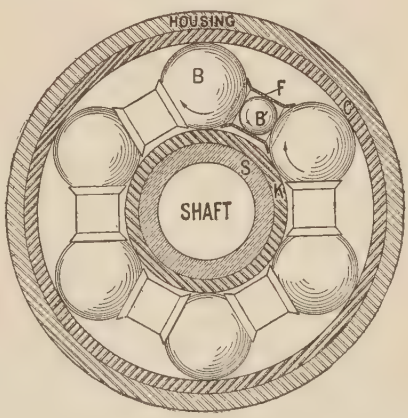
Bearer Company, a British organization for removing wounded soldiers from the field of battle to the dressing station or temporary hospital, which is part of the equipment of the bearer company, and where first aid can be given to them. The bearer company, first introduced into the British army in 1873, comprises the medical and other officers for discipline and supply duties, over 30 non-commissioned officers and men, trained as sick bearers of the medical staff corps, about 100 attendant untrained bearers from the Militia Reserve, six "bâtmen" and drivers of the Army Service Corps. Tents for the personnel and for the dressing stations are carried, and a bearer company also has ambulances, surgery wagons, equipment, supply, and water carts, requiring over 100 horses. A modified organization for mountain warfare comprises muleteers, mules, and a special kind of cacolets or litters. Half a bearer company is attached to each army corps on active service, forming the link between the battalion stretcher bearers and the field hospitals.

Bearings, Anti-friction. Anti-friction bearings are bearings involving the principle of rolling friction, as distinguished from sliding friction. An ordinary shaft turning in a plain journal slides around on a layer of some lubricating substance. If the lubricant is good and properly applied, little energy or power is lost in the heat produced by rubbing friction. If not, then much heat is produced, often to such an extent that the oil or grease is set on fire, dried up, thereby causing a so-called "hot box" or journal. The starting friction of a plain journal differs very greatly from the friction of motion. The reason is that while at rest under a heavy load, the film of the lubricant is penetrated, and contact of metal to metal is established. To overcome this contact, until the bearing has moved far enough to drag the film of oil between the points of contact again, requires much more power. Careful tests show the coefficient of rest to be from .09 to .13, as compared with .05 to .08 for the coefficient of motion. Bearings involving rolling friction are entirely different in this respect. No lubricant other than enough to prevent rusting is needed. Between the shaft and the wheel or other bearing is interposed some shape, made of hardened metal that rolls between the two surfaces. Rollers and balls are the two forms adopted to accomplish this purpose. During the last decade rapid evolution has taken place in the design and range of use to which such bearings are applied. Improved manufacturing methods in the way of production of large balls are bringing this type rapidly to the front for large work, such as trolley and steam car bearings, shafting, and many other uses not formerly possible commercially, because of cost.

The latest improvements have also very greatly advanced the possibilities of the bearing of the ball type. It is the invention of C. H. Chapman, interposing smaller balls between the working, or load carrying balls, in such a way as to prevent all rubbing, sliding or wedging tendencies, thus eliminating all wear, and indefinitely prolonging the life of a bearing. Advanced designers of this bearing have learned also to skilfully combine the materials, dimensions and design of same in such a way as to successfully perform what has hitherto been thought too heavy work for ball or roller bearings. The saving of such a bearing as made by the American Compound Bearing Company over the plain journal is very remarkable. Tests give the following comparative results:

Bearing	Starting Friction	Running Friction
Plain	.100	.05
Ball	.009	.005

It is seen that the starting friction for this ball bearing is not appreciably greater than the running friction, and that under all conditions the running friction of this compound bearing (the highest refinement of anti-friction bearing), is less than one tenth of the friction of the best lubricated plain journal.



By referring to the cut it will be noted that *B* is the load-carrying ball, *B'* the idler, *F* the retaining tube or float for *B'*, *C* the cup, *K* the cone, and *S* the journal sleeve.

The idler *B'* is so placed that its centre is coincident with a line connecting the centres of each of the adjacent load-carrying balls *B*, and is positively and automatically held in position by a loose free tube *F* that floats with the load-carrying balls, but not in frictional contact with any of the balls when the same are under load, during which time the idler balls are maintained

in the same relative position by rolling contact with the load-carrying balls.

An important and unique function of the compound features of the bearing is the differential compensating movement of the journal between the shaft and the balls, insuring a positive revolution of the load-carrying balls under all conditions.

For the class of journals that are called upon to start frequently, the saving in power is exceedingly great, and the necessity of saving power is bringing about the very general use of anti-friction bearings. Incidentally, there are other very important advantages in the decrease of annoyance and expense of lubrication, hot boxes and dirt attending the use of all plain journals. The use of anti-friction bearings as a means of saving power in all transmission problems is attracting increased attention among all mechanical engineers.

HENRY SOUTHER,
Engineer of the American Compound Bearing Company.

Béarn, bā-ārn, a former province of France, at the foot of the Pyrenees, with the title of a principality; about 42 miles long and 36 broad. It now forms part of the department of the Basses-Pyrénées. It belonged, with Navarre, to Henry IV., when he obtained the crown. The plain country is very fertile, and the mountains are covered with fir-trees, while within are mines of copper, lead, and iron; and the little hills are planted with vines, which yield good wine. Pau is the chief town. There is a peculiar and well-marked dialect,— the Béarnese,— spoken in this district, which has much more affinity with the Spanish than with the French. It contains a certain number of Greek elements, which some believe to have been derived from the ancient Greek colonists established in Gaul. The people have retained many Old-World manners, customs, and superstitions, as well as their old costume. See Bordenare, 'Histoire de Béarn et Navarre' (1873).

Bears, a family (*Ursidæ*) of large, heavy, long-haired, plantigrade, carnivorous mammals, scattered throughout all the northern hemisphere, and some parts of the tropics. They are absent from Africa (except the Atlas Mountains, which zoologically belong to Europe), and from Australasia. In their structure and dentition they are allied to the dogs on one hand, and to the badgers, weasels, skunks, etc., (*Mustelidæ*), on the other. The head is broad, and the jaws extended and rather narrow, but not so powerful as those of dogs or hyenas; while the teeth are complete and large, the molars especially being broad and tuberculous, fitting them well for crushing the vegetable fare so largely eaten by this group. The skeleton is massive, the limbs of great strength and furnished with long and powerful claws for digging, and for use in fighting. The whole sole of the foot rests upon the ground, leaving a footprint much resembling that of a man. Ordinarily they move about rather slowly and clumsily, yet all except the heaviest bears climb trees, and the largest scramble over rocks or ice with surprising agility; and all, when urged by rage or fear, can get over the ground at great speed, their gait being a lumbering but effective gallop. Their ears, though small, are highly developed, and their hearing is perhaps of more service to them than is their eye-sight; but neither equals in keenness the nose, which seems to be extremely sensitive. In respect to food, bears are truly omnivorous, taking flesh, fish, or vegetable materials as circumstances favor. They seize such small animals of the woods as cannot avoid them, and near settlements raid the herds of swine and flocks of sheep and cattle, especially in search of the young ones. All bears eat fish, and some, like the Polar and the Kadiak bear, live almost wholly upon this diet, catching the fishes cleverly from the shore by a stroke of the paw, or going into the water after them. Reptiles, crabs, crayfish, etc., are eaten also; and insects form a large part of their fare, especially ants and honey-making bees and wasps. They dig up ant hills and overturn rotting logs and stumps for the former, and search out and tear to pieces the combs of the latter, well protected against stings by their long hair. They also eat succulent leaves and herbage, certain roots, fruit, and especially sweet acorns and berries, of which they are exceedingly fond. The Rocky Mountain Indians used to burn over certain tracts of mountain-side annually in order to keep the oaks low and promote the growth of certain berry-bearing bushes in order to attract the bears. They drink a great deal of water, enjoy going into it, and will swim long distances.

Bears are nowhere very numerous, each pair or family occupying a district and keeping it fairly well to itself. When, as frequently happens, three or four are seen together, they are likely to be old and young of the same family. Their home is usually some cave or crevice among rocks, a hollow tree, a tangle of wind-thrown logs, or a dense thicket. There, in the early spring, are born the young, usually two, sometimes four; and in the case of the Arctic species, this often happens under the snow, before the female is released from her hibernation. The young remain with the mother until fully grown; and when they are little she guards and controls them with great solicitude, and will rush at an intruder. At other times bears are rather shy and will usually endeavor to retreat, yet when brought to bay, fight with great courage, and are among the most dangerous animals men can encounter. Their attack is made with both teeth and claw, striking down or clasping the foe in a crushing embrace, and then tearing him with the teeth. They can easily be tamed, however, remain friendly and prove intelligent and docile to a limited extent. They submit well to confinement, endure change of climate, and breed readily in captivity. The close family likeness throughout the group has made their distinction into natural species a matter of much dispute and uncertainty. Everyone recognizes the great white «Polar» or «ice» bear of the Arctic region (*Ursus maritimus*) as distinct. Its elongated body, long, pointed head, slender limbs, large, hairy-soled feet, and cream-white coat, are quite unlike the features of any other. Large specimens are nine feet or more in length, and have enormous strength. These bears are numerous throughout the icy circumpolar regions, and wander a vast distance away from the coast on the ice, sometimes swimming many miles. They often winter and their young are born on the floes. They live mainly upon seals, young walruses, and fish, which they scoop out of the

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1. Polar Bear (Ursus maritimus).

2. Grizzly Bear (Ursus horribilis).

surf and from the coast rivers where they come to spawn, but in summer obtain various other kinds of food, including marine grass and shore herbage. The writings of Arctic explorers abound in accounts of this wide-spread species, and should be read by those who wish to know more of their habits. Another sub-Arctic bear that seems undoubtedly distinct is the glacier or "blue" bear of the Mount St. Elias Alps on the coast of Alaska (q.v.) first described by Dall in 1895, and named *Ursus emmonsi*. It is the smallest of all bears — not larger that a half-grown grizzly, and bluish black, with a dorsal stripe, the ears and the outer surfaces of the limbs jet black; black and silver is the prevalent color of the sides, neck, and rump; the belly and inside of the legs are white; sides of the nose bright tan color. Very little is known of its habits, or of the extent of its limited range.

The other American bears, called black, grizzly, cinnamon, Barren-Ground, brown, Kadiak, and so on, are so confusingly alike that some conservative naturalists regard them all as merely varieties of one species, altered by climate and food, and a tendency to individual variation; and it has even been said that there was no real specific distinction between them and the Old World bears, which also present differences that blend confusingly together when many specimens are compared. Others regard the differences not only of specific value, but even place some of the forms in separate genera. The latest monographer of the American *Ursidæ* recognizes no less than eight species on this continent, besides the Polar bear, and the spectacled bear of the Andes (*Ursus ornatus*), which is thought by others to be merely an isolated variety of the black bear, that somehow has acquired whitish rings around its eyes. The black bear (*Ursus Americanus*) is the most wide-spread of these, being found in all the forested regions of the continent north of Mexico, and still remaining wherever a large patch of forest, or a range of mountains or rough hills give it a harbor, whence it may raid the pasture-lots and pig sties of frontier farmers, especially in early spring, when wild food is scarce. Black bears climb trees easily, travel about a great deal, and are often captured and tamed. They are timid and secretive, and rarely are dangerous unless wounded or cornered and enraged. The color of this bear is properly black, but brown, reddish ("cinnamon"), or even yellowish examples are frequently seen. The nose is always tan-colored. In size they average about five feet, and never reach the dimensions of a large grizzly. The bears of Florida and of Texas are each regarded by some as separate species, but most naturalists consider them to be merely geographical races. The Barren-Ground bear (*Ursus richardsoni*) is a large whitish-brown species dwelling on the brushy plains northwest of Hudson Bay, which there is good reason to believe is an isolated American race of the European brown bear.

The grizzly bear (*Ursus horribilis*) of the mountains of western North America is one of the largest, and perhaps the most to be feared, of any of the family. It is found from the Black Hills and the Badlands of Dakota westward to the Pacific coast, and from Mexico to northern Alaska. A large specimen is nine feet in length, and will weigh 1,000 pounds, but the size varies greatly. So does the color, which ranges from reddish-brown to hoary gray. Hence several varieties are recognized by hunters, such as "cinnamons," "silvertips" (in which the tips of the hairs are white), and "grizzlies." The typical form may be described as yellowish-brown, with a reddish mane, black dorsal stripe, and dark-colored legs. In form they are massive, with broad, squarish heads, and immensely muscular bodies. They cannot, or at any rate, do not, climb trees, but they scramble about the roughest mountains or through a dense forest with surprising agility, and can run very rapidly on occasions. They seem rarely if ever to hibernate, and go about alone or in pairs, eating all sorts of food, but seizing and pulling down large prey when an opportunity offers. In former days even a bull buffalo was unable always to resist their strength, and they constantly attacked them and the deer. At present the cattle and horses upon the ranges in some parts of the west suffer from their ravages. Though so mighty, and when at bay or enraged probably not less dangerous to encounter than a lion or tiger, they will usually avoid and flee from man, and do not seem quarrelsome, the tradition of a constant enmity between them and the black bears not finding support in facts. The grizzly is easily the most terrible of the game animals of North America, and one of the most formidable in the world; but different bears vary greatly in temperament and according to circumstances. The Indians and experienced hunters of the west, however, have learned to hold all of the race in the highest respect. Much the same statement will apply to the Barren-Ground bear, already mentioned, and to the Alaskan bears to be spoken of presently. The grizzly is still to be found throughout most of its range, though no longer numerous except in the wilder parts of the Rocky Mountains, in the northern parts of the Sierra Nevada, and in the high mountains northward from Oregon to Alaska, where the largest ones are now to be obtained. The Kadiak bear is a brownish species or variety (*Ursus middendorffi*) dwelling on Kadiak Island, Alaska, and the neighboring mainland. Specimens of it exceeding in size any other bear have been obtained, and weighing 1,200 pounds. Whether it will prove to be a distinct species remains to be seen. The same may be said of Dalli or the Sitka bear (*Ursus dalli*). Both are dark-brown or grizzled, and difficult to distinguish externally from other bears of the north.

The bears of the Old World have been divided into many species by earlier naturalists, but are now regarded as more nearly connected. The best known is the common brown bear of Europe and Asia (*Ursus arctos*). It is of large size, reaching about eight feet in length in the bigger European specimens, and is usually of some shade of yellowish-brown, reddish-brown, or black, but varies greatly. It is exceedingly difficult to distinguish from the American bears, and passes by indeterminate variation into the so-called species of Siberia, Japan, and the Himalayan region, the differences being such as might come from varying climate and habitat; thus those of the high Himalaya are smaller and lighter in color, etc. Although long ago extinct in Great Britain, it still lingers in the

wilder, more mountainous parts of Europe, and is numerous in the forests of Russia, the Caucasus, on the Lebanon range of Asia Minor (where it is called the Syrian bear), in the Atlas Mountains of Morocco, and throughout Asia north of the Himalayas. The largest are those of Kamchatka, where they are numerous and bold, and live in summer almost wholly on salmon, as do the Kadiak and other Alaskan bears east of Bering Sea. This is the bear most often seen in menageries, where it breeds readily; and which is led about by "bear-tamers," and taught certain clumsy "dancing" tricks. The Thibetan or "blue" bear (*Ursus pruinosus*), is a little known species regarded as distinct. Two other quite distinct species of bear belong to the Indo-Malayan region. One is the sloth-bear or honey-bear of India, a large animal which in its jungle home is one of the most dangerous carnivores of the Indian forests, yet is often tamed and led about the country by Hindu jugglers, who called it "aswail," etc. It is black, unusually shaggy, and has a prolonged mobile snout, a very long tongue and no teeth in the front of the mouth (after the milk teeth drop out), making its facial grimaces very comical. Another very distinctive feature is the large yellowish crescent on its breast. It is an agile climber, and exceedingly fond of robbing the nests of honey-making bees. These facts are recorded in its name (*Ursus* or *Melursus*), *labiatus*.

The Malayan sun bear, or "bruang" (*Ursus,* or *Helarctos, Maylayanus*), is a smaller species inhabiting the forests of the Malayan Peninsula, and islands eastward to Borneo. Its coat is short and fine, black in color, marked on the breast with a white or orange crescent, and the lips and tongue are remarkably long and flexible. It feeds mainly on ants, which it gathers with its glutinous tongue after digging up their hills, to which its long claws are well fitted.

Fossil bears, commonly called "cave bears," have been found in the Quaternary bone-breccia of many caves of Europe, North and South America. Some are closely allied to or identical with living species; others, as the California and South American cave bears, are referred to a distinct genus, *Arctotherium.* In the Tertiary strata of the Old World occur remains of a series of animals (*Amphicyon, Hyaenarctos,* etc.) which appear to connect the bears with primitive *Canidæ,* indicating that they are an offshoot of the dog family. See also Cave Bears.

Bibliography.— For structure and relationships of this group, consult: Flower and Lydekker, 'Mammals, Living and Extinct' (1891). For modern and contrasting ideas of classification: Lydekker, 'Proceedings of Zoological Society of London, for 1897,' page 412; Merriam, 'Proceedings Biological Society of Washington,' p. 65 (1896). For habits and hunting, such general works as Brehm, 'Thierleben'; the Standard, Royal, and Allen's 'Natural Histories'; Mayne Reid, 'Bruin, or the Grand Bear Hunt' (1864); Aflalo, 'Sport in Europe' (1901); the works of Jerdon, Blanford, and Blyth on the mammals of Persia, India, and eastward; and the writings of sportsmen-naturalists, especially Baker, Hornaday, Kinloch, Pollok, Sanderson, Shakespeare, and Wallace. For American bears, consult Richardson, 'Fauna Boreali Americana' (1829); Audubon and Bachman, 'Quadrupeds of North America' (1846); Merriam, 'Mammals of the Adirondacks' (1882); Marey (editor), 'Sport with Rod and Gun' (1892); Shields (editor), 'Big Game of North America' (1890); Porter, 'Wild Beasts' (1897); and the writings of sportsmen in the Rocky Mountains, especially Baillie-Grohman, 'Fifteen Years of Sport, etc.' (1900).

Beas, bē'as, or **Bias** (the ancient *Hyphasis*), one of the five great rivers of the Punjab, having its rise at the Ratanki Pass, on the south side of the Santch Mountains, a branch of the Himalaya system, in lat. 32° 21′ N.; lon. 77° 22′ E.; where the former attain an elevation of 13,300 feet. Its entire course is about 215 miles. The Beas has been considered larger than the Sutlej, which it joins 35 miles to the southeast of Amritsar, but it is greatly inferior to that river in the length of its course; and, though they have about the same breadth, the Sutlej has the greater volume of water. The united stream, below the point of junction, is called the Ghara or Gharra.

Beasts of Prey, is not a scientific term, but, as in the case of the phrase "birds of prey," represents merely the idea of an assemblage of such mammals as prey upon other creatures. The greatest number, and most prominent examples, belong to the order *Carnivora,* whose members subsist mainly upon flesh, and some of which, as the cats, bears, and wolves, are the most powerful, deadly, and dangerous animals of the world. These have acquired bodies with great strength and endurance in chasing and leaping, seizing and holding; teeth adapted to cutting and piercing; sharp muscular claws; and a high degree of intelligence in the wiles of hunting, and of courage and pertinacity in attacking their prey or defending their gains against rivals. Their digestive organs are simplified and adapted to the assimilation of flesh, of which a less quantity is required than in the case of an animal subsisting on vegetable fare, because it is already in a concentrated, partly elaborated form; but as the obtaining of it is occasional and often interrupted by long intervals, all beasts of prey are likely to kill and eat excessively when opportunity offers, in instinctive preparation for a possible fast. To provide against the loss of heat during the periods of famine, rather than as a provision against low temperature, most beasts of prey are clothed in dense, hairy coats of hair, or "fur." Not all the beasts of prey belong to the *Carnivora* for animals with similar structures and adaptations are to be found in other orders of mammals, whose basal structure is very different. The blood-sucking bats, for example, have teeth roughly similar to those of a dog; and some of the apes are savage and powerful and have carnassial teeth. The most precise parallel, however, is found in the predatory marsupials of Australia, such as the Zebra wolf, Tasmanian devil, and several others, which have the equipment and habits of true beasts of prey.

Beat, in music, the beating or pulsation resulting from the joint vibrations of two sounds of the same strength, and all but in unison. Also a short shake or transient grace-note struck immediately before the note it is intended to ornament. The Greeks employed the up beat

1 American Black Bear (Ursus Americanus).
2. Brown Bear (Ursus arctos).
3. Black Bear of the Himalayan Mountains (Ursus torquatus).
4. Malay Bear (Ursus Malayanus).

(*arsis*) to denote the accented, and the down beat (*thesis*) to signify the unaccented part of the measure, but in modern practice the down beat denotes the accented and the up beat the unaccented.

Beatifica'tion, in the Roman Catholic Church, an act by which the Pope declares a person beatified or blessed after his death. It is the first step to canonization, or the raising one to the honor and dignity of a saint. No person can be beatified till 50 years after his or her death. All certificates or attestations of virtues and miracles, the necessary qualifications for saintship, are examined by the Congregation of Rites at Rome. This examination often continues for many years, and embraces a number of different steps or stages, at one of which a functionary known popularly as the «devil's advocate» brings forward all possible objections, and points out all weak points in the evidence brought forward in favor of the reputed saint. When the question has been finally debated in successive meetings of the congregation, the Pope at last gives his decision, and the beatification may then take place in the Vatican. Beatification differs from canonization in this, that «whereas the cultus of a canonized saint belongs to the universal Church, and churches and altars can be freely erected in his or her honor, and images, pictures, or statues of him or her displayed without special permission, in the case of one of the Blessed it is otherwise. The honor and veneration which are authorized in their regard are limited and partial; and because the cultus of one of them is permitted to one country, or city, or order, or branch of an order, it does not follow that it should be practised elsewhere; and the attempt to extend it without special permission is condemned.» Compare Addis & Arnold's Catholic Dictionary. See CANONIZATION.

Beating the Bounds, a periodical survey or perambulation by which the boundaries of parishes in England are preserved. It is, or was, the custom that the clergyman of the parish, with the parochial officers and the boys of the parish school, should, on Ascension Day, march to the boundaries, which the boys struck with willow rods. A similar ceremony in Scotland is called riding the marches. In the New England colonies parallel duties were performed by «perambulators» and in Virginia by «processioners.» The custom is of Teutonic origin.

Beatitude, the Christian term meaning the highest degree of happiness of which our nature is susceptible, and applied particularly to the state of the elect in heaven. It was a favorite topic of discussion among the scholastic theologians, who divided it into subjective and objective, perfect and imperfect, and made our eternal happiness consist in the vision of God perfecting the intellect and will in possessing Supreme Truth and God. Recent theologians have generally made beatitude consist in honoring God and sharing his perfections, a sublime though indefinite conception. Though the state of beatitude be incomprehensible to us, yet the belief in it is a motive in the present life which begets heroism in the midst of misfortune, and an adherence to virtue in the midst of evils. The Beatitudes is the name given particularly to the beginning of the separate clauses in Christ's Sermon on the Mount.

Beaton, David, Scottish prelate and cardinal: b. 1494; d. St. Andrew's, 29 May 1546. He studied at St. Andrew's, Glasgow, and Paris, was for years Scottish resident in France, and in 1537 was consecrated bishop of Mirepoix in that country. Pope Paul III. raised him to the cardinalate in 1538, and next year he became primate of Scotland. He had much influence with James V., and after his death (1542) set himself to oppose the English party, to which the Reformers belonged. Upon the coronation of the young Queen Mary, he was made chancellor, and became also legate *a latere* from Rome. He now began to renew the persecution of heretics, and among the rest the famous Protestant preacher George Wishart suffered, being strangled and burnt at the stake, on the twofold charges of sedition and heresy. But a conspiracy had been formed against him, and he was assassinated at his own castle of St. Andrews. He was a man of great ability and recent historical research has cleared his character from many former calumnies.

Be'atrice, a witty, lively character in Shakespeare's 'Much Ado About Nothing,' who marries Benedick by the contrivance of the friends of each.

Beatrice Cenci, bā-ą-trē'chā chĕn'chę, a 16th century Roman girl whose picture was painted by Guido Reni, and whose career is the subject of Shelley's tragedy 'The Cenci.'

Beatrice Portinari, bā-ą-trē'chā pōr-tę-nä'-rę, the Beatrice of Dante's poems: b. about 1266; d. 1290. She was the daughter of a wealthy citizen of Florence, and wife of Simone de Bardi. She was but eight years of age, and Dante nine, when he met her first at the house of her father. He saw her only once or twice, and she probably knew little of him. The story of his love is recounted in the 'Vita Nuova,' which was mostly written after her death.

Be'atrice, Neb., a city and county-seat of Gage County, on the Big Blue River, and several railroads; 40 miles south of Lincoln, the State capital. It is the seat of the State Institution for Feeble Minded Youth; and has a handsome court-house, United States government building, Holly system of waterworks, electric light and street railway plants, public library, three national banks, excellent water power, flour and planing mills, tile and barbed wire works, creamery, iron foundry, and manufactories of gasoline engines, wind mills, and farming implements. It was incorporated as a town, 1871, and as a city, 1873. Pop. (1900) 7,875.

Beatrix (bę-ā'trĭks) **Antelope,** an Arabian oryx *Oryx beatrix*), resembling the beisa but without black markings on the haunches. See ORYX.

Beattie, bē'tĭ, **Francis Robert,** Canadian-American educator: b. near Guelph, Ontario, 1848. He was educated at Toronto University, studied theology at Knox College, Toronto, and at the Presbyterian College in Montreal. He was pastor at Baltimore and Cold Springs, Ontario, in 1878–82, and at Brantford in 1882–8. In 1888 he became professor of apologetics in the Presbyterian Theological Seminary in Columbia, S. C., where he remained till 1893, and then accepted the chair of systematic theology and apologetics in the Presbyterian Theological

Seminary, Louisville, Ky. His writings include 'An Examination of Utilitarianism' (1884); 'Methods of Theism' (1887); 'The Higher Criticism; or, Modern Critical Theories' (1888); 'Radical Criticism, an Exposition and Examination of the Radical Critical Theory of the Old Testament Scripture' (1895); 'Presbyterian Standards' (1896), etc.

Beattie, bā'tę, **James,** Scotch poet: b. Kincardineshire, 25 Oct. 1735; d. Aberdeen, 18 Aug. 1803. He obtained a scholarship at Aberdeen, and subsequently became assistant in the Aberdeen grammar school, and married the daughter of the head schoolmaster. After this event he began to be distinguished as a writer, and in 1771 commenced the publication of his work called the 'Minstrel.' This obtained for him the patronage of Lord Errol, and caused him to be appointed professor of moral philosophy and logic in Marischal College. In 1765, he published a poem, the 'Judgment of Paris,' which failed of any celebrity. The work which gained him the greatest fame was an 'Essay on the Nature and Immutability of Truth,' in opposition to sophistry and skepticism. It was designed as a reply to Hume, and was so much in demand that in four years five large editions were sold; and it was translated into several languages. He was urged by the archbishop of York and the bishop of London to take orders in the Church of England, a proposal which he declined. While in London he became intimate with Dr. Johnson, Dr. Porteus, and other distinguished literary characters. In 1783, he published 'Dissertations, Moral and Critical,' and the 'Evidences of the Christian Religion,' written at the request of the bishop of London. In 1790 he published the first volume, and in 1793 the second, of his 'Elements of Moral Science'; subjoined to the latter was a dissertation against the slave trade.

Beatty, John, American legislator: b. Bucks County, Pa., 10 Dec. 1749; d. Trenton, N. J., 30 May 1826. He was educated at Princeton, and took up the study of medicine with Dr. Rush of Philadelphia. He fought with distinction through the Revolutionary war, reaching the rank of colonel; was delegate to the Continental Congress in 1783–5; speaker of the House; served in the convention which adopted the Federal Constitution; was a member of Congress in 1793–5; and secretary of State of New Jersey in 1795–1805.

Beatty, bē'tĭ, **John,** American military officer: b. Sandusky, Ohio, 16 Sept. 1828. He fought on the Union side in the Civil War, rising from private to brigadier-general, and showing intrepid courage at Stone River, 1862–3. He was a member of Congress in 1868–74, and Republican presidential elector-at-large in 1884. He has written 'The Citizen Soldier; or, Memoirs of a Volunteer' (1876); 'The Belle o' Becket's Lane' (1882).

Beau Brummel. See BRUMMEL, GEORGE BRYAN.

Beaucaire, Monsieur, the principal figure in a story of the same name by Booth Tarkington (1900), dramatized 1901. Beaucaire is a French prince living incognito in the fashionable society of Bath, England, near the end of the 18th century.

Beaucaire, bō-kār, a small, well-built, commercial city of France, in the department of the Gard, on the Rhone opposite Tarascon, with which it communicates by a fine suspension-bridge, at the commencement of the Beaucaire and Aigues-Mortes Canal, and connected with several lines of railway. It has a commodious harbor for vessels which come up from the Mediterranean, seven leagues distant, considerable commerce and some manufactures; but is chiefly famous for its great fair (founded in 1217, by Raymond II., Count of Toulouse), held yearly from 21 to 28 July. Merchants from all parts of Europe, and even from the coast of Africa, attend with their goods; and almost every kind of article, however rare, is to be purchased here; though silks, woolens, printed cottons, leather, wool, wine, brandy, olive-oil, and fruits, are the chief objects of sale. Pop. (1890) 9,020.

Beauchamp, bō-shān, **Alphonse de,** French historian and publicist: b. Monaco, 1767; d. Paris, 1 June 1832. Under the Directory he had the surveillance of the press, a position which supplied him with materials for his 'History of La Vendée' (1806). He contributed to the 'Moniteur' and the 'Gazette de France.' Among his chief works are the 'History of the Conquest of Peru' (1807); the 'History of Brazil' (1815); and the 'Life of Louis XVIII.' (1821); 'Life of Julius Cæsar' (1821). The 'Memoirs of Fouche' is also with reason ascribed to him.

Beauchamp, bēch'ăm, **William Martin,** American clergyman and author: b. Coldenham, N. Y., 25 March 1830. Ordained to the Protestant Episcopal ministry in 1863, he filled rectorships at Northville, N. Y., 1863–5, and Baldwinsville, N. Y., 1865–1900. He has published 'The Iroquois Trail; or Foot Prints of the Six Nations' (1892); 'Indian Names in New York' (1893); and a valuable series of archæological studies published as Bulletins of the New York State Museum, namely, 'Aboriginal Chipped Stone Implements of New York' (1897); 'Polished Stone Articles used by the New York Aborigines' (1897); 'Earthenware of the New York Aborigines' (1898); 'Aboriginal Occupation of New York' (1900); 'Horn and Bone Implements of the New York Indians' (1902); 'Metallic Bone Implements of the New York Indians' (1902).

Beauclerk, bō'klärk, **Topham,** one of Dr. Johnson's favorite friends: b. December 1739; d. 11 March 1780. He was the only son of Lord Sidney Beauclerk, third son of the first Duke of St. Albans, and in general appearance much resembled his great-grandfather, Charles II. He studied at Oxford, and his conversational talents so much charmed Johnson that when «The Club» was founded, in 1763, he was one of the nine members who originally formed it. When he went to Italy, in 1762, Johnson wrote to his friend Baretti, warmly commending Beauclerk to his kindness. In 1765 he accompanied Johnson on a visit to Cambridge. A short time before his death, Johnson said of him: «He is always ready to talk, and is never exhausted»; and when communicating his death to Boswell, he said: «His wit and his folly, his acuteness and maliciousness, his merriment and reasoning, are now over. Such another will not often be found among mankind.»

Beaufort, bō-fôr, **François de Vendôme** (Duc de), French naval officer, grandson of Henry IV.: b. Paris, January 1616; d. 25 June 1669. He is peculiarly known by the conspicuous part he took in the civil war of the Fronde. On the accession of Louis XIV., the queen-regent treated him very favorably, but was soon dissatisfied with his impertinent manners. Her displeasure threw him on the side of the malcontents, and he became one of the leaders of the Frondeurs. He was extremely popular with the Parisians, and was consequently called *le roi des halles,* and he exercised a powerful influence on the common people against Cardinal Mazarin, who was twice driven out of France. In 1664 and 1665 he successfully led attacks against the corsairs of Africa; in 1666 was at the head of the fleet which was to join the Dutch to make war against England; lastly, in 1669 he went to the assistance of the Venetians, then besieged by the Turks in the island of Candia; fought bravely and was killed in a sally.

Beaufort, bū'fêrt, or bō'fêrt, **Henry,** English cardinal, natural son of John of Gaunt, and half-brother of Henry IV., king of England; d. Winchester, 11 April 1447. He became bishop of Lincoln, 1398, whence he was translated to Winchester, and in 1403 was made chancellor. In 1426 he received a cardinal's hat, and was appointed legate in Germany. In 1431 he crowned Henry VI. in Paris. Shakespeare depicts him in his 'Henry VI.,' but it is questionable whether the likeness is true to history.

Beaufort, Margaret, English countess: b. 1441; d. 1509. She was daughter of John, first Duke of Somerset, and mother of Henry VII., king of England. She was three times married, namely, to Edward Tudor, Earl of Richmond, in 1455; Henry Stafford, son of the Duke of Buckingham, and to Lord Stanley, a minister of Edward IV. In the Wars of the Roses, she and her son Henry became more or less dangerous to the Yorkists and were for a long time in retirement or exile.

Beaufort, bū'fêrt, N. C., city, port of entry and county-seat of Carteret County, at the mouth of Newport River, 167 miles east of Raleigh. The harbor here is the finest in the State. At Cape Lookout, 11 miles to the southeast, is a lighthouse 156 feet high. Pop. (1900) 2,195.

Beaufort, S. C., a town and county-seat of Beaufort County; on the Port Royal River, and the Charleston & W. C. R.R.; 15 miles from the ocean and 80 miles southwest of Charleston. It is midway between Charleston and Savannah; has an excellent harbor, and is the centre of the phosphate trade of the State. It was founded in 1711, and for many years prior to the Civil War was a noted health and pleasure resort, especially for the cotton planters interested in the plantations on the adjoining Sea Islands. It is still a popular summer and winter resort, principally engaged in phosphate mining, and with large exports of cotton, yellow pine and cypress lumber, rice, and sweet potatoes. In the fiscal year ending 30 June 1900, the imports of merchandise here aggregated in value $81,042, and the exports, $181,908. Pop. (1900) 4,110.

Beaufort Scale, an instrument for measuring the apparent force of the wind, so called from Admiral Beaufort who introduced it into the English navy about 1805. It is now in common use among navigators. Twelve numbers are embraced in the scale.

Beaugency, bō-zhŏn-sę, a town of France, in the department Loiret, 16 miles southwest of Orleans, on the side of a hill, above the Loire, here crossed by a stone bridge of 26 arches. The town was formerly surrounded by a wall flanked by towers and bastions, parts of which still remain. The square donjon tower of Beaugency, 115 feet high, is a remarkable structure of high antiquity, probably of the 10th or 11th century, though the exact date of its erection is unknown. The articles manufactured here are principally cloth and leather. There are also some distilleries and a considerable trade in wine. In the Franco-German war Gen. Chanzy was defeated here by the Grand-Duke of Mecklenburg on 7 and 8 Dec. 1870. Pop. (1896) 3,305.

Beaugrand, bō-grăn, **Honoré,** Canadian journalist: b. Lanoraie, P. Q., 24 March 1849. In 1865 he joined the French army in Mexico under Marshal Bazaine, and, after the failure to establish Maximilian as emperor, accompanied the army to France. In 1867 he went to New Orleans, where he engaged in newspaper work. He served subsequently as a journalist in Boston and St. Louis, and, returning to Canada, founded *La Patrie* in Montreal in 1879, as an organ of the French Liberal Party. He sold this paper in 1897. In 1887 he established a paper in the English language, the Montreal *Daily News.* He was mayor of Montreal 1885–7, and a delegate from Montreal to the Congress of the World's Chambers of Commerce in London in 1896. His publications include 'Melanges; Trois Conferences' (1888); 'Lettres de Voyage' (1889); and a novel, 'Jeanne la Fileuse.' He was decorated with the Cross of the Legion of Honor in 1885, and became commander of that order in 1889. He is also an officer of the Academy of France; a commander of the Order of Nicham Iftikar of Tunis, etc.

Beauharnais, bō-är-nā, **Alexandre** (Viscount de), French soldier: b. Island of Martinique, 1760; d. Paris, 23 July 1794. He served with distinction as major in the French forces under Rochambeau which aided the United States in their Revolutionary War, and married Joséphine Tascher de la Pagerie, afterward the wife of Napoleon. At the breaking out of the French Revolution he was chosen a member of the National Assembly, of which he was for some time president, and which he opened, after the king's departure, with the following words: «*Messieurs, le roi est parti cette nuit: passons à l'ordre du jour.*» In 1792 he was general of the army of the Rhine, but retired in 1793, in consequence of the decree removing men of noble birth from the army. He was falsely accused of having promoted the surrender of Mainz, was sentenced to death, and guillotined. His children, Eugène and Hortense, were adopted by Napoleon on the latter's marriage to Beauharnais's widow.

Beauharnais, Eugene de, French general: b. 3 Sept. 1781; d. Munich, 21 Feb. 1824. He was the son of Alexandre Beauharnais, who was guillotined in 1794, and Joséphine Tascher de la Pagerie, afterward wife of Napoleon and

Empress of France. During the French Revolution Eugene entered the military service, and after his father's death joined Hoche in La Vendée, and subsequently studied for a time in Paris. In 1796 Joséphine was married to Napoleon Bonaparte, then commander-in-chief of the army of Italy, and Eugene accompanied the great warrior in his campaigns in Italy and Egypt. In 1805 he was created a prince of France and viceroy of Italy, and after the peace of 13 Jan. 1806, married the Princess Augusta Amelia of Bavaria. In 1807 Napoleon made him Prince of Venice, and declared him his heir to the kingdom of Italy. He administered the government of Italy with great prudence and moderation, and was much beloved by his subjects. He conducted himself with great prudence on the occasion of the divorce of Napoleon from his mother. In the disastrous retreat from Moscow he did not desert the wrecks of his division for a moment, but shared its toils and dangers with the soldiers, and encouraged them by his example. To him and to Ney France was indebted for the preservation of the remains of her army during that fatal retreat. On the departure of Napoleon and Murat he was left in the chief command, and showed great talent at that dangerous conjuncture, and at the battle of Lützen, 2 May 1813, by surrounding the right wing of the enemy, he decided the fate of the day. Napoleon sent him from Dresden to the defense of Italy, and after the fall of Napoleon he concluded an armistice with Count Bellegarde, by which he delivered Lombardy and all upper Italy to the Austrians. Eugene then went immediately to Paris, and thence to his father-in-law at Munich. He was at the Congress of Vienna. On the return of Napoleon from Elba he was obliged to leave Vienna and retire to Baireuth. By an ordinance of the king of Bavaria, his father-in-law, he was created Duke of Leuchtenberg, November 1817. The Bavarian principality of Eichstädt was bestowed upon him, and his posterity declared capable of inheriting in case of the failure of the Bavarian line. Prince Eugene, under a simple exterior, concealed a noble character and great talents. Honor, integrity, humanity, and love of order and justice were the principal traits of his character. Wise in the council, undaunted in the field, and moderate in the exercise of power, he never appeared greater than in the midst of reverses. See Aubriet, 'Vie Politique et Militaire d'Eugène Beauharnais, Vice-roi d'Italie.'

Beauharnais, François (Marquis de), French nobleman: b. La Rochelle, 12 Aug. 1756; d. Paris, 10 Jan. 1819. He violently opposed the motion of his younger brother, the Viscount Alexandre, to take from the king the chief command of the army, and would not listen to any of the amendments proposed, saying, «*Il n'y a point d'amendement avec l'honneur.*» He was called in consequence of this, *Le féal Beauharnais sans Amendement.* In 1792 he formed the project of a new flight of the royal family; but the arrest of his companion, the Baron Chambon, prevented the execution of the plan. He was appointed major-general in the army of the Prince of Condé, and wrote, in 1792, to the president of the National Assembly, protesting against their unlawful treatment of the king, and offering to appear himself among his defenders. When Bonaparte became first consul, the marquis sent him a letter, in which he exhorted him, by the glory which he would gain by such a course, to restore the sceptre to the house of Bourbon. Having at last recognized the emperor he was sent by him as ambassador to Florence and Madrid; but having afterward fallen into disgrace he was banished.

Beauharnais, Hortense Eugenie, wife of Louis Bonaparte, and queen of Holland: b. Paris, 10 April 1783; d. Arenenberg, Switzerland, 3 Oct. 1837. She was the daughter of Alexandre Beauharnais and Joséphine, afterward wife of Napoleon. She was to have married Desaix; but on 7 Jan. 1802, in compliance with the wish of Napoleon, became the wife of Louis, who also gave up a former attachment for the marriage. The union was not happy; and Hortense returned to Paris, and lived a dissolute life there apart from her husband. Prominent among her lovers was the Comte de Flahaut, for whom she composed her popular air, «*Partant pour la Syrie,*» as he was leaving Paris for Germany, and Admiral Veruel, a Dutch naval officer. The former is believed to have been the father of M. de Morny, universally recognized as the illegitimate half-brother of Napoleon III., whom he greatly aided in becoming emperor; and to the latter is attributed the paternity of Napoleon III. himself. It is known that Louis Bonaparte had a warm dispute with his brother, the emperor, touching this child, which he averred to be none of his, and that his unwillingness to recognize it as such was only overcome by the most decided measures on the part of Napoleon. After the separation of Napoleon and Joséphine, Hortense remained on intimate terms with the former. When the Bourbons came back in 1814, she alone of all the Bonaparte family remained in Paris. After the Hundred Days, she lived in Augsburg, in Italy, and in Switzerland, devoted to her sons, and greatly beloved by the people with whom she came in contact, who found her a kind and gentle benefactress. When her sons had to flee, after participating in an unsuccessful attempt at revolution, in Italy, in 1831, she went for a time to Paris, and was kindly received by Louis Philippe. She possessed much literary, as well as social talent.

Beaulieu, bō-lyė, **Jean Pierre,** Austrian military officer: b. Namur, 26 Oct. 1725; d. near Linz, Austria, 22 Dec. 1819. He served in the Seven Years' war; was promoted a major-general for his successful operations against the Belgian insurgents in 1789; commanded at Jemappes in 1792; was defeated by Napoleon, in 1796, while commander-in-chief of the forces in Italy, in the battles of Montenotte, Millesimo, Montesano, Mondovi, and Lodi.

Beaulieu, bū'lĭ, a village in Hampshire, England, six miles southwest of Southampton. It contains the remains of an abbey founded by King John and much visited by students of mediæval architecture. Within the limits of Beaulieu Manor exemption from arrest for debt was enjoyed till very recent years.

Beaumarchais, bō-mär-sha, **Pierre Augustin Caron de,** French dramatist: b. Paris, 1732; d. May 1799. He was the son of a watchmaker, who destined him for his trade, and early gave striking proofs of his mechanical and also of his musical talents. He was afterward the teacher of the harp to the daughters of Louis XV., and was admitted into their society.

By a rich marriage he laid the foundation of the immense wealth which he afterward accumulated by his speculations, and which was also increased by a second marriage. In the meantime he occupied himself with literature and published the dramas of 'Eugénie' (1767), and 'Les Deux Amis' (1770). The first still holds its place on the stage. He showed all his talents in his lawsuit against Goezman and Lablache, when he wrote against the former (who belonged to the *parlement Maupeou*, so called, which was engaged in a dispute with the ministry) his celebrated 'Mémoires' (1774), which entertained all France. The fame of his 'Mémoires' alarmed even Voltaire, who was jealous of every kind of glory. 'The Barber of Seville' (1775) and the 'Marriage of Figaro' (1784) have given him a permanent reputation. In 1792 he wrote 'La Mère Coupable,' but never regained his former fame. His last work was 'Mes Six Epoques,' in which he relates the dangers to which he was exposed in a revolution in which a celebrated name, talent, and riches, were sufficient causes of proscription. He still possessed, at the age of more than 60, all the vigor of his youth, but was afflicted with deafness. He lost about 1,000,000 livres by his famous edition of the works of Voltaire (1785), and still more at the end of 1792 by his attempt to provide the French army with 60,000 muskets. In 1809 an edition of his works appeared in seven volumes; a later edition in one volume came out in 1835. Beaumarchais was a singular instance of versatility of talent, being at once an artist, politician, projector, merchant, and dramatist. He was passionately fond of celebrity. His 'Marriage of Figaro' excited one of those extraordinary sensations for which Paris has always been remarkable. The English modifications and versions of this comedy convey but a slight notion of the mischievous subtlety and deep spirit of intrigue in the original. See Loménie, 'Beaumarchais et son temps'; 'Beaumarchais et ses œuvres' (1887); 'Histoire de Beaumarchais' (1886); Lescure, 'Eloge de Beaumarchais' (1887); Bonnefou, 'Etude sur Beaumarchais' (1887); Hallays' 'Beaumarchais' (1897).

Beaumaris, bō-mar'is, a seaport town of North Wales, Isle of Anglesey. It is situated on the west shore of the Menai Strait, near its junction with the Irish Sea, where it expands into a good roadstead called Beaumaris Bay. It consists of several well-paved streets; houses in general, good, particularly in the principal street, terminated by the ancient castle of Beaumaris, erected by Edward I.; while many modern dwellings of very handsome appearance have lately been erected. The chief public buildings, exclusive of the churches, are the town-hall, a commodious and handsome edifice, the county-hall, the grammar-school, police office, and public library. The chief place of worship is the Church of St. Mary, a spacious and elegant structure in the later style of English architecture, with a lofty, square, embattled tower; and several chapels. The harbor is safe and commodious, and may be entered at any state of the tide. Beaumaris is now a favorite watering-place. Pop. (1901) 2,310.

Beaumont, Francis, b. 1585; d. 1616; Fletcher, John, b. 1576; d. 1615: English poets and dramatists, well known for their work in collaboration.

Francis Beaumont, third son of Sir Francis Beaumont of Grace Dieu in Leicester, one of the Justices of Common Pleas, was admitted gentleman commoner at Broadgates Hall, Oxford, in 1597, and was entered at the Inner Temple, London, 3 Nov. 1600. He married Ursula, daughter of Henry Isley of Sundridge, Kent, probably in 1613, and left two daughters, one a posthumous child. He was buried in Westminster Abbey.

John Fletcher, son of Richard Fletcher, Bishop of London, was entered as a pensioner at Bene't College, Cambridge, 1591. His father, as Dean of Peterborough, attended Mary Queen of Scots at Fotheringay, and was later rapidly promoted to the sees of Bristol, Worcester, and London. He was a successful courtier and a favorite of the queen, though he suffered a loss of favor shortly before his death in 1596. The dramatist received by bequest a share in his father's books, but apparently little other property. He was buried 29 Aug. 1625, in Saint Saviour's, Southwark.

Although the biographical details of the friendship and collaboration of the two dramatists are involved in uncertainty, it seems probable that Fletcher began writing plays for the London theatres as early as 1604–5, and that his friendship with Beaumont was established by 1607, when both prefixed commendatory verses to Jonson's 'Volpone,' and 'The Woman Hater,' probably by Beaumont alone, was published. In 1612, in the address to the reader prefixed to the 'White Devil,' Webster praises "the no less worthy composures of the both worthily excellent Master Beaumont and Master Fletcher," ranking them on equal terms with such scholars and experienced dramatists as Chapman and Jonson, and apparently above Shakespeare, Dekker, and Heywood. Before 1612, the reputation of Beaumont and Fletcher as dramatists must have been well established.

By 1612, indeed, the work of their collaboration was accomplished, for there is no direct evidence that Beaumont wrote anything for the public stage after that date. The most famous collaboration in the history of English literature, therefore, comprises only some half dozen years. During this time the dramatists, we are told, lived as brothers, sharing everything in common; and so intimate was their association as writers that it is only recently that criticism has been able to separate their shares in the authorship of the plays with any degree of probability. Fletcher's energies seem to have been devoted exclusively to the theatre; but Beaumont wrote verses to the Countess of Rutland, and elegies on the Lady Markham, Lady Penelope Clifton, and the Countess of Rutland; and also a masque for the Lady Elizabeth's marriage in 1613, performed with great splendor by the gentlemen of the Inner Temple and Gray's Inn. 'Salmacis and Hermaphroditus,' 1602, may possibly have been written by him; it is so assigned in the entry of 1639 in the *Stationer's Register*. Eight plays may be assigned to this period before 1612 with considerable certainty, each being the result of collaboration except where the contrary is indicated:

'The Woman Hater' (by Beaumont alone); 'The Knight of the Burning Pestle' (Beaumont); the 'Faithful Shepherdess' (Fletcher); 'Philaster'; 'The Coxcomb'; 'The Maid's Tragedy'; 'Cupid's Revenge'; 'A King and No King.' Eight other plays may be assigned before 1612 with more or less probability: 'The Woman's Prize' (Fletcher); 'Wit at Several Weapons' (first version); 'Love's Cure'; 'Thierry and Theodoret'; 'Monsieur Thomas'; 'Four Plays in One'; 'The Scornful Lady'; 'The Captain.'

The brief period of their collaboration came at the climax of the astonishingly rapid and varied development of the Elizabethan drama. It was during these years that Jonson and Shakespeare were at their greatest; but a growing critical consciousness among the dramatists themselves and an increasing patronage from the court seemed to promise for the drama a future even greater in achievement than its past. Gentlemen by birth and breeding, attached to the court rather than the people, Beaumont and Fletcher naturally joined with Jonson in viewing the plays of their predecessors with critical, though doubtless appreciative minds, and in seeking for a more cultivated audience and a more critical art. Their attitude toward the preceding drama is indicated by their abandonment of several species long popular but by this time falling under Jonson's attacks. Beaumont and Fletcher in their collaboration made no use of the historical matter of the chronicles or of the methods or spectacles of the chronicle play; nor did they use the story of blood vengeance, which had been popularized by Kyd in 'The Spanish Tragedy,' transformed by Shakespeare into 'Hamlet,' and was still the prevailing type of tragedy. Some of their earlier plays were experiments that further attest their reforming attitude. Beaumont's 'Woman Hater' was a comedy in Jonson's manner; and his 'Knight of the Burning Pestle,' written under the inspiration of 'Don Quixote,' was a burlesque on contemporary plays of adventure. Fletcher's 'Faithful Shepherdess' was an attempt to replace the abortive pastorals of earlier playwrights by a genuine and elaborate pastoral tragi-comedy on the model of 'Il Pastor Fido.' These plays won the praise of the critical, but even the manifest genius of the two latter was impotent to avert the disapproval of a public unused to such innovations.

Their other plays, though hardly less novel in character, and affording full opportunity for the authors' gifts of invention and language succeeded in captivating the public. These successes, the result of a constant attention to theatrical effectiveness, comprised two distinct classes of plays, the comedies and the heroic romances, both immediately popular and both of large influence on the later history of the drama.

Their comedy has its resemblances and connections with preceding drama; but it is a distinct departure from Jonson's comedy of «humours,» and it marks out a line of development that led to the plays of the Restoration. A lively plot, abounding in surprises, combines in a love story the manners of the day and the excitements of romance, an overflowing wit and no morals. Its full development belongs to Fletcher's later years; 'The Scornful Lady' is perhaps the best representative of the collaboration.

The romances, sometimes tragic and sometimes tragi-comic, also mark important innovations. The period immediately preceding them had been distinguished by Shakespeare's tragedies, the prevalence of realistic comedy, and the absence of sentimental or romantic comedy or tragi-comedy. The return to romance seems to have been established by 'Philaster,' and resulted in six plays that form the most distinctive product of the collaboration.

Other plays of the collaboration and many later written by Fletcher might be grouped with these; but the six plays, 'Four Plays in One,' 'Thierry and Theodoret,' 'Philaster,' 'The Maid's Tragedy,' 'Cupid's Revenge,' 'A King and No King,' serve to define the type, and resemble one another so closely in material, construction, characterization, and style that a single analysis will serve for all.

Their plots are usually original, and are ingenious complications of suspense and surprise. Like most preceding tragedies, they deal with royal or noble persons, foreign localities, and the plots and passions that convulse kingdoms; but there are no battles or processions, and the action is mainly confined to the rooms of the palace or an adjoining forest. A story of gross sensual passion is usually contrasted with one of idyllic sentiment; and a great variety of incidents are designed to keep the interest at fever heat. A girl disguised as a page is stabbed by the man whom she loves; a woman accused of adultery defies her accusers; the hero is saved from the tyrant by a timely insurrection — such idyllic or melodramatic material as this is skilfully constructed into a number of telling theatrical situations, leading through a series of surprises to startling climaxes or catastrophes. In the ingenuity of their structure even more than in the choice of their material, the romances marked a departure from preceding plays. Their *dramatis personæ* belong to the impossible and romantic situations, and are usually of certain types,— the sentimental or violent hero; his faithful friend, a blunt outspoken soldier; the sentimental heroine, often disguised as a page that she may save the hero; the evil woman who makes most of the trouble; and the poltroon, usually a comic personage. With the addition of a king, some persons of the court, and some from the lower ranks, the cast is complete. Even at their best such plays afford little that is valuable in the revelation of character or the criticism of life; yet the masterpieces of the class, 'Philaster' and 'The Maid's Tragedy,' take almost if not quite the highest rank after Shakespeare, because of the skill of their invention and the felicities and vigor of their poetry.

Both romances and comedies delighted their own age, and the young authors were quickly established among the poets of highest rank in both critical and popular estimation. There is evidence that their heroic plays suggested Shakespeare's change from tragedy to romance, and that 'Philaster' led somewhat directly to 'Cymbeline.' Certainly both comedies and romances were much imitated by dramatists of the next 30 years. Their freedom in versification, their emphasis on stage situation rather

than interpretation of character, their heedlessness of morality, and their fondness for the abnormal and sensational, all led to the decadence of the drama; but much of what is worthy as well as what is unworthy in the drama of the 17th century may be traced back to their initiative. They were ranked above Shakespeare and Jonson by their contemporaries, and their plays remained the favorites of the theatre during the Restoration. By the beginning of the 18th century, pseudo-classicism brought them into disrepute with the critics, and a chastened stage condemned their immorality. During the two centuries since they have never recovered their position on the stage, but numerous editions of their plays testify to their continued favor with the reading public.

After 1612 Fletcher continued for 13 years to write plays with unabated energy, displaying even greater versatility of invention and wit than when writing with Beaumont, but becoming more addicted to his mannerisms and more careless of moral decency. About 1613 he seems to have collaborated with Shakespeare on 'Henry VIII.' and 'The Two Noble Kinsmen,' and the association with the great master brought forth some of his finest passages. He was, indeed, frequently engaged in collaborating with various authors, and especially with Massinger. 'The Queen of Corinth,' 'The Double Marriage,' 'The Laws of Candy,' 'The Little French Lawyer,' 'The False One,' 'The Prophetess,' and 'The Spanish Curate' are some of the plays most certainly to be ascribed to this partnership, and most typical of the two authors. Fletcher, however, did not require collaboration for stimulus. In 'Bonduca' he produced one of the most vivid of our historical tragedies; and in a series of romances and comedies, of which 'The Little French Lawyer,' 'The Chances,' 'The Wild Goose Chase,' and 'The Loyal Subject' are among the best, he gave continued evidence of his extraordinary fertility both as a playwright and as a poet.

Most of the characteristics of these later plays may, however, be traced in the period of Fletcher's collaboration with Beaumont; and, though modern criticism has denied to the latter a share in the majority of the plays long published under his name it is difficult to separate the sentiments and opinions of the two friends or to divide their contribution to the development of the drama.

The following plays were printed separately, many of them several times before 1647, when the first collected edition appeared. The dates are for the first editions. 'The Woman Hater,' 1607; 'The Faithful Shepherdess,' 1609 (?); 'The Knight of the Burning Pestle,' 1613; 'Cupid's Revenge,' 1615; 'The Scornful Lady,' 1616; 'The Maid's Tragedy,' 1619; 'A King and No King,' 1619; 'Philaster,' 1620; 'Thierry and Theodoret,' 1621; 'The Two Noble Kinsmen,' 1634; 'The Elder Brother,' 1637; 'Rollo, or the Bloody Brother,' 1639; 'Monsieur Thomas,' 1639; 'Wit Without Money,' 1639; 'The Coronation,' 1640; 'The Night Walker,' 1640; 'Rule a Wife and Have a Wife,' 1640. In 1647 appeared the first folio entitled, «Comedies and Tragedies written by Francis Beaumont and John Fletcher,» and containing the following plays «never before printed»: 'The Mad Lover,' 'The Spanish Curate,' 'The Little French Lawyer,' 'The Custom of the Country,' 'The Noble Gentleman,' 'The Captain,' 'The Beggar's Bush,' 'The Coxcomb,' 'The False One,' 'The Chances,' 'The Loyal Subject,' 'The Laws of Candy,' 'The Lovers' Progress,' 'The Island Princess,' 'The Humorous Lieutenant,' 'The Nice Valour,' 'The Maid in the Mill,' 'The Prophetess,' 'The Tragedy of Bonduca,' 'The Sea Voyage,' 'The Double Marriage,' 'The Pilgrim,' 'The Knight of Malta,' 'The Woman's Prize,' 'Love's Cure,' 'The Honest Man's Fortune,' 'The Queen of Corinth,' 'Woman Pleased,' 'A Wife for a Month,' 'Wit at Several Weapons,' 'The Tragedy of Valentinian,' 'The Fair Maid of the Inn,' 'Love's Pilgrimage,' 'Four Plays in One,' 'The Mask of the Inner Temple and Gray's Inn.' In 1679 appeared the second folio, containing all the plays of the 1647 folio and the 17 previously published and also 'The Wild Goose Chase' (4to 1652). 'The Faithful Friends' and 'Sir John Van Olden Barnavelt' remained in manuscript and were not printed until the 19th century. With the exception of a few plays already noted as by Beaumont alone, Fletcher seems to have had at least a share in all of these plays and in 'Henry VIII.' See DRAMA; ELIZABETHAN LITERATURE — THE DRAMA.

Bibliography.— Collective editions of Beaumont and Fletcher were published in 1711; 1750, edited by Theobald, Seward, and Symson, 10 vols.; 1778, 10 vols.; 1812, ed. Henry Weber, 14 vols.; 1843–6, ed. Alexander Dyce, 11 vols.; and there have been various reprints of these editions. Dyce's edition has long remained the standard, but there are now in course of publication two editions of the complete works; one of which, vol. 1, appeared in 1904 under the general editorship of A. H. Bullen; vol. 1 of the other in 1905, under the editorship of A. R. Waller.

The most important of recent critical discussions are: 'Francis Beaumont, a Critical Study,' by G. C. Macaulay (1883); 'The Influence of Beaumont and Fletcher on Shakespeare' by A. H. Thorndike (1901); 'The Chronicle of the English Drama,' by F. G. Fleay (vol. 1, pp. 164–229); and articles by Robert Boyle in *Englische Studien* (1881–1887), and by E. F. Oliphant, *Englische Studien* (1890–92). Separate plays with critical introductions and notes are published in 'Belles Lettres Series' (Boston).

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Beaumont, Sir George Howland, English art patron: b. Dunmow, Essex, 6 Nov. 1735; d. 7 Feb. 1827. He possessed considerable skill as a landscape painter, but was noted more especially as a munificent patron of the arts. The establishment of the National Gallery was mainly owing to his exertions, and 16 of its fine paintings, chiefly landscapes, including one by N. Poussin, three by Claude, and the 'Blind Fiddler' of Wilkie, were his gifts. Wordsworth dedicated to him his 'Elegiac Musings' (1830).

Beaumont, bō-môn, **Gustav Auguste de la Bonniere de,** French publicist: b. 16 Feb.

1802; d. Tours, 6 Feb. 1866. He early entered upon the legal profession, and, in 1831, was sent with De Toqueville to study the penitentiary system of the United States. He was elected deputy in 1839, and, in 1848, vice-president of the Constituent Assembly. He was subsequently ambassador to London and Vienna. Beaumont first became known as a writer by his publishing, in conjunction with M. de Tocqueville, 'Traité du Système Pénitentiaire aux Etats-Unis et de son application à la France' (1832). Among his other works may be named, 'Marie, ou l'Esclavage aux Etats-Unis' (1835)—a work somewhat resembling 'Uncle Tom's Cabin'; and 'L'Irlande sociale, politique, et religieuse' (1839).

Beaumont, bō'mŏnt, Sir **John,** English poet: b. Leicestershire, 1582; d. about 1627. He was an elder brother of Francis Beaumont, the dramatist, and studied at Broadgate Hall (now Pembroke College), Oxford. In 1605 he succeeded to his father's estates on the death of his elder brother. He began writing poetry at a comparatively early age, and in 1602 published anonymously a mock-heroic piece entitled 'The Metamorphosis of Tobacco.' He was created a baronet in 1626. In 1629 his son, Sir John, published a collection of his poems under the title 'Bosworth Field, with a Taste of the Variety of other Poems left by Sir John Beaumont.'

Beaumont, Joseph, English poet: b. Hadleigh, Suffolk, 13 March 1616; d. 23 Nov. 1699. He was educated at Peterhouse College, Cambridge, where he gained great distinction. Elected a Fellow in 1636, he was ejected with others in 1644 owing to royalist sympathies, and while living in retirement wrote 'Psyche,' an epic poem (1648). On the restoration of the monarchy he became a royal chaplain, and after a brief term as master of Jesus College he was appointed in 1663 master of Peterhouse. He received the regius professorship of divinity at Cambridge in 1674.

Beaumont, William, American surgeon: b. Lebanon, Conn., 1785; d. St. Louis, 25 April 1853. He is principally noted for his discoveries regarding the laws of digestion and for his experiments upon the body of Alexis St. Martin. In 1822 Beaumont was stationed at Michillimackinac, Michigan. On 6 June, St. Martin, a young man 18 years of age, in the service of the American fur company, was accidentally shot, receiving the whole charge of a musket in his left side, from a distance of about one yard, carrying with it portions of his clothing, and fracturing two ribs, lacerating the lungs, and entering the stomach. Notwithstanding the severity of the wound, Beaumont undertook his cure, and by careful and constant treatment and attention, the following year found him enjoying good health with his former strength and spirits. In 1825 Beaumont began a series of experiments upon the stomach of St. Martin, showing its operations, secretions, the action of the gastric juices, etc.; these experiments he was obliged to discontinue after a few months, but renewed them at various intervals until his death; his patient during so many years presenting the remarkable spectacle of a man enjoying good health, appetite, and spirits, with an aperture opening into his stomach two and a half inches in circumference, through which the whole action of the stomach might be observed.

Beaumont, Texas, city and county-seat of Jefferson county: situated on the west bank of the Neches River; on the So. Pacific, Sabine, and East Texas, Gulf, Colorado and Santa Fé, Gulf and Interstate, Kansas City So., and Beaumont, Sour Lake and W. R.R.'s; 80 miles northeast of Houston and 22 miles distant from the Gulf of Mexico.

Industries.—Beaumont is an important shipping point; is at the head of tidewater navigation and has a number of important industries, among which are oil refineries, rice mills, stove and iron works and lumber. Oil was discovered in the Beaumont fields in 1901, when there was opened up a series of gushers, the most remarkable in the history of the oil industry. That oil was there had long been known and several men had lost fortunes trying to get at it, but it was not until the wells were sunk on Spindle Top that success came. The structure of Spindle Top appears to be that of a dome with steep sides and rather flat summit. The equipment of the refineries, the pipe lines, and transportation and storage facilities for this industry alone, represent an investment of over $45,000,000. The lumber industry has assumed great proportions, the city being the natural headquarters for this business and the annual output now exceeds 360,000,000 feet of yellow pine. The cultivation of rice was begun some years ago; the belt extending along the coast of Louisiana and Texas produces more rice than is consumed in this country; and the largest rice mill in Texas is located at Beaumont.

Public Buildings, Banks, Churches, etc.—Among the most notable public buildings are the new Federal Court-house and Post-office, costing over $200,000, the Jefferson County Court-house, city hall, Y. M. C. A. building, and the Sisters Hospital. Religious services are held in churches representing nearly all denominations. A theatre has been erected at a cost of about $100,000. There are four banks with a combined capital of $600,000 and doing an annual business of $25,000,000.

Educational Institutions and Public Works.—For the public education there are a fine new high school with manual training department and several ward schools. Bell Austin Institute is located there. About 20 miles of street are paved with brick and shell; a complete sewerage system has been installed; a new waterworks system has been completed at a cost of over $300,000; and there are well appointed fire and police departments.

History, Government, and Population.—Beaumont was first settled in 1836, being plotted by John Grisby, Joseph Pulsifer, Henry Millard, and Thomas B. Huling. It was incorporated under the general law in 1881 and granted a special charter in 1889, the affairs of the community now being administered by a mayor and council of six members, elected biennially. About 80 per cent of the population are white, the remainder negroes. Pop. (1900) 9,427; (1905) about 25,000. Death rate 13.4.

H. G. Spaulding.
Secretary Chamber of Commerce.

GENERAL P. G. T. BEAUREGARD.

Beaune, bōn, **Florimond de,** French mathematician: b. Blois, 1601; d. there, 1652. He materially developed the Descartes method in geometry and was the first to treat systematically the question of superior roots of numerical equations. What is styled "Beaune's Problem," solved only by Jean Bernouilli, depends on the determination of a curved line from the property of its tangent. He was the first to treat in a systematic way superior and inferior roots of numerical equations.

Beaune, a town of France, in the department Côte d'Or, 23 miles south-southwest of Dijon. As early as the 7th century it was a fortress under the name of Belna. It is surrounded with planted ramparts, which furnish a pleasant promenade; is well built, and has a notable Church of Notre Dame, dating from the 12th century, and a large hospital, founded in 1443 by Nicholas Rollin, chancellor of Philip the Good, Duke of Burgundy. Beaune has also a public library containing about 50,000 volumes with 500 manuscripts, a very fine public garden, a theatre, etc. The trade is chiefly in Burgundy wines, to one of which the town gives its name, and in agricultural produce. The manufactures include woolen cloth, cutlery and leather. There is a statue erected in 1849, to the celebrated mathematician Monge, who was born there. Pop. (1896) 11,808.

Beauregard, bō'rę-gärd, **Pierre Gustave Toutant,** American Confederate general: b. New Orleans, 28 May 1818; d. there, 20 Feb. 1893. After studying military science at West Point he joined the artillery, but was afterward transferred to the engineers. In the Mexican war of 1846–7 he distinguished himself, and was promoted major. On the outbreak of the Civil War he resigned in order to enter the Confederate army, and was placed in command of the city of Charleston, South Carolina. On 12 April 1861 he reduced Fort Sumter, and later in the same year led the Confederates to victory in the battle of Bull Run. At the battle of Shiloh in the following year he assumed the command on the death of Gen. A. S. Johnston, but though very successful on the first day he was ultimately compelled to retreat to Corinth, Miss., which he had to evacuate shortly afterward. From September 1862, till April 1864, he defended Charleston against the siege operations of Gen. Gillmore and Admirals Dupont and Dahlgren. In October 1864, became commander of the military division of the West, in which capacity he strove without success to resist Sherman's victorious advance, and in April 1865 he and J. E. Johnston surrendered. He was afterward a railroad director, adjutant-general of Louisiana, and manager of the Louisiana State Lottery. In 1866 the chief command of the Rumanian army was tendered him, and in 1869 that of the army of the khedive of Egypt, both of which he declined. He published 'The Principles and Maxims of the Art of War' (1863), and 'Report of the Defense of Charleston' (1864).

Beaurepaire-Rohan, bō-r'-pãr-rō-äṅ, **Henriques de,** Brazilian geographer of French extraction: b. province of Piauhy, about 1818; d. 1894. He traveled extensively in the region south of Rio de Janeiro, publishing the results of his tour in a volume called 'Descripçâo de uma viagem de Cuyaba' âo Rio de Janeiro' (1846). The Brazilian government subsequently employed him to gather statistics relating to the interior provinces, and he was at one time lieutenant-general in the Brazilian army. His Etudios acerca da organizçâo da Carta geographica e da historia physica e politica do Brazil' (1877) is a work of great importance.

Beausobre, bō-sōbr, **Isaac de,** French Protestant historian: b. Niort in France, 1659; d. Berlin, 1738. He was at first intended for the law, but his own inclinations were decidedly in favor of the Church; and in 1683 he became Protestant minister of Chatillon-sur-Indre. In the persecuting spirit of the time the Church had been closed by fixing the royal seal upon the gate. Beausobre held special services in his own house, and being for this reason obliged to flee, sought an asylum at Rotterdam. Shortly after he became chaplain to the Princess of Anhalt at Dessau, which he quitted in 1694, when he became minister to French Protestants at Berlin. He enjoyed much of the favor both of Frederick William I. and of the crown-prince, afterward Frederick the Great. His most remarkable work is the 'Histoire Critique de Manichée et du Manichéisme' (1734); and he also wrote 'Histoire de la Réformation' (1785–6).

Beautiful Snow, a popular poem first published in 'Harper's Weekly' in 1858. Its authorship has had various claimants but has been definitely assigned to John W. Watson.

Beauty and the Beast, an ancient story very evidently a myth of the Sun and the Dawn. In all the variants the hero and the heroine cannot behold each other without misfortune. One of the earliest forms of the story is the Vedic myth of 'Urvasî and Purûravas.' Another is the Sanskrit Bhekî, who marries on condition she shall never see water; thus typifying the dawn, vanishing in the clouds of sunset. In Greek myths we find a resemblance in some features of 'Orpheus and Eurydice'; and the name of Orpheus in its Sanskrit form of Arbhu, meaning the sun, hints quite plainly at a solar origin of this cycle of tales. A more marked likeness exists in the myth of Eros and Psyche by Apuleius, and in the Scandinavian tale of the 'Land East of the Sun and West of the Moon,' related by Morris in 'The Earthly Paradise.' More or less striking parallels are seen in the Celtic 'Battle of the Birds'; in the 'Soaring Lark,' by Grimm; in the Kaffir 'Story of Five Heads'; in Gaelic, Sicilian, and Bengal folk-lore; and even in as remote a quarter as Chile. The tale is told in Straparola's 'Piacevoli notti' (1550); in Madame Villeneuve's 'Contes Marines' (1740), and is the basis of Gretry's opera, 'Zémise et Azor.'

Beauty. See ÆSTHETICS; ART.

Beauvais, bō-vā (ancient BRATUSPANTIUM, BELLOVACUM), a town of France, capital of the department of Oise, 54 miles north of Paris. It stands in a rich valley enclosed by wooded hills, at the confluence of the Avelon with the Thérain; and though poorly built, derives great interest from its antiquity. It existed in the time of the Romans, and in 1472 resisted an army of 80,000 Burgundians under Charles the Bold. The principal edifice is the unfinished cathedral of Saint Pierre, consisting of choir and transept. It has the loftiest stone vault in the world, and beautifully painted glass, exe-

cuted by the most celebrated masters of the art. The choir was built in 1225–72. The town-house is the finest modern structure. The principal manufacturing establishment is the Gobelins branch tapestry and carpet manufactory, famed for the beauty of its products, and employing about 400 hands; and there are also manufactures of woolens, buttons, brushes, gold and silver lace, etc. It has also large bleachfields, tanneries, and dyeworks. Beauvais is the seat of a bishop, and had a population in 1896 of 16,371.

Beauvois, bō-vwä, **Ambrose Joseph Palisot de,** French naturalist: b. Arras, 1752; d. 1820. He visited Africa, the West Indies, and America, in connection with his favorite pursuits in natural history, and was rewarded by the discovery of the jaws and molar teeth of the great mastodon, on the banks of the Ohio. He afterward returned to France, and devoted the remainder of his life to the arrangement and publication of his collections. Comparatively few of them had arrived in safety, but out of the wreck he managed to procure materials for the important publications on which his fame chiefly rests. The most valuable is his 'Flore d'Oware et de Benin.' One of the most curious plants contained in it has been named after him Belvisia.

Beaux, bō, **Cecilia,** American artist: b. in Philadelphia. She studied under William Sartain, and at Paris. She has four times gained the Mary Smith Prize of the Pennsylvania Academy of Fine Arts, and has been awarded the same academy's gold medal and Temple gold medal. She has received similar honors from the National Academy of Design, the Philadelphia Art Club, Carnegie Institute, and the Paris Exposition of 1900.

Beaux-arts, bō-zär, **Academie des.** See Academy of Fine Arts, The.

Beaux' Stratagem, a well known comedy by the English dramatist, George Farquhar (q.v.).

Beaven, Thomas, American Roman Catholic prelate: b. Springfield, Mass., 1849. He was educated at the Jesuit colleges of Holy Cross, Worcester, Mass., and Georgetown, D. C. After holding pastorates at Spencer and Holyoke, Mass., was consecrated Bishop of Springfield in 1892.

Beaver, James Addams, American military officer and statesman: b. Millerstown, Pa., 21 Oct. 1837. He was graduated at Jefferson College, Canonsburg, Pa., in 1856; and for a time practised law. He served in the Federal army, 1861–4; and was retired with the rank of brigadier-general of volunteers (22 Dec. 1864). He then resumed the practice of law; became major-general of the Pennsylvania State militia; was defeated as Republican candidate for governor in 1882; elected in 1887; president of the board of trustees of the Pennsylvania State College; vice-moderator of the Presbyterian General Assembly in 1888 and 1895; and member of the President's commission on investigation of the War Department in 1898.

Beaver, Philip, English naval officer: b. in Lewknor, Oxfordshire, England, 28 Feb. 1766; d. Table Bay, South Africa, 5 April 1813. He served during the American Revolutionary War in the royal navy. After the war he undertook to establish an agricultural colony on Bulama Island, on the west coast of Africa, and in April 1792 left England with three ships and 275 white colonists, expecting that the latter would not only cultivate the soil, but would do much toward civilizing the negroes. The enterprise proved a failure and he returned to England in 1794. Subsequently he distinguished himself in the naval service.

Beaver, Pa., a borough and county-seat of Beaver County, on the Ohio River, and the Pennsylvania and the Pittsburg & L. E. RR.'s; 28 miles northwest of Pittsburg. It has natural gas, abundant water power, large coal and oil shipping interests, a public park, national bank, and daily and weekly newspapers, and is the seat of Beaver College (Methodist Episcopal). Pop. (1900) 2,348.

Beaver, a large aquatic rodent animal of the northern part of the world, named by Linnæus, *Castor fiber,* and representing the family *Castoridæ.* It is distinguished from its nearest relatives, the marmots, not only by adaptation to an aquatic life, and the possession of large, fully webbed hind feet, which form the principal instrument for swimming, but especially by its extraordinary tail, which is exceedingly broad and covered with a horny integument resembling scales. A large beaver is about two feet in length from the root of the tail to the nose, and the tail will be nearly a foot long. Such a one will weigh about 35 pounds. Its flesh is edible, but not particularly good. The fur is exceedingly close and fine, and when freed from the long hairs that are scattered through it and overlie the under coat, forms one of the most valuable furs of commerce and one which figured largely in the early history of North America. It is owing, indeed, to the eagerness with which men have sought for this valuable commodity, going farther and farther into the wilderness in search of the animal, that the beaver has almost disappeared from large regions where it was once numerous. Originally it was widespread throughout Europe and northern Asia, but became extinct in the British Islands in the 12th century, and it remains elsewhere in Europe only in a few of the wilder streams of Norway and some of the tributaries of the Rhone and the Danube, where it is under royal protection. In some cases colonies of captives have re-established themselves in parks, notably that of Lord Bute, in England. It still exists, however, in eastern Siberia, whence a large number of its skins are annually sent to market.

When America was first entered by Europeans, the beaver was found inhabiting almost all of the woodland streams of the whole northern continent, from the Arctic Circle down to Central Mexico. Its temperament and manner of life made it an easy prey, and prevented it from adapting itself to changed conditions as did its neighbor, the muskrat. It rapidly disappeared, therefore, wherever civilization progressed or trapping was systematically carried on, and now no beavers are to be found south of the rivers that flow into Hudson Bay, except in the northern parts of the Rocky Mountains and in a few remote and scattered places like the forests of Maine and the Lake Superior region, where they are more or less protected by law. A few survive, nevertheless, in the wild ranges

of the southern Alleghenies and along the borders of Mexico. The principal use to which beaver fur was put was for the making of hats; and it is probable that had not the method of making hat-coverings from silk been discovered, the animal would long ago have become extinct, and also its South American substitute, the coypu or nutria.

The life of the beaver is remarkably interesting on account of the skilful structures by which it keeps itself surrounded with a sufficient depth of water, and so maintains access to a continuous supply of food. The food of the beaver consists mainly of the bark of hardwood trees, such as the maple, linden, birch, poplar, and the like. It never eats the bark of the coniferous trees, and beavers are not found living in forests composed entirely of coniferous trees, nor are beavers able to live in a treeless country. They are gregarious and dwell in colonies, which in favorable circumstances, may persist for centuries. From time to time a pair of young beavers will wander away from such a colony and seek a new place in which to start afresh. They will choose a sluggish stream in the woods, preferably where the ground is low and level, and there will dig for themselves a burrow in the bank, the entrance of which is below the surface of the water. The tunnel will lead upward into the earth above the level of high water, and there be enlarged into a chamber in which will be placed a bedding of grass, etc. They are likely to make an opening from this chamber into the air, and, as if for defense or concealment, will pile over this opening a little heap of brush, in which perhaps may be seen the germ of the architectural ability which the species have so highly developed. It is necessary to their scheme of life that the water in the stream should never fall so low in summer as to expose the entrance of the burrow; moreover, it is necessary that this water should be so deep that in winter the ice will not freeze to the bottom, but that, on the contrary, there shall remain room enough between the ice and the bed of the creek for them to store there a supply of winter food. In order to maintain this requisite level of water the beavers throw a dam across the stream below their settlement, holding the water back to a sufficient height. For this purpose they choose a place where the water is not more than 2½ feet deep and the bottom is firm, and beginning in the centre of the channel they place there, lengthwise of the current, a number of long sticks which they hold down by piling upon them mud and stones, moved into place with their dexterous fore feet. They procure these poles by cutting off small trees with their front teeth, which are exceedingly large and strong and are faced with a hard yellow enamel. As the back part of the tooth consists of softer material, it wears away more rapidly, leaving the front with a chisel-like edge, which is always sharp. Standing on their hind feet, they gnaw round and round the stem of a tree until it falls; and are able to cut down trees 18 inches in diameter, but this is only done in procuring their winter supplies. From its foundation in the centre the dam is carried each way to the shore. As the beavers increase in number and the young ones grow up, they settle in the immediate neighborhood until after a few years a considerable colony will have arisen. During all this time work progresses upon the dam, each beaver gathering drift-wood, branches, and logs from the shore, stones, mud, pieces of sod, and everything available for the purpose, and working it into the structure of the dam. The work is carried on only at night and especially on pleasant moonlight nights, when they seem to be extremely busy from sunset till sunrise. There is no superintendence, but each one possessed with an instinct for industry, does whatever seems to it best. The result is a mere tangled heap, having a long slope and comparatively tight surface on the upper side, which sometimes in a low, swampy region, will stretch for several hundred feet and hold back a large pond or morass, largely grown up to grass, but having many channels running through it. Meanwhile each family of beavers has erected for itself upon the bank of the pond or upon some islet adjacent to one of the channels, a conical house or lodge, the interior of which may be a room six or seven feet in breadth, which has no opening into the air, but is entered from beneath the water by two channels, one of which is commonly used, while the other forms a means of escape in case of invasion by a mink or some other aquatic enemy. These houses are more solidly constructed than even the dam; and when frozen in winter are so thick and strong that nothing less than a bear is able to break into them. These houses are largest and strongest in the cold northern regions. During the summer beavers go ashore and obtain from time to time such bark as they want for food, and also feed largely upon the roots and stems of the flags, lilies, and other water plants. In winter, however, when the pond is covered with ice and the banks with snow, the beavers would be unable to obtain such food, and to escape starvation are obliged to store in the autumn a sufficient supply to last them through the winter. They do this by felling large trees near the water's edge and cutting them up into such portions as they can manage to roll or drag into the water. These are floated away and sunk at the doors of their houses, where they are weighted or stuck into the mud to prevent their floating away, until a sufficient pile has been procured. Piece by piece this store is taken into the house during the winter, and, the bark having been eaten off, the sticks are thrown out to be used in the spring as material for repairing and extending the dam.

It will be apparent that a colony of beavers would soon exhaust the supply of trees bearing edible bark within reach of the shore of their stream, unless they had some means of reaching new and more distant supplies. In truth, where the banks are steep, this soon happens, and the beavers must then seek a new place. Where the forest is low and level, however, they will excavate canals which are gradually extended farther and farther into the woods on each side of the pond, and so enable themselves to reach more and more fresh trees. In some of the swampy forests about the headwaters of the Mississippi which was perhaps the headquarters of beaver life in this country, these canals have been known to extend several hundred feet, and in such places colonies of beavers have maintained an existence of more than 200 years. These channels are kept free from weeds and of a proper depth; and the most important service which the dam renders is to maintain

the right level of water in these canals, so that they may always be used as the avenues of the industrious community.

The American beaver seems to have carried its architectural work to a higher degree of perfection than the European beaver was ever known to do, although in Siberia, where similar climatic conditions prevail, and it is necessary for them to erect houses impervious to the great cold and to the attacks of marauding animals, they come near to equaling their American cousins. There is little record of such structures being made primitively in central Europe, and the beavers now living in the streams of Germany and Austria make few attempts at either dams or houses, but are content to dwell in their bank-burrows.

The substance called *castoreum* is obtained from two glandular pouches in the beaver, closely connected with the organs of reproduction, and probably of service in attracting the sexes to one another in the rutting season. It is a secretion having a powerful, peculiar, pungent odor, and was formerly in demand for medicinal purposes. At present its only use is as a scent-bait for traps. Fossil remains of beavers have been found as far back as the middle of the Tertiary period. Fossils of small-sized species, with some distinctive peculiarities, occur in the Miocene rocks of the western United States; and a huge beaver (*Trogontherium*) existed in Europe in the Pliocene age.

Beaver Dam, Wis., a city of Dodge County, situated on Beaver Dam Creek, and on the Chicago, M. & St. P. R.R. It is the seat of Wayland Academy, has a library of 10,000 volumes and several parks. It is in an agricultural district and has a considerable trade; it is also well provided with water-power and has numerous manufacturing interests, including flour mills, iron works, machinery manufactures, etc. Beaver Dam was settled in 1841 and incorporated in 1856. The revised charter of 1889 provides for a mayor and a city council, to be elected biennially. Pop. (1900) 5,128.

Beaver Falls, Pa., a borough in Beaver County, situated on the west bank of the Beaver River, about four miles from its confluence with the Ohio River, and seven miles north of Beaver, the county-seat, and on branches of the Lake Shore and Pennsylvania R.R.'s. The water-power furnishes excellent facilities for manufactories; there is an abundant supply of coal and natural gas, and the manufactures consist of iron bridges, axes, saws, glassware, gas engines, and steel products. There are four banks, a Carnegie library, and a commodious post-office building. Beaver Falls is also the seat of Geneva College (Reformed Presbyterian). Religious services are held in 17 church edifices. Beaver Falls was settled about 1800 by a few families of pioneers, and was called Brighton until 1868, when it was incorporated as a borough. The affairs of the community are administered by a burgess and council of 12 members elected irregularly every three years. Until 1868 the town was only a small village, but in that year the Harmony Society bought up nearly the entire tract of land and laid it out into lots, thus starting the growth in population, until it now is the largest town in Beaver County. Pop. (1900) 10,054.

Beaver Islands, a group of islands situated in the north part of Lake Michigan in Charlevoix County, and interesting as the scene of a short-lived Mormon colony. The largest town, Saint James, on Big Beaver Island, was settled in 1847 by James J. Strang, a Mormon elder, driven away from the parent Mormon community because his claims conflicted with those of Brigham Young. In the little colony which he called Saint James, after himself, Strang exercised the authority of king and high priest, and was implicitly obeyed. In 1849 he introduced polygamy, which did not spread rapidly and led to withdrawals and troubles with the "gentiles." Strang was assassinated in 1856 and the colony dispersed. There are several lighthouses on the island. Pop. of Saint James (1900) 420; of Peaine township, 372.

Beaver State, a popular designation of Oregon.

Beaverwood. See MAGNOLIA.

Bebber, Wilhelm Jakob van, Prussian meteorologist and writer: b. Grietham-Niederrhein, 10 July 1841. He was educated at Bonn University and for several years was a teacher. He became rector of the high school at Weissenburg-am-Sand in 1875. Since 1879 he has been chief of the weather telegraphing department of the German Seewarte at Hamburg. Among his works are a 'Hand-book of Practical Meteorology' (1885–6), and a 'Manual of Meteorology' (1890).

Bebee'rine, an uncrystallizable basic substance, $C_{19}H_{21}NO_3$, extracted from the bark of the bebeeru or greenheart-tree (*Nectandra rodiæi*), of Guiana. In pharmacy, the sulphate of bebeerine is a valuable medicine, being used, like quinine, as a tonic and febrifuge. Unfortunately, owing to the supplies of the bark being uncertain, the drug is sometimes scarce and difficult to obtain. Bebeerine is thought, by some chemists, to be identical with buxine.

Bebee'ru, a tree (*Nectandra rodiæi*) of the laurel family. See GREENHEART.

Bebel, bā'bĕl, **Ferdinand August,** German socialist: b. Cologne, 1840. He was apprenticed to the turner's trade, and acquired a practical knowledge of the difficulties and disabilities of workingmen. He settled in Leipsic in 1860, joined various labor organizations, and became one of the editors of the *Volkstaat* and of the better known *Vorwärts*. Membership in the North German Reichstag was followed by his election to the German Reichstag, of which he was a member from 1871 to 1881, and which he entered again in 1883, being the acknowledged leader of his party therein. Bebel's earnestness, large sympathy, and wide range of knowledge impress his hearers, although his appearance and manner in the Reichstag did not at first win them. These qualities are also characteristic of his books, among which are: 'Our Aims' (1874); 'The German Peasant War' (1876); 'The Life and Theories of Charles Fourier' (1888); 'Women in Socialism, the Christian Point of View in the Woman Question' (1893).

Bebel, Heinrich, German humanist: b. 1472; d. 1518. He was an alumnus of Cracow and Basel universities, and from 1497 professor

of poetry and rhetoric at Tübingen. His fame rests principally on his 'Facetiæ' (1506), a curious collection of bits of homely and rather coarse-grained humor and anecdote, directed mainly against the clergy; and on his 'Triumph of Venus,' a keen satire on the depravity of his time.

Bec, a celebrated abbey of France, in Normandy, near Brionne, now represented only by some ruins. Lanfranc and Anselm were both connected with this abbey.

Beccafico, bĕk-ä-fē'kō, the Italian name of the small olive-brown garden-warbler (*Sylvia hortensis*), called in England "pettychaps," which has the habit of pecking holes in the rind of ripening figs and other fruits, in search of small insects. The damage done is very slight. These birds were eaten with much delight by the ancient Romans, and are still in high favor on Grecian, French, and Italian tables, especially in Venice. An annual feast made on beccaficos is called Beccaficata. The term is also applied in continental Europe, rather indiscriminately, to different kinds of sylvan warblers when fat and in condition for the table.

Beccafumi, Domenico, bĕk-kä-foo'mē, dō'mā-nē'kō, surnamed MECHERINO, Italian painter: b. near Sienna, 1486; d. Sienna, 1551. As a shepherd boy amusing himself with drawing figures on the sand, he attracted the attention of a wealthy man, from whom he takes the name of Beccafumi, who, discerning his genius, sent him to Sienna to study drawing. He there saw, admired, and tried to imitate the paintings of Perugino, but having heard much of Raphael and Michael Angelo, obtained means from his patron to travel to Rome. After much study of the masterpieces of the Vatican he returned to Sienna and enriched its churches and its city with many noble frescoes, and painted an altar-piece in the museum there. He drew and colored well, possessed strong inventive powers, was thoroughly acquainted with perspective, and excelled particularly in foreshortening, but he was not free from mannerism, and his heads are in general deficient in both dignity and beauty. He was buried with pomp in Sienna cathedral, among some of the finest monuments of his genius. His paintings include: 'St. Catherine receiving the Stigmata' (Sienna), 'Madonna and Child' (Berlin), 'Marriage of St. Catherine' (Rome), etc. He also gained distinction as a sculptor and engraver.

Beccaria, Cesare Bonesana, Marchese di, bĕk-kä-rē'a, chä'sä'rĕ bō-nä-sä'na, mär-kā'sĕ dē, Italian author: b. Milan, 1735 (or 1738); d. November 1794. He was early excited by Montesquieu's 'Persian Letters,' to the cultivation of his philosophical talents, and was afterward favorably known as a philosophical writer by his noble philanthropic 'Crimes and Punishments' (1764), and several other works. With the eloquence of true feeling and a lively imagination he opposes capital punishments and torture. This work led to the establishment of more correct principles of penal law, and contributed to excite a general horror against inhuman punishments. He is also known in Italy as the author of a philosophical grammar and theory of style, 'Ricerche intorno alla Natura dello Stilo' (Milan 1770), and of several good treatises on style, rhetorical ornament, etc., contained in the journal 'Il Caffé,' edited by him in conjunction with his friends, Visconti, Verri, and others. In 1768 a chair of political philosophy was created for him at Milan.

Beccaria, Giovanni Battista, jō-vä'nē bät-tēs'ta, Italian philosopher: b. Mondovi, 1716; d. 27 April 1781. He went to Rome in 1732, where he studied, and afterward taught grammar and rhetoric; at the same time applying himself with success to mathematics. He was appointed professor of philosophy at Palermo, and afterward at Rome. Charles Emanuel, king of Sardinia, invited him to Turin in 1748, to fill the professorship of natural philosophy at the university there. He paid much attention to the subject of electricity, and published 'Natural and Artificial Electricity' (Turin 1735), besides many other valuable works on this subject. In 1759 the king employed him to measure a degree of the meridian in Piedmont.

Becerra, Gasparo, bĕ-thĕr'ra, gäs-pä'rō, Spanish artist: b. Baeza, Andalusia, 1520; d. Madrid, 1570. He studied for some time in Rome under Michael Angelo and others, and on his return became sculptor and painter to Philip II. He adorned the palace of Madrid with several frescoes, and also executed works in sculpture and architecture.

Beche, bāsh, Sir Henry de la, English geologist: b. 1796; d. 1855. He founded the geological survey of Great Britain, which was soon undertaken by the government, De la Beche being appointed director-general. He also founded the Jermyn Street Museum of Economic or Practical Geology, and the School of Mines. His principal works are: 'Geology of Jamaica'; 'Classification of European Rocks'; 'Geological Manual'; 'Researches in Theoretical Geology'; 'Geology of Cornwall, Devon, and West Somerset'; etc.

Bêche-de-Mer, bāsh-dĕ-mār, the French name for the dried flesh of holothurians. It is largely cured in the South Sea Islands.

Becher, Johann Joachim, bĕH'ĕr, yō'hän yō'ä-HĭM, German chemist: b. Speyer, 1635; d. 1682. He traveled and resided in various parts of Germany, Holland, Italy, Sweden, and Great Britain, investigating Cornish and Scotch mines. He wrote a number of works on chemistry, the chief of which is entitled 'Physica Subterranea.' In it he expounds his views on the composition of inorganic bodies, the constituents of which, according to him, are three earthy principles, the vitrifiable, the combustible, and the mercurial. The metals consist of these three earths in different proportions, and whenever a metal is calcined the combustible and mercurial earths are expelled, and the vitrifiable earth forms the residual calx. When these principles are combined with water different salts are formed, and a fundamental acid, which exists in all the others. This theory was subsequently developed by Stahl, who, by means of the principle of phlogiston (q.v.) explained not only the calcination of metals, but the phenomena of combustion in general.

Bechstein, Johann Matthäus, beH'stīn, yō'hän mä-tā'oos, German naturalist: b. Waltershausen, Gotha, 1757; d. 1822. He studied theology for four years at Jena, but never felt in his element unless hunting in the fields or roam-

ing the forest. After teaching for some time he resolved to devote himself to his favorite pursuits, and in 1800 the Duke of Saxe-Meiningen made him director of the Forest Academy of Dreissigacker, in the vicinity of his capital. This academy, under Bechstein's management, became one of the most celebrated establishments of the kind in Germany. His chief work is his 'Natural History of Germany,' in four volumes. In Great Britain he is best known by a treatise on singing-birds.

Bechstein, Ludwig, lood'vĭH, German poet and novelist: b. 1801; d. 1860. He is chiefly remembered for 'The Legend Treasure and the Legendary Cycles of Thuringia' (1835–8); 'German Fairy-Tale Book' (1845, 41st ed. 1893); and others. Among his epical poems are: 'The Children of Haymon' (1830); 'The Dance of Death' (1831); 'New Natural History of Pet Birds' (1846), a humorous didactic poem; and 'Thuringia's Royal House' (1865). Of his numerous novels, chiefly historical, the best known is 'Journeys of a Musician' (1836–7).

Bechuanaland, bĕt-choo-ä'nä-lănd, Africa, an extensive British territory in the southern part of the continent, so named from its chief inhabitants, the widely spread race of people called Bechuanas. It may be said to extend from the Orange River on the south to the Zambesi on the north, having the German territory on the west and the former South African republic (Transvaal), etc., on the east. The Bechuanas belong to the great Kaffir race, and are divided into tribal sections, each of which has a chief. Many of them live in villages or towns, some of which are of considerable size. They work with skill in iron, copper, and ivory, and engage in husbandry, cattle-breeding, and hunting. Bechuanaland is a portion of an elevated plateau 4,000 to 5,000 feet above the level of the sea, and though so near the tropics, is suitable for the British race. In winter there are sharp frosts, and snow falls in some years. The rains fall in summer, and then only the rivers are full. It is an excellent country for cattle; sheep thrive in some parts, and there are extensive tracts available for corn lands; but it is not a wheat country on account of the summer rains. Though apparently subject to droughts, it is not more so than Cape Colony, and the greater portion will be available for farming operations when the necessary dams have been constructed. It can be reached from Cape Town, Port Elizabeth, Durban, Delagoa Bay, and the Zambesi, the railway from the former being extended to Kimberley, Vryburg, Mafeking, Palachwe, Tati, and Buluwayo. There are extensive forests to the northeast, and to the west lies the Kalahari desert, which only requires wells dug to make it inhabitable.

The enormous quantities of buck which roam over the land attest the productiveness of the soil. Gold has been found near Sitlagoli, and there are indications of gold-bearing quartz reefs in many directions. Diamondiferous soil is also said to exist in several localities; indeed, diamonds were discovered at Vryburg in the autumn of 1887.

The province of Stellaland is principally inhabited by Boers, and the remainder of the country by Bechuanas. The Bechuanas are a black race possessing a language in common with the Bantu races of South Africa, extending as far north as the equator. Their ancestors are said to have come from the north, and progressing southwest, met the Hottentots from the Cape of Good Hope journeying north. The Bechuanas have divided up within the last 150 years, and comprise the Bahurutse, Bamangwato, Bakwena, Bangwaketse, Barolongs, Batlapins, and Batlaros. Each tribe has an animal as an emblem, or heraldic sign, which it is said they hold in esteem. Since 1832 they have been at enmity with the Matabele, and in later years the Transvaal Boers have on one pretext or another endeavored to occupy their country. During the native risings in 1878 the Bechuanas invaded Griqualand West, and were in turn subdued by British volunteers as far as the Molopo. When the British government withdrew from Bechuanaland in 1880, the natives, being helpless, were left to the mercy of the Boers of the Transvaal, whose harsh treatment in 1882 and 1883 led to the Bechuanaland expedition in 1884. At the beginning of the 19th century the Bechuanas were further in advance in civilization than other nations of South Africa, and they are still ahead in this respect. The system of government among the Bechuanas would be termed in Europe local government. All important matters are decided in the public assembly of the freemen of the town, but matters are previously arranged between the chief and headmen. During the Boer-British war of 1899–1900, Mafeking was the scene of one of the most determined and successful defenses in history. See Baden-Powell.

Beck, James Burnie, American lawyer: b. Dumfriesshire, Scotland, 13 Feb. 1822; d. 3 May 1890. He came to the United States when a youth and settled in Kentucky, and was graduated at the law school of Transylvania University in 1846. He practised law in Lexington, Ky., for 20 years. He was elected a Democratic representative to Congress in 1866, 1868, 1870, and 1872; and United States senator in 1876, 1882, and 1888.

Beck, Karl, Austrian poet: b. Baja, Hungary, 1 May 1817; d. Vienna, 10 April 1879. His poems reflect the passionate temperament of his Hungarian countrymen in sonorous verses of consummate finish. Among his works are 'Nights' (1838); 'The Poet Errant' (1838); 'Jankó' (1842), a romance in verse; 'Songs of the Poor Man' (1847); 'Jadwiga' (1863), a tale in verse; 'Mater Dolorosa' (1854), a novel.

Beck, Lewis Caleb, American scientist: b. Schenectady, N. Y., 4 Oct. 1798; d. Albany, N. Y., 20 April 1853. A man of remarkable and wide scientific attainments, he graduated at Union College 1817, and became professor of chemistry and natural history at Rutgers College 1830–37 and 1838–53; professor of chemistry and pharmacy at Albany Medical College 1841–53; and State mineralogist of New York 1837. His publications include 'Gazetteer of Illinois and Missouri' (1823); 'Salt Springs at Salina' (1826); 'Mineralogy of New York' (1842), his most important work; and 'Botany of the United States North of Virginia' (1848). Cf. Gross, 'American Medical Biography.'

Becke, George Louis, Australian author: b. Port Macquarrie, New South Wales, 1848. He went to sea at the age of 14 and has spent his life

trading in the South Pacific. His publications are 'By Reef and Palm' (1894); 'South Sea Stories'; The Ebbing of the Tide' (1896); and with W. Jeffery, 'A First-Fleet Family' (1896); 'Pacific Tales' (1897); 'Wild Life in Southern Seas' (1897); 'Ridan the Devil'; 'Tom Wallis' (1900); 'Edward Barry'; 'Tessa, the Trader's Wife'; 'By Rock and Pool'; Breackley Black Sheep'; 'York the Adventurer' (1901); 'The Strange Adventure of James Shervinton'; 'The Jalasco Brig' (1902); 'Rodman the Boat Steerer; 'Naval Pioneers of Australia' and 'Admiral Philip' (1899); 'The Tapir of Banderah' (1901).

Beckenham, England, a town of Kent, situated southeast of London. It is one of the English municipalities which have experimented in "municipal socialism," as it owns its electric lighting plant and public baths, and has charge of the work of a technical institute. Pop. (1901) 26,300.

Becker, August, German poet and novelist: b. 1828; d. 1891. He was the author of 'Young Friedel, the Minstrel' (1854), a lyrical epic; and of the novels 'The Rabbi's Bequest' (1866); 'Proscribed' (1868); 'The Carbuncle' (1870); 'My Sister' (1876), descriptive of the doings of Lola Montez and the events of 1848 in Bavaria; 'Painter Fairbeard' (1878); and 'The Sexton of Horst' (1889).

Becker, Christiane Luise Amalie Neumann, krís-tē-än' loo-ēs' ä-mä'lē-ē noi'män, German actress: b. Krossen, 15 Dec. 1778; d. Weimar, 27 Sept. 1797. She was the daughter of Johann Christian Neumann, the actor. She performed in both tragedy and comedy, and was a friend of Goethe, who, after her death, made her the theme of his elegy, 'Euphrosine.'

Becker, George Ferdinand, American geologist: b. New York, 5 Jan. 1847. He graduated at Harvard University in 1868; was instructor of mining and metalurgy in the University of California in 1875–9; was attached to the United States geological survey since 1879, and special agent of the 10th census, 1879–83. He was appointed a special agent to examine into the mineral resources of the Philippine Islands in 1898. His publications include 'Geology of the Comstock Lode'; 'Statistics and Technology of the Precious Metals' (with S. F. Emmons); 'Geology of the Quicksilver Deposits of the Pacific Slope'; etc.

Becker, Karl Ferdinand, German philologist: b. Liser, 14 April 1775; d. Offenbach, 5 Sept. 1849. He was the author of 'Ausfuhrliche Deutsche Grammatik'; 'Handbuch der Deutschen Sprache'; etc.

Becker, Karl Ferdinand, German musician: b. Leipsic, 17 July 1804; d. Leipsic, 26 Oct. 1877. He wrote 'Systematisch-chronologische Darstellung der Musikalischen Literatur' (1836–39); 'Die Hausmusik in Deutschland' (1840); etc.

Becker, Karl Friedrich, German historical writer: b. Berlin, 1777; d. Berlin, 15 March 1806. He wrote various popular works on historical topics, the best known being 'The World's History for Children and their Teachers' (1801–5), a truly successful undertaking.

Becker, Nikolaus, German song writer: b. Bonn, 8 Jan. 1809; d. 28 Aug. 1845; known as the author of the Rhine song, 'They Never Shall Obtain It, the Free, the German Rhine,' which became immensely popular throughout Germany, and provoked Alfred de Musset's 'We Have Had it, Your German Rhine,' and Lamartine's more conciliatory 'Peace-Marseillaise' (1841).

Becker, Oskar, political fanatic: b. Odessa, Russia, 1839; d. Alexandria, Egypt, 1868. In 1861 he attempted, at Baden-Baden, to kill King Wilhelm I. of Prussia, by shooting at him with a pistol at a distance of but three paces. The king fortunately escaped with only a slight wound in the neck. Becker's motive for the act was his belief that the king was unable to unite Germany. Though sentenced to 20 years' imprisonment he was pardoned by the king on condition of living out of Germany ever after.

Becker, Rudolf Zacharias, German author: b. Erfurt, 9 April 1752; d. 28 March 1822. He first became known by an essay on the theme, "Is it useful to deceive the people?" which gained a prize from the Berlin Academy of Sciences in 1799. His theory was that happiness depended on the gratification of an innate desire for improvement. In 1782 he took charge of a school at Dessau and published a journal for youth. A work in two volumes, entitled 'A Little Book of Needful Help; or, Instructive Tales of Joy and Sorrow in the Village of Mildheim,' became such a favorite with the public that over 500,000 copies were soon disposed of. He also produced other works and journals, and the extensive transactions in them led him, in 1797, to set up a publishing and bookselling establishment at Gotha, which is still continued by his son. On 30 Nov. 1811 he was arrested by Davoust on suspicion of conspiring against Napoleon, and was imprisoned at Magdeburg till April 1813. On this imprisonment he wrote a book, which still has a historical value.

Becket, Thomas à, archbishop of Canterbury, the Saxon hero, priest, and martyr of England in the reign of Henry II.: b. London, 1119, or, according to some writers, 21 Dec. 1117; d. Canterbury, 29 Dec. 1170. He was the son of a Saxon and a Syrian lady, whose union was said to have been brought about in the following extraordinary manner: Gilbert, the father of Thomas, having gone to the Holy Land in the second crusade, was made a prisoner; but while in durance a Syrian damsel, becoming enamored of him and being converted by him to Christianity, contrived to effect his liberation, after which, with little chivalry or gratitude, the Saxon crusader returned home as best he might, leaving the lady by the seabanks of Tyre. But, with a love and faith stronger than that of the deserted Carthaginian queen, the fair Saracen followed her recreant lover, and, although she knew but two words of any European language, the names of her lover and of the city where he dwelt, by the repetition of those two words, "London" and "Gilbert," and by the display of her tears, her beauty, her jewels, and her gold, she at length made her way to the already famous metropolis, and there, with well-deserved good fortune, found her Gilbert, both free and willing to reward her undoubting trust by taking her to his home and to his heart, all of which is pure romance. Of so strange a union Thomas was said to be the offspring; but, if possible, his

own fortunes were stranger yet. He was at first educated by the canons of Merton, and continued his studies in the schools of Oxford, London, and Paris. On the death of his father he was admitted into the family of Theobald, archbishop of Canterbury, and, with his permission, went to the Continent for the purpose of studying the civil and canon law. He attended the lectures of Gratian at Bologna, and of another celebrated professor at Auxerre. Concerning his early life little more is known; but it is recorded that his first appearance at the court of Henry was made in the humblest guise, bearing his fortunes on his back in the shape of a not too sumptuous garb, riding a spavined jade with galled withers and bare ribs, which moved the insolent mirth of the Norman courtiers. He soon, however, obtained high favor with the king, who, it was alleged, was in some sort under obligation to him, as if he, acting as agent for Theobald, had obtained from the Pope letters prohibitory of the crowning of Eustace, the son of Stephen, by which that design was defeated. This service not only raised Becket in the esteem of the archbishop, but in that of King Henry II., and was the foundation of his high fortune. In 1158 he was appointed high-chancellor and preceptor to Prince Henry, and at this time was a complete courtier, conforming in every respect to the humor of the king. He was, in fact, his prime companion, had the same hours of eating and going to bed, held splendid levees, and courted popular applause. In 1159 he made a campaign with the king in Toulouse, having in his own pay 700 knights and 1,200 horsemen; and it is said he advised Henry to seize the person of Louis, king of France, shut up in Toulouse without an army. This counsel, however, so indicative of à Becket's energy, being too bold for the lay counselors of one of the boldest monarchs of the age, was declined. In the next year he visited Paris to treat of an alliance between the eldest daughter of the king of France and Prince Henry, and returned with the young princess to England. He had not enjoyed the chancellorship more than four years when his patron Theobald died, and King Henry was so far mistaken as to raise his favorite to the primacy, on the presumption that he would aid him in those political views, in respect to Church power, which all the sovereigns of the Norman line embraced, and which, in fact, caused a continual struggle till its termination by Henry VIII. It is narrated that when Henry announced his intention of having Becket promoted to the primacy left vacant by the death of Theobald, Becket prophetically remarked: «I am certain that if, by God's disposal, it were to so happen, the love and favor you now bear towards me, would speedily turn into bitterest hatred.»

Becket was consecrated archbishop in 1162, and immediately assumed an austerity of conduct which formed a very natural prelude to the course which he was to follow. Pope Alexander III. held a general council at Tours in 1163, at which Becket attended and made a formal complaint of the infringements by the laity on the rights and immunities of the Church. On his return to England he began to act in the spirit of this representation, and to prosecute several of the nobility and others holding Church possessions, whom he also proceeded to excommunicate. Henry, an able and politic monarch, was anxious to recall certain privileges of the clergy, which withdrew them from the jurisdiction of the civil courts; and it was not without a violent struggle, and in the interests of peace, that Becket finally acquiesced. The king soon after summoned a convocation or parliament at Clarendon, to the celebrated «constitutions» of which, although the archbishop swore that he would never assent, he at length yielded, but afterward refused to affix his signature, and by way of penance suspended himself from his archiepiscopal functions till the Pope's absolution could arrive. Finding himself the object of the king's displeasure, he soon after attempted to escape to France; but being intercepted, Henry, in a parliament at Northampton, charged him with a violation of his allegiance, and all his goods were confiscated. A suit was also commenced against him for money lent him during his chancellorship, and for the proceeds of the benefices which he had held vacant while in that capacity. In this desperate situation he with great diffiulty and danger made his escape to Flanders, and, proceeding to the Pope at Sens, humbly resigned his archbishopric, which was, however, restored. He then took up his abode at the abbey of Pontigny, in Normandy, whence he issued expostulatory letters to the king and bishops of England, in which he excommunicated all violators of the prerogatives of the Church, and included in the censure the principal officers of the Crown. Henry was so exasperated that he banished all his relations and obliged the Cistercians to send him away from the abbey of Pontigny; from which he removed, on the recommendation of the king of France, to the abbey of Columbe, and spent four years there in exile.

After much negotiation a sort of reconciliation took place in 1170, on the whole to the advantage of Becket, who, being restored to his see with all its former privileges, forthwith prepared to return to his long vacant see. After a triumphant entry into Canterbury the young Prince Henry, crowned during the lifetime of his father, transmitted him an order to restore the suspended and excommunicated prelates, which he refused to do, for the reason that the Pope alone could grant the favor, though the latter had authorized him to inflict the censure on them. The prelates immediately appealed to Henry in Normandy, who in a state of extreme exasperation exclaimed, «What an unhappy prince am I, who have not about me one man of spirit enough to rid me of a single insolent prelate, the perpetual trouble of my life!» These rash and too significant words induced four of the attendant barons, Reginald Fitz-Urse, William de Tracy, Hugh de Morville, and Richard Breto, to resolve to wipe out the king's reproach. Having laid their plans, they forthwith proceeded to Canterbury, and having formally required the archbishop to restore the suspended prelates, they returned in the evening of the same day (29 Dec. 1170), and, placing soldiers in the courtyard, rushed with their swords drawn into the cathedral, where the archbishop was at vespers, and, advancing toward him, threatened him with death if he still disobeyed the orders of Henry. Becket, without the least token of fear, replied that he was ready to die for the rights of the Church; and magnanimously added, «I charge you in the name of

the Almighty not to hurt any other person here, for none of them have been concerned in the late transactions.» The confederates then strove to drag him out of the church; but not being able to do so on account of his resolute deportment, they killed him on the spot with repeated wounds, all which he endured without a groan.

The perpetrators of the deed repented, one of them, de Tracy, taking a voyage to Rome, and expiating the enormity in the Holy Land. Henry II. did penance at the saint's tomb.

Thus perished Thomas Becket in his 52d year, a martyr to the cause which he espoused, and a man of unquestionable vigor of intellect. He was canonized two years after his death, and miracles abounded at his tomb. In the reign of Henry III. his body was taken up and placed in a magnificent shrine erected by Archbishop Stephen Langton; and of the popularity of the pilgrimages to his tomb the 'Canterbury Tales' of Chaucer will prove an enduring testimony. See 'Life,' by John Morris, and 'Thomas Becket,' by R. A. Thompson.

Beckett, Arthur William, à, English journalist and novelist (son of Gilbert Abbot à Beckett, q.v.): b. Fulham, 25 Oct. 1844. Beside fulfilling other journalistic engagements he was on the staff of 'Punch' 1874–1902, edited the *Sunday Times* 1891–5, and the 'Naval and Military Magazine' 1896. In addition to several comedies he has published 'Comic Guide to the Royal Academy,' with his brother Gilbert (1863–4); 'Fallen Amongst Thieves' (1869); 'Our Holiday in the Highlands' (1874); 'The Shadow Witness' and 'The Doom of St. Quirec,' with Burnand (1875–6); 'The Ghost of Grimstone Grange' (1877); 'The Mystery of Mostyn Manor' (1878); 'Traded Out'; 'Hard Luck'; 'Stone Broke'; 'Papers from Pump Handle Court, by a Briefless Barrister' (1884); 'Modern Arabian Nights' (1885); 'The Member for Wrottenborough' (1895); 'Greenroom Recollections' (1896); 'The Modern Adam' (1899); 'London at the End of the Century' (1900).

Beckford, William, English writer, famous in his time for his immense wealth, eccentricities, and literary talents: b. London, 1761; d. Bath, 2 May 1844. When only 10 years old he was in receipt of an income, through the death of his father, of more than $500,000 a year. Under the direction of Lord Chatham he received a careful education, and at an early age gave evidence of unusual abilities. His first work, a satirical essay entitled, 'Biographical Memoirs of Extraordinary Painters,' in which he ridiculed the English artists of his time, was published before he was 20 years of age. After this he spent some time in traveling on the Continent, an account of which he published half a century later with the title, 'Italy, with Sketches of Spain and Portugal' (Lond., 2 vols. 1834). On his return to England he entered the House of Commons for a short time as member for Hindon, but soon became tired of this career, and withdrew to Portugal, where he bought an estate in the neighborhood of Cintra, and lived in familiar intercourse with the royal family of Portugal. After the lapse of some years he appeared again in England, and began in 1796 to erect a splendid edifice upon his estate of Fonthill, which he furnished with more than royal luxury, and continually enlarged with new buildings. Here he resided till 1822, when, owing to the loss of two large estates, which had been successfully claimed in Chancery by other owners, he was obliged to sell Fonthill for £330,000. He then settled at Bath, where he began to occupy himself anew with building and collecting works of art. His literary fame rests upon his eastern tale 'Vathek,' which he wrote in French, and published at Lausanne in 1784, and which made a remarkable impression upon Byron.

Beckham, John Crepps Wickliffe, American statesman: b. Bardstown, Ky., 1867. In 1893 he began the practice of law; elected to the Kentucky legislature 1894–7; speaker 1898; elected lieutenant-governor 1899, and became governor upon the death of Goebel, 3 Feb. 1900; elected governor on the Democratic ticket in the fall of the same year.

Beckmann, Johann, German writer on agriculture and natural history: b. Hoya, Hanover, 4 June 1739; d. Göttingen, 4 Feb. 1811. He studied theology at Göttingen, but soon applied himself to natural philosophy and chemistry. For a short time he was professor of natural philosophy and history at a gymnasium in St. Petersburg. He resigned this, and coming back through Sweden, made the acquaintance of Linnæus and was allowed to see how the Swedish mines were worked. Having returned to Göttingen, he was made professor of philosophy there in 1766, and in 1770 ordinary professor of economy, which office he held for over 40 years. He published several scientific works, which once were popular, but the best known of his productions is called 'Contributions to the History of Discovery and Inventions,' of which several translations have been published in England, where (with corrections and additions extending it to the present time) it continues to be a favorite work.

Beckwith, Sir George, English military officer: b. 1753; d. London, 20 March 1823. His scene of action was largely in America — in the United States and the West Indies. He fought with the English in the American Revolution in 1776–82, and was entrusted with important diplomatic commissions in 1782–91, as there was then no British minister to the United States. In 1804 he was made governor of St. Vincent, and four years later governor of Barbados. As England was then at war with France he organized an expedition and conquered Martinique, for which he obtained the thanks of the House of Commons. Later (1810) he conquered Guadeloupe, the last possession of the French in that part of the world. When he returned to England, after nine years' service in the West Indies, a set of silver plate was given to him by the legislature of Barbados, and the king conferred upon him armorial distinction.

Beckwith, James Carroll, American genre painter: b. Hannibal, Mo., 23 Sept. 1852. He was a pupil of Carolus Duran, in Paris, and became a member of the National Academy in 1894. Among his paintings are 'Under the Lilacs' and 'The Falconer.'

Beckwith, John Watrus, American Episcopal bishop: b. Raleigh, N. C., 9 Feb. 1831; d. 24 Nov. 1890. He was graduated at Trinity College, Hartford, in 1852; ordained priest in 1855; labored in Mississippi and Alabama till

after the close of the Civil War; was then called to the rectorship of Trinity Church, New Orleans; and while there was elected bishop of Georgia, being consecrated in Savannah, 2 April 1868. He was an eloquent preacher, and published several sermons and addresses.

Beckx, Pierre Jean, běks, pē-ār zhŏń, French general of the order of Jesuits: b. near Louvain, Belgium, 8 Feb. 1795; d. Rome, 4 March 1887. The success of the Jesuits, especially in non-Catholic countries, was greatly due to his tact and energy.

Becky Sharp, the heroine in Thackeray's 'Vanity Fair.' She has been accepted as the type of the shrewd, conscienceless adventuress whose sole purpose is to rise in the world and who allows nothing to interfere with it.

Becque, Henri François, běk, ŏń-rē fräń-swä, French dramatist: b. Paris, 9 April 1837. He was the pioneer of realism on the Parisian stage, producing 'The Prodigal Son' (1868); 'The Abduction' (1871); 'The Ravens' (1882); 'The Parisian' (1885); etc.

Becquer, Gustavo Adolfo, běk-kăr′, goos-tä′vō ä-dōl′fō, Spanish poet and novelist: b. Seville, 17 Feb. 1836; d. Madrid, 22 Dec. 1870. His lyrics, chiefly elegiac, show much feeling, and his tales and legends are among the best creations of modern Spanish prose.

Becquerel, Alexandre Edmond, běk-rĕl, ä-lĕx-ändr ād-mŏń, French physicist: b. Paris (son of Antoine César Becquerel, q.v.), 24 March 1820; d. Paris, 13 May 1891. He was decorated with the cross of the Legion of Honor in 1851, and was appointed professor of physics in the Conservatoire des Arts et Métiers in 1853. Besides his conjoint labors with his father he made important researches on the nature of light and its chemical effects, on phosphorescence, and on the conductivity and magnetic properties of many substances. He wrote 'Light, Its Causes and Effects' (1868).

Becquerel, Antoine César, än-twän sā-zär, French physician, and member of the Institute: b. Chatillon-sur-Loing, 7 March 1788; d. Paris, 18 Jan. 1878. In early life he served in the French army in Spain as an officer of engineers. In 1815 he resigned his commission as *chef de bataillon* of the engineers and devoted himself to scientific pursuits. In 1829 he became professor of physics in the Museum of Natural History. He was a voluminous writer on chemistry and electricity, and his industry in the collecting of facts was remarkable. His principal works are: 'Traité d'Electro-Chimie'; 'Traité de Physique Appliquée à la Chimie et aux Sciences Naturelles'; 'Eléments de Physique Terrestre et de Météorologie' (1847); and 'Traité de l'Electricité et du Magnétisme' (1855). He invented a new psychometer in 1866.

Becquerel, Antoine Henri, ŏń-rē, French physicist: b. Paris, 15 Dec. 1852 (son of Alexandre Edmond, and grandson of Antoine César Becquerel, qq.v.). In 1892 he became professor of physics in the Natural History Museum, and in 1895 held a similar position at the Polytechnic School. His investigations have largely dealt with such subjects as the magnetic rotation of polarized light, phosphorescence, the ultra-red rays, light-absorption, etc. He is perhaps best known in recent years by his researches concerning the invisible rays given off by uranium, radium, thorium, etc., called, in his honor, Becquerel rays — a mixture of Roentgen and cathode rays.

Becse, bĕch′ĕ, Hungary, the name of two towns situated on the river Theiss. Old Becse is on the right bank, 48 miles south of Szegedin. Pop. (1901) 18,865. New Becse is on the left bank, five miles east of Old Becse. Pop. (1901) 7,752. Both towns carry on an extensive trade in grain.

Bed, in modern domestic use, a framework (bedstead) supporting a mattress or cushion, with coverings, on which to take repose or sleep. Originally a bed consisted merely of a lair or hollowed-out place in the earth, such as is made by a wild animal; then the skins of beasts were employed to render the spot more comfortable, and such skins form the beds of many savage tribes of the present day. Rushes, leaves, husks, twigs, and straw came in time to supplement or replace the skins, and when the Romans invaded Britain they taught the natives to sew their straw within sacks. In the progress of luxury feathers came to take the place of the harder straw, and their use was made the basis of charges of effeminacy against the Roman patricians. The feather bed still persists among the older nations of Europe, but as feathers are bad conductors of caloric they do not permit that free radiation of heat from the body which is essential to comfort and health, and the hair mattress has very largely supplanted it. The feather bed was particularly unserviceable in cases of sickness, as it did not permit of the patient's easily changing his position. Modern mattresses are sometimes made of felt, of pure hair, or of layers of hair and cotton, stuffed more or less tightly into a casing of strongly woven material called ticking. Pillows are made of materials similar to those of the mattress, and the bed-coverings of almost any fabric suited to the taste and purse of the owner, from coarse cotton sheets or blankets to the finest wool or silk. In the northern countries of Europe the downy feathers of the eider duck are largely used for bed-coverings, their slow radiation of heat, mentioned above, permitting the retention of the bodily heat combined with extreme lightness.

Bedsteads have for thousands of years ranged from a mere platform, designed merely to keep the bedding off the floor, to enormous structures of solid costly woods or ivory, magnificently decorated with carvings, or inlaid with precious metals and gems. They were frequently surmounted by canopies, and surrounded with curtains to keep off drafts, or with nettings to exclude flying insects. The bedding was supported within the framework on a network of cord, which later was supplanted by cross-bars or slats of wood. Sometimes bedsteads were built with such lofty platforms that a short stepladder was necessary for ingress and egress. The four-post bedstead held its own for centuries, but within the last 50 years their close curtains, valances, and canopies have given way before the more hygienic iron or brass bedstead, almost entirely free from draperies and fitted with metallic springs or woven-wire mattresses, some of the latter being so elastic, though firm, and giving such general support to the body, as to render thick mattresses almost unnecessary. Wooden bedsteads

are still in considerable use, however; but they are mostly free from the objectionable features of the four-post bed.

Folding-beds have had considerable vogue for a long period, being designed for economy of space in small rooms. Truckle or trundle beds, were formerly used for similar economic reasons, and consisted of a low platform on wheels to admit of its being run under the larger bed by day, and was occupied at night by children or servants. Other forms of space-saving beds are folding cots, and lounges constructed over a box-body wherein the bedding may be concealed by day.

Special forms of bed have been contrived for the benefit of sick and wounded persons, notably mattresses of material impervious to air or water and filled with those fluids.

In French history, the bed of justice was the throne on which, before the Revolution of 1789, the king used to sit when he went to Parliament to look after the affairs of State, the officers of Parliament attending him in scarlet robes. As this interference of the king with the Parliament was not compatible with free government, sitting on the bed of justice came to signify the exertion of arbitrary power.

In law, a divorce from bed and board is the divorce of a husband and wife to the extent of separating them for a time, the wife receiving support, under the name of alimony, during the severance.

In mechanics, a bed is the foundation piece or portion of anything on which the body of it rests, as the bed-piece of a steam engine; the lower stone of a grinding-mill; or the box, body, or receptacle of a vehicle.

Bed-sore, an ulcer due to long-continued pressure on certain bony prominences of the body, due to protracted maintenance of the reclining position. The buttocks, shoulder-blades, and heels are the most frequently affected sites. In certain diseases, notably in myelitis, or inflammation of the spinal cord, bed-sores may develop very rapidly, within ten days to two weeks. Here the nerve-fibres governing the tone of the skin are affected. In long-continued diseases, however, necessitating the reclining posture, bed-sores develop largely from lack of careful nursing. A due amount of attention paid to absolute cleanliness, care for the skin, careful turning, and use of air-cushions or the water-bed, are often effective in preventing them. Alcohol and water, equal parts, is one of the best washes. If ulcers develop in spite of all precautions, they should be surgically treated. Oxid of zinc ointment, balsam of Peru, aristol powder, or bismuth powder, may all be used, alone or in combination.

Bed of Justice (Fr. *lit de justice*), formerly a solemn ceremony in France, in which the king, with the princes of the blood royal, the peers, and the officers of the crown, state, and court, proceeded to the Parliament, and there, sitting upon the throne (which in the old French language was called *lit,* because it consisted of an under cushion, a cushion for the back, and two under the elbows), caused those commands and orders which the Parliament did not approve to be registered in his presence. The Parliament had the right of remonstrating in behalf of the nation against the royal commands and edicts. If the king, however, did not choose to recede from his measures, he first issued a written command (*lettres de jussion*) to the Parliament, and if this was not obeyed he held the *lit de justice.* The Parliament was then, indeed, obliged to submit, but it afterward commonly made a protest against the proceeding. Louis XV. held such a *lit de justice* in 1763, in order to introduce certain imposts, but on account of the firm resistance of the parliaments was finally obliged to yield. The last *lits de justice* were held by Louis XVI. at Versailles, 6 Aug. 1787.

Bedamar, bā-da-mar', a character (a Spaniard of noble birth) in Saint Real's 'Conjuration des Espagnols contre la République de Venise,' the source of Otway's 'Venice Preserved.'

Bédarieux, bā-dä-rē-ür, France, a town in the department of Herault, on the left bank of the Orb, 18 miles north from Beziers. It is well built, and is one of the busiest and most thriving commercial and manufacturing towns of the same size in France. It has manufactures of fine and common cloth, woolen stuffs, floss silk, worsted and cotton stockings, hats, soap, olive-oil; tanneries, dye-works, paper and glass works, and a brass foundry. It has also a trade in wine and brandy. Pop. (1901) 5,802.

Bedbug, a hemipterous insect (*Cimex* or *Acanthias lectularius*). The body is broad, two and a half lines in length, flat and wingless; it is a rust red color with fine brown hairs. By its shape it is adapted for living in cracks between boards in furniture, etc., and by its long, slender beak it sucks the blood of its victim. This insect lays eggs throughout the warmer months of the year, the generations succeeding each other as long as the temperature is high enough. The eggs are oval, white, and the young bugs hatch in about eight days, escaping by pushing off a lid at one end of the shell. They are white, transparent, differing from the perfect insect in having a broad, triangular head, and short and thick antennæ. The bedbug is said to live as a parasite on domestic birds, such as the dove. A nest of swallows swarming with alleged bedbugs was once found on a courthouse in Iowa. Trestwood states that the bedbug is 11 weeks in attaining its full size; it molts about five times. De Geer has kept full-sized individuals in a sealed bottle for more than a year without food. The cockroach is the natural enemy of the bedbug and destroys large numbers, as does also the Reduvius and certain kinds of ants. In Europe a small black ant, *Monomorium,* is said to clear a house of them in a few days. Houses have been cleaned of them after being thoroughly fumigated with brimstone, or by the use of insect powder blown into the cracks and crevices where they live. They are also easily destroyed by painting the cracks with corrosive sublimate dissolved in alcohol. Temporary relief may be had by sprinkling insect powder over the sheets of the bed one is to occupy. As the bedbug was known to Aristotle, who supposed it arose spontaneously from sweat, it is probable that it originated about the Mediterranean Sea, for it was not known to have occurred in England before the 17th century.

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Beddoes, Thomas Lovell, English dramaauthor: b. Shiffnal, Shropshire, 1760; d. 1808. He distinguished himself both at school and at Oxford by his knowledge of ancient and modern languages and literature. The great discoveries in physics, chemistry, and physiology irresistibly attracted him. He continued his studies with success in London and Edinburgh. In his 26th year he took his doctor's degree, afterward visited Paris, and formed an acquaintance with Lavoisier. On his return he was appointed professor of chemistry at Oxford. There he published some excellent chemical treatises, and observations on the calculus, scurvy, consumption, catarrh, and fever. Dazzled by the splendid promises of the French Revolution, he offended some of his former admirers, and excited such a clamor against him by the publication of his political opinions that he resigned his professorship. He then composed his 'Observations on the Nature of Demonstrative Evidence,' in which he endeavored to prove that mathematical reasoning proceeds on the evidence of the senses, and that geometry is founded on experiment. He also published the 'History of Isaac Jenkins,' which was intended to impress useful moral lessons on the laboring classes in an attractive manner. After his marriage in 1794 he formed the plan of a pneumatic institution for curing diseases, particularly consumption, by means of factitious airs or gases. With the assistance of the celebrated Josiah Wedgewood, he succeeded in opening this institution in 1798. As superintendent of the whole, he engaged young Humphry Davy, the foundation of whose future fame was laid here. The chief purpose of the institution, however, was never realized, and Beddoes' zeal gradually relaxed, so that he relinquished it a year before his death. In the last years of his life he acquired considerable reputation by his 'Hygeia,' in three volumes.

Beddoes, Thomas Lovell, English dramatist and physiologist: b. Clifton, 20 July 1803; d. Basel, 26 Jan. 1849. He published 'The Bride's Tragedy' while an undergraduate at Oxford, and led an eccentric life, ultimately committing suicide. His work was largely fragmentary, but his posthumous 'Death's Jest-Book; or, the Fool's Tragedy' (1850) received the high praise of such judges as Landor and Browning. It was begun in 1825, and occupied him till his death, being mostly written while he was studying medicine in Germany. In 1890 Mr. Gosse edited an edition of his poetical works in two volumes, with a memoir.

Bede, Beda, or **Boeda,** known as "The Venerable Bede," English historian and scholar, was born in 673 at the double monastery of Wearmouth and Jarrow, in the county of Durham, and died in the same monastery in 735. At the age of seven he was intrusted to Benedict Biscop, abbot of Wearmouth, and one of the best equipped scholars of the age, who, together with Ceolfrith, abbot of Jarrow, directed his education. All the rest of Bede's life was spent in the monastery of Wearmouth and Jarrow. In his nineteenth year he was made deacon, and in his thirtieth year, priest. He never held positions of higher dignity, refusing the office of abbot because its duties would have interfered with his chosen work of "learning, teaching, and writing." Under Bede, Northumbria became one of the great centres of learning in Europe. Bede himself gave instruction in Latin, Greek, Hebrew, astronomy, mathematics, grammar, rhetoric, and music, in short in all the subjects which constituted the learning of the Middle Ages. His knowledge was encyclopedic in character, and though all directed towards the service of the church, seems to have been imparted with a vivacity and charm that endeared him greatly to his pupils. Besides attending to his monastic duties and his work as teacher, Bede wrote voluminously. In a brief summary of the main events of his life at the conclusion of his 'Historia Ecclesiastica,' finished in 731, he gives a list of his works amounting to nearly forty titles. His activities did not cease, however, with the completion of his great history, and at the very hour of his death, as is narrated by his pupil, St. Cuthbert, he was engaged in dictating a translation of the Gospel of St. John, now unfortunately lost. Cuthbert states that Bede was a lover of Anglo-Saxon poetry, but the only extant writings in the vernacular which can be connected with his name are two lines of a poem known as Bede's 'Death Song,' quoted by Cuthbert. The body of his writings consists of exegetical treatises on the books of the Old and New Testaments, and of treatises on scientific, rhetorical, and historical subjects, all written in Latin. His reputation as a mathematician was very great, and for five centuries following his death, his works were standard throughout Europe. For modern readers, however, Bede's most interesting and important achievements lie in the field of history. His greatest work is his 'Ecclesiastical History' (*Historia Ecclesiastica Gentis Anglorum*), a history of England from the earliest Roman occupations to the year 731. It is written in a charmingly simple and pure style, and is remarkable for a degree of critical judgment such as one would not expect in a monk of the 8th century who had never lived outside his monastery. It was translated into West Saxon by Alfred the Great, or under his direction, and it was largely used for the earlier entries of the 'Anglo-Saxon Chronicle.' It is still the main source of our information concerning England for the period which it covers.

Bibliography.—For Bede's works, consult Migne, 'Patrologiæ Cursus Completus,' (vol. 90); Giles, 'Opera Omnia' (London 1843). The separate edition of the 'Historical Works,' by Plummer (Oxford 1896), contains much valuable material, among other things the letter of Cuthbert narrating Bede's death. The West Saxon translation of the 'Historia' is printed in Wülker, 'Bibliothek der Angelsächsischen Prosa' (vol. IV., 1899). For estimates of the character and work of Bede, consult Bright, 'Chapters of Early English Church History' (3d edition 1897; Brooke, 'English Literature from the Beginning to the Norman Conquest' (1898); Hunt, 'The English Church from its Foundation to the Norman Conquest' (1899).

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Bede, Adam, a character in the novel of the same name, by George Eliot. He is a

carpenter with some knowledge of books. He loves Hetty Sorel, but marries Dinah Morris (q.v.).

Bedeau, bĕ-dō, **Marie Alphonse,** French general: b. Vertou, near Nantes, 1804; d. Nantes, 1863. He won his military fame in Algeria, where he was active in the operations against the Algerians and became general of brigade. He was in Paris at the outbreak of the revolution of 1848, and was subsequently vice-president of the constituent assembly. As he opposed Louis Napoleon, he went into exile after the *coup d'état* of December 1851.

Bedeguar, bĕd'e-gär, or **Sweetbriar Sponge,** a mossy roundish gall somewhat resembling a chestnut burr in size and form, but generally more or less reddish or purplish. It is caused by a poisonous fluid injected into the plant by a gall-fly (*Rhodites rosæ*), the larvæ of which may be found feeding upon the plant juices. Like many other vegetable substances, it was believed to be useful in medicine in cases of sleeplessness, diarrhœa, scurvy, stone, worms, etc.

Bedel, bĕ-dĕl', **Timothy,** American army officer: b. Salem, N. H., about 1740; d. 1787. In the Revolutionary War he was in command of the American force near Montreal, which surrendered without resistance when attacked by Brant's Indians. He was sick at the time, and the surrender was made by the officer second in command, yet Arnold placed the blame on Bedel.

Bedell, bĕ-dĕl', **Frederick,** American physicist: b. Brooklyn, N. Y., 12 April 1868. He graduated at Yale in 1890, and at Cornell in 1892, and was assistant professor of physics at the last named, 1892–1900. He has established a high reputation for his investigations in alternating currents of electricity. Publications: 'Principles of the Transformer' (1896); with A. C. Crehore, 'Alternating Currents' (4th ed. 1901); and numerous special articles in the 'Sibley Journal' and 'Physical Review.'

Bedell, Gregory Thurston, American clergyman: b. Hudson, N. Y., 27 Aug. 1817; d. 11 March 1892. In early life he was rector of the Protestant Episcopal Church of the Ascension, New York. In 1859 he was consecrated assistant bishop of Ohio, and in 1873 bishop of that State. He wrote 'The Divinity of Christ'; 'The Profit of Godliness'; 'The Age of Indifference'; 'Episcopacy — Fact and Law'; 'A Canterbury Pilgrimage'; 'A Votive Pillar'; 'Memorial of Bishop McIlvaine'; and 'Pastoral Theology.'

Bedell, William, English clergyman: b. Black Notley, Essex, 1570; d. 1642. He studied at Cambridge, became minister of St. Edmundsbury in Suffolk, and in 1604 went to Venice as chaplain to the ambassador, Sir Henry Wotton. Here he remained for eight years and became intimately acquainted with the celebrated Fra Paolo Sarpi, who taught him Italian and was taught theology in return. While here Bedell translated the English prayer-book into Italian. On his return to England he resumed the duties of his curacy, but left it in 1615 for the living of Horingsheath. Here he remained for 12 years, and quitted it to become provost of Trinity College, Dublin. He undertook several important reforms, and successfully accomplished them through the admirable manner in which he tempered firmness with prudence. In 1629 he was appointed to the united sees of Kilmore and Ardagh, but thinking the duties of one sufficient, he retained only Kilmore and insisted on resigning Ardagh. He next turned his attention to the Roman Catholics, and labored assiduously to convert them to Protestantism. He caused the prayer-book to be translated into Irish and read regularly every Sunday in the cathedral. The New Testament had already been translated, but Bedell had the honor of perfecting the boon by procuring the translation of the Old Testament. In 1641, on the breaking out of the rebellion, his house was for some time the only English one in the county of Cavan which remained uninjured; but at last he was so far involved in the common fate that he was carried off to the castle of Cloughboughter, where he was imprisoned with many others, the only exception in his favor being that he was not put in irons. His works are few and of comparatively little importance. His biography has been written by Bishop Burnet.

Beden, the Arabic name, in Palestine, of the local species of ibex (*Capra sinaitica*), which ranges throughout Palestine and along both shores of the Red Sea. It varies little from other ibexes except in having the great horns of the bucks more compressed, and the knobs on their front at less regular intervals. The general color is yellowish, with conspicuous dark markings on the front of the fore legs, chest, and back. See Ibex.

Bedesman (Saxon, *bead,* a prayer), was a common suffix to the signature at the end of English letters in the 15th and 16th centuries, and equivalent to petitioner. The Pasten letters, 1460–80, furnish many examples. Sir Thomas More, writing to Cardinal Wolsey, styles himself "Your humble orator and most bounden bedesman." Margaret Bryan, the governess of Princess Elizabeth, signs herself, in writing to a superior, "Your dayly bede-woman."

Bedford, Gunning, American patriot: b. Philadelphia, Pa., about 1730; d. Sept. 1797. He was a lieutenant in the French war; entered the Revolutionary army with the rank of major; was wounded at White Plains; became muster-master-general in 1776; was a delegate to the Continental Congress; and was elected governor of Delaware in 1796.

Bedford, Gunning, American lawyer: b. Philadelphia, Pa., 1747; d. 30 March 1812. He was graduated at Princeton in 1771; became a lawyer; acted for a time as aide-de-camp to Gen. Washington; represented Delaware in the Continental Congress in 1783–6; and became attorney-general of the State, and United States judge for the district of Delaware.

Bedford, Gunning S., American physician: b. Baltimore, Md., 1806; d. New York, 5 Sept. 1870. He was graduated at Mount St. Mary's, Emmittsburg, Md., 1825; took his medical degree in Rutgers Medical College, 1829; and spent some years in special study in Europe. In 1833 he was appointed professor in the medical college at Charleston, S. C.; subsequently was called to the Medical College, Albany, N. Y.; and in 1836 settled in New York. He made a specialty of obstetrics; was one of the projectors of the University Medical College; and introduced into the United States obstetrical

clinics for the gratuitous treatment of poor women. His principal publications, 'Diseases of Women and Children' and 'Principles and Practice of Obstetrics,' have had a large circulation in the United States and Europe.

Bedford, Jessie (ELIZABETH GODFREY), English novelist: b. Hampshire, England. Under the pen name of ELIZABETH GODFREY she has published in America several musical novels which have been popular. Her most important works are: 'The Harp of Life'; 'Poor Human Nature'; 'The Winding Road' (1902).

Bedford, John Plantagenet (DUKE OF), regent of France, third son of Henry IV. of England: b. 20 June 1389; d. 1435. Shakespeare, who calls him Prince John of Lancaster, introduces him in his plays of Henry IV. as distinguishing himself by his youthful courage in the battle of Shrewsbury in 1403, and forming a kind of moral contrast to his more dissipated brother, the Prince of Wales. During the reign of Henry V. he participated in the fame acquired by the conquest of France; but his talents were fully displayed when, after the death of that king, he became regent of France, having been appointed to this post by Henry in his will. At Verneuil, in 1424, he displayed his military talents; and the difficulties which he experienced in endeavoring to maintain possession of the conquered provinces in France afforded frequent occasion for the manifestation of his ability. The greatest blemish in his character is his cruel execution of the Maid of Orleans in 1431. He survived this event about four years, and dying at Rouen, was buried in the cathedral of that city.

Bedford, John Russell (DUKE OF), English nobleman: b. 1766; d. 1839. He was versed in literature, fond of science, and a passionate lover of agriculture, to the improvement of which he devoted years of his life and the expenditure of vast sums of money. He was the father of the celebrated statesman, Lord John Russell (q.v.).

Bedford, England, a parliamentary and municipal borough, situated on the Ouse, county town of Bedfordshire. The chief buildings are the law courts, a range of public schools, a large infirmary, county jail, etc., and several churches. The town is rich in charities and educational institutions, the most prominent being the Bedford Charity, embracing grammar and other schools, and richly endowed. There is an extensive manufactory of agricultural implements; lace is also made, and there is a good trade. John Bunyan was born at Elstow, a village near the town, and it was at Bedford that he lived, preached, and was imprisoned.

Bedford, Ind., a city and county-seat of Lawrence County, 65 miles southwest of Indianapolis on the Baltimore & O. S. W. and other R.R.'s. It has 24 large quarries of building-stone, the working of which is the chief industry, but there are also railroad shops, veneering-mills, etc. The court-house and other public buildings are fine stone edifices. Pop. (1900) 6,115.

Bedford, Nova Scotia, a village of Halifax County, situated on the Intercolonial R.R., north of the city of Halifax. Its site is very picturesque, and it is a favorite summer resort. Pop. about 1,500.

Bedford, Pa., the county-seat of Bedford County, situated on a branch of the Juniata River, and on the Pennsylvania R.R., Bedford division, 94 miles southwest of Harrisburg. It is a place of considerable historic interest, as it was for some time an important military post, was once Washington's headquarters, and in 1794 the headquarters of the troops sent to suppress the Whiskey Rebellion. Bedford Springs, a favorite summer resort, is located about a mile from Bedford. The chief industry is the mining and manufacture of iron. Pop. (1900) 2,167.

Bedford, Quebec, a town in Missisquoi County, situated near the northern end of Lake Champlain, on the Canadian P. R.R. Its chief manufactures are knitting-needles, gloves, and farming implements. Pop. (1901) 1,364.

Bedford City, Va., a town and county-seat of Bedford County, on the Norfolk & W. R.R. It has a picturesque situation at the base of the Blue Ridge Mountains, with an elevation of over 1,000 feet. It is the seat of the Randolph Macon Academy (Methodist Episcopal), of the Belmont Seminary (Presbyterian), of the St. John's Institute for Girls (Episcopal), and of the Jeter Female Institute (Baptist). It is in a tobacco-growing region, is the centre of the trade for its district, and has a number of tobacco factories, as well as several other industries, including a woolen-mill, flouring-mills, and foundry. Pop. (1900) 2,416.

Bedford Level, England, a large tract of low-lying land, comprising about 400,000 acres in Cambridge, Norfolk, Suffolk, Huntingdon, Northampton, and Lincoln counties, formerly full of fens and marshes, and in rainy seasons for the most part under water. Peterborough Fen, which is that part of the level running into Northamptonshire, and extending between Peterborough and Crowland, contains between 6,000 and 7,000 acres. One seventh part of the level is situated in Huntingdonshire. Nearly the whole of the Isle of Ely, which forms the northern division of Cambridgeshire, consists of this marshy ground. The southeastern part of Lincolnshire, usually termed Holland, extending to the river Witham on the north, is also included in the Bedford Level. About 63,000 acres are situated in Norfolk, and 30,000 in Suffolk. It derives its name from Francis, Earl of Bedford, who in the 17th century expended large sums of money in attempting to drain the district. Numerous cuts have been made, intersecting every part, some so large and deep as to serve as navigable canals. In the Isle of Ely two of these cuts, the Old and New Bedford rivers, running nearly parallel to each other, are navigable for over 20 miles. Wind-mills and steam-engines raise the water to such a height as to admit of its being carried off to its proper channel; but the expense has sometimes greatly exceeded the value of the land reclaimed; and the great cuts and embankments constructed in recent times have rendered the drainage now tolerably effective. A great part of the level is under cultivation, and produces grain and some other crops in considerable quantities; but there is still enough fen to form shelter for vast numbers of wild fowl.

Bedford Missal, a book made for John Plantagenet, Duke of Bedford (q.v.) and his duchess. This rich volume is 11 inches long,

7½ broad, and 2½ thick, bound in crimson velvet, with gold clasps, on which are engraved the arms of Harley, Cavendish, and Hollis, quarterly. It is embellished with 59 large miniature paintings, with over 1,000 of a small size; and among them are to be seen several portraits of persons of eminence. It was purchased by Edward Harley, Earl of Oxford, from Lady Worsley, great-granddaughter to W. Seymour, second Duke of Somerset, who figured in the reign of Charles I.; and descended from Lord Oxford to his daughter, the Duchess of Portland. In the year 1786, when the collection of the duchess was brought to sale, it was purchased by a Mr. Edwards for $1,100, and was sold again at the sale of the collection of that gentleman, in the year 1815, when it brought $3,350, and came into the possession of the Duke of Marlborough. On coming to the hammer once more it strongly attracted the attention of book-collectors and antiquaries, and realized the unprecedented sum of $5,350, being sold at that price (June 1833) to Sir John Tobin of Liverpool. It is now lodged in the collection of the British Museum. In a historical point of view it is interesting on account of its pictorial embellishments, some of which have been engraved by Virtue for his portraits to illustrate the 'History of England.' For the antiquarian and the student of the fine arts it is one of the most interesting monuments of that age. The antiquarian Gough published a work describing the Bedford Missal. Dibdin, in his 'Bibliomania,' gives an account of it.

Bedivere, bĕd'ĭ-vĕr, **Sir,** in Arthurian legend, one of King Arthur's most trusted knights. It was Sir Bedivere who cast the sword Excalibur into the lake and carried the dying Arthur to the vessel in which he was borne away to Avalon.

Bedlam, a corruption of Bethlehem, the name of a religious foundation granted in 1547 by Henry VIII. to the corporation of London, and by them applied to the purpose of a hospital for the insane. The place was originally within the city boundaries, but in 1814 a new building was erected in St. George's fields, on the south side of the Thames, which was called New Bethlehem, or vulgarly, Bedlam. The patients, who had been discharged partially cured, and went about begging, were called Bedlam beggars, or Tom-o'-Bedlams.

Bed'lington, a coal-mining town of England on the river Blyth in Northumberland, 11 miles north of Newcastle. Pop. (1901) 18,750.

Bedlington Terriers. See TERRIER.

Bedloe's, or **Liberty Island,** an island in New York harbor; ceded to the United States government, in 1800; the site of Fort Wood, erected in 1841 and mounted with 77 guns. It is now the location of Bartholdi's colossal statue of 'Liberty Enlightening the World,' presented by France to the United States. See LIBERTY, STATUE OF.

Bedmar', Alphonso de la Cueva (MARQUIS DE), Spanish politician and cardinal: b. 1572; d. Oviedo, 1655. He was sent in 1607 by Philip III. as ambassador to Venice, and rendered himself famous by the conspiracy against Venice which St. Real has so well described. Notwithstanding the circumstantiality with which the details are given by St. Real, the very existence of the conspiracy is still considered by many a very difficult historical problem. The probability is that the conspiracy was real, but that the Senate, satisfied with having discovered it, and not willing to break altogether with Spain, did not think it advisable to give it much publicity. It forms the subject of Otway's tragedy, 'Venice Preserved.' Bedmar was obliged to save himself by flight to avoid the fury of the populace, but he did not lose the favor either of his own sovereign or of the Pope. By the former he was appointed governor of the Low Countries, where his severity and rigor made him universally detested; and from the latter he received a cardinal's hat.

Bednur, bĕd-noor', or **Bednore,** a decayed city, now a village, of Mysore, India; in the midst of a basin in a rugged tableland of the western Ghats, at an elevation of more than 4,000 feet above the sea, 150 miles northwest of Seringapatam. It was at one time the seat of government of a rajah, and its population exceeded 100,000. In 1763, it was taken by Hyder Ali, who pillaged it of property to the estimated value of £12,000,000, and subsequently established an arsenal here.

Bedott', Widow, the literary name of Mrs. Francis Miriam Whitcher, author of the once famous 'Widow Bedott Papers.'

Bedouin, bĕd'oo-ĕn or bĕd'oo-ĭn, the name given to the nomadic Arabs, as distinguished from those settled in towns and villages and engaged in agriculture and manufactures. The Bedouin inhabit the deserts of Arabia and northern Africa, and are lean and short, but very active and capable of enduring great fatigue. They live mainly by hunting and pastoral occupations, and very little agriculture is carried on. Their food consists mostly of the produce of their herds, and they enjoy excellent health. Their temperament is cheerful, and they are honorable in their dealings with one another or with guests. Many of them, however, partly support themselves by robbery, but the statements regarding their marauding propensities seem to have been exaggerated. They live in tents, but frequently, when traveling, they sleep in the open air. Their religion is professedly Mohammedan, but is of a very simple character. The women grind corn and weave coarse cloths, and many of the tribes barter horses, camels, cattle, etc., for various necessaries, such as arms and cloth. Some tribes gain part of their subsistence by escorting travelers, pilgrims, etc., across the deserts. They are monogamous, but divorce is easily obtained and frequent. Though generally very ignorant, they are by no means unintelligent; and they possess the lively fancy of most Eastern nations. The head of a tribe is the *sheik,* and they have also judges known as *cadis.* See Burckhardt, 'Notes on Bedouins and Wahabys' (1830); Blunt, 'Bedouin Tribes of the Euphrates' (1879).

Bedreddin Hassan, bĕd-rĕd-dēn' häs'sạn, the hero of the amusing cream tart story in the 'Arabian Nights Entertainments.'

Bedstraw, Galium, a genus of about 200 annual or perennial herbs with four-angled stems, natives mostly of the colder climates, whether of latitude or altitude, in the northern hemisphere. The species, which are mostly harsh-feeling weeds, are often attractive for their regular whorls of leaves and their pani-

cles of profuse minute, white, yellow, green or purple blossoms which in some species are used by florists to add "misty delicacy and airy grace" to bouquets especially of sweet peas, and to cover rock-work in and out of doors. The two species most cultivated for this purpose are *G. mollugo* (European) sometimes called baby's breath (see GYPSOPHILA), and *G. boreale* (American). Yellow bedstraw or cheese rennet (*G. vernum*), a species with yellow flowers, is used for curdling milk. Its flower sprays yield a yellow dye when boiled in alum solutions and its roots a red one, said to rival madder as a wool dye. For this use attempts at cultivation have been made in England. This species, together with *G. trifidum* and *G. boreale*, redden the bones and milk of animals that eat them in quantity. Goose grass or cleavers (*G. Aparine*), a troublesome weed common to Europe, Asia, and America, yields a seed sometimes used as a substitute for coffee. It is noted for the hooked prickles of its stems, fruits, and leaves. In China *B. tuberosum* is cultivated for its farinaceous tubers. Some species, for instance, *G. mollugo* and *G. rigidum*, have been tried in cases of epilepsy and others in cutaneous disorders.

Bee, a name applied to those Hymenoptera which stand at the head of the order, and are represented by the bumblebee and the honeybee. They differ from the wasps in the mouth parts being longer, especially the tongue or proboscis. Each hind tibia is hollowed, broad, and so modified as to form a "honey-basket." The hairs are more or less spinulose or plumose, often of use in carrying pollen. Bees are solitary or social in their habits, and form nests consisting of either a single or many cells, and of varying materials and degrees of complexity. There are two families of bees: (1) *Andrenidæ*, comprising solitary bees, with the labian or under lip flattened and very short. They excavate nests in turf and in grassy sunny fields, making a deep pipe or hole, with short lateral galleries in which the grub feeds and grows. The species of Halictus and Andrena comprise the most common wild bees. They entertain guest bees (Nomada). See GUEST-BEES.

The family *Apidæ* includes the species of Bombus (see BUMBLEBEE), Xylocopa (see CARPENTER BEE); stingless bees (Melipona), and the honeybee (q.v.) *Apis mellifica*. In the bees the labium is usually produced into a long, slender, hairy proboscis, which is bent under the body. It is very long in Anthropora, and in Englossa longer than the body. The basal joints of the labial palpi are longer than the others. The mouth-parts are complicated and adapted for manifold purposes connected with nest- or cell-building and the collection of nectar and pollen. Indeed the bees stand at the head of the insect series, whether we take into account their structure, mode of development, habits, instincts, and differentiation of the sexes, though the flies (Diptera) are in their way more specialized, but the specialization of certain parts in flies is accompanied by the degeneration and atropy of others. The humble-bee besides its ordinary use in nest-building employs its jaws to cut holes in flowers in order to reach the nectar.

The transformations of the bee are complete. The larva is a footless maggot incapable of extended locomotion and lives in its cell where it is fed by the workers, or lives on pollen or honey stored up in the cell; the food is always derived from plants or other bees, although honeybees have been observed licking meat. The cells of the honeybee are open, the workers feeding the larvæ with a mixture of honey and pollen, the honey being specially adapted to be digested by the young. The larva transforms into the pupa within its cell, previously spinning a slight cocoon, or in the case of the honeybee simply closing the mouth of its cell with a cover of silk.

The sting of the queen bee is curved, of the worker straight; it is composed of three pairs of processes arising from the under side of the segments near the end of the abdomen, wherein is the poison-sac.

Besides male and female, there are in the social species numerous barren females or workers, in which the ovaries are small and undeveloped. Occasionally worker bees are capable of laying eggs and producing young. The difference between the workers and the fertile females or queen is now known to be due to the difference in the food given to the larvæ; that of the queen larva being richer in nitrogenous substances than that fed to the larval workers. Thus heredity has nothing to do with the matter; the larvæ of the workers and of the queen inherit the same peculiarities; the barrenness and smaller size of the worker bee is the result of being fed with different food.

Bees are essential agents in the fertilization of flowers, in setting fruit, and were it not for them it is now supposed that we should not have had the irregular flowers of the pea and other papilionaceous plants. It is a notable fact that the incoming or origin of flowers and of the bees and other insects which visit them was geologically about the same time. At any rate bees ensure the existence of flowers and the latter have modified bees.

The number of known species of bees is upward of 5,000. They abound in all parts of the world, especially the tropics; while humblebees (*Bombus*) reach the polar regions and live as alpine forms on high mountain plateaux and ranges. For the different kinds of bees, see also BEE-KEEPING; BUMBLEBEE; CARPENTER BEE; HONEYBEE; LEAF-CUTTING BEE; MASON BEE; STINGLESS BEE; also INSECT.

Bee-birds, birds that devour bees, especially the honeybee. Not many birds have this habit, the bees being protected against most birds by their stings. A few fly-catching birds, however, have learned how to avoid being stung, and catch not only bees but wasps, take them to a perch and beat them, so as to kill them, and probably get rid of the sting before swallowing them. Notable among these are the European and African bee-eaters (q.v.). The American kingbirds (q.v.), also catch bees, but not as frequently as is popularly supposed, and are known in the southern States as "bee-martins."

Bee-eater, a small, richly plumaged, and graceful bird of southern Europe and northern Africa, whose food consists almost wholly of bees and wasps, and which haunts the neighborhood of the hives of honeybees and devours these useful insects in great numbers. The bee-

1. Drone.
2. Queen.
3. Worker, with front view of each.
4. Italian bee.
5. Egyptian bee.
6. Comb with open and closed cells, (a), queen cell.
7. A swarm; 8–15, Bee enemies.
8. Hornet.
9. Bee wolf.
10. Wasp.
11a, Male; 11b, female, and 11c, larvæ of the May worm.
12, 12a. Bee beetle and larva.
13, 13a. Bee fly and larva.
14, 14a. Wax moth and larva.
15. Bee louse, enlarged.

eaters are related to the kingfishers, and like them dig deep nesting-holes in earthen banks, and lay pure white eggs.

Bee-keeping. Few persons who see the little boxes of honey in the market realize the importance and extent of the bee-keeping industry of this country. Careful estimates, based on United States statistics, and the output of large factories for the manufacture of bee-hives and honey-boxes, show that at least 125,000,000 pounds of honey is annually produced, making an aggregate of 5,000 carloads, or a train 35 miles long. The aggregate value of this, at a conservative figure, is $10,000,000. When it is remembered that California alone, in a good year, can produce 500 carloads of honey, and that a good many of the other States produce from 50 to 100 carloads, one can form some idea of the commercial possibilities wrapped up in so small an animal as the bee.

Bee on the wing.

Bee on Red Clover.

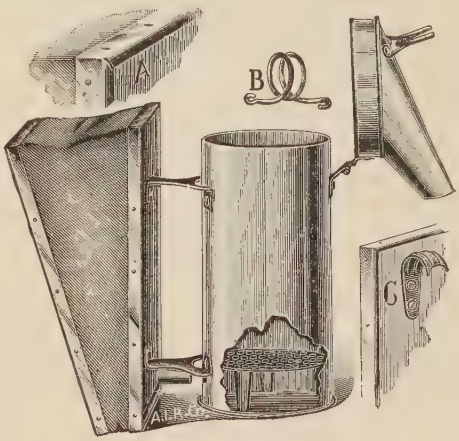
The honey resources of the great West are very largely dependent on alfalfa and mountain sage. In the north-central and eastern States, clover and basswood, in the south-central, tupelo, palmetto, catclaw, mesquite, and guajilla.

There are several races of bees — *Apis dorsata,* or the giant bee of India and of the Philippines; *A. Indica,* of India; *A. florea,* and *A. mellifica.* From a commercial standpoint, the last mentioned is by all odds the most important. It comprises the black or German bees of this country; the Italians, from the southern part of Italy; the Syrians, of Palestine; the Cyprians, from the island of Cyprus; the Carniolans, from Austria; and the Tunisians, from North Africa. But the most important of all of these varieties is the Italian. They are the most industrious and the gentlest. They, together with the black or German bees and their crosses, incorrectly termed "hybrids," are used most extensively in the United States — in fact, throughout almost all the civilized world.

Three Kinds of Hive Bees.—There are three kinds of bees in the hive; namely, the workers, or undeveloped females; the queen, a fully developed female; and the drone, or the male bee. The queen lays all the eggs of the hive, and may lay as many as 3,000 a day. Notwithstanding there may be from 10,000 to 100,000 bees in a single colony, the queen will be the mother of the whole colony. The drones are incapable of gathering honey, and serve only one purpose — that of fertilizing or fecundating the young queens, which act takes place in the air. The workers gather all the honey and pollen, fill all the combs, and rear the young or baby bees. As soon as the mating season is over, the drones are shoved out of the hives and allowed to starve.

Queen Bee.

How to Handle Bees.— There is a general impression to the effect that the ordinary honey-bees are vicious, ever in a towering rage, ready to attack any one who comes near their hives. This is a great mistake. Under certain conditions, when their habits are known, they can be handled almost like kittens; will permit one to tear their hives apart, rob them of their months and months of hard earnings — the honey and the wax — without even offering to sting. But an inexperienced or awkward person may infuriate them to fearful vengeance. To bring them into a state of subjection it is only necessary to blow smoke into the entrance and over the combs, when, if the motions about the hive are careful and deliberate, they will offer no attack. Smoke, when intelligently used, disarms opposition, puts the bees in a quiet state, and enables their owner to do with them, within reasonable limits, whatsoever he will.



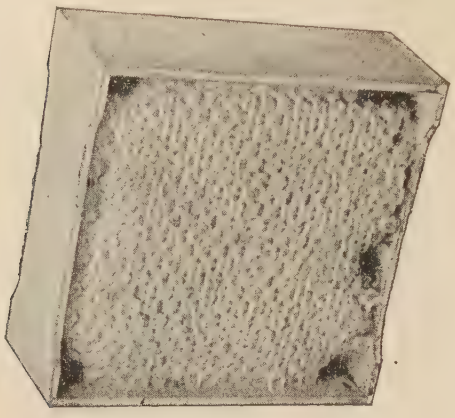
Bee-Smoker.

The bee-smoker is simply a small bellows attached to a sort of tin cup having a suitable snout from which the smoke is blown by the action of the bellows, forcing air through the cup in which there is a slow-burning fuel. Besides the bee-smoker, the bee-keeper generally uses a bee-veil made of mosquito-netting, Brussels net, or any suitable material, the same fastened to the rim of the hat, and tucked inside of the coat-collar or under the suspenders. Gloves are sometimes used by very timid persons or beginners; but as a general thing all work with the bees is performed with the bare hand. Stings are, of course, occasionally received; but beyond a sharp momentary pain no permanent effect will be felt after the first season; for the system of the bee-keeper very soon becomes

Bee-Veil.

inoculated so that no swelling takes place. There are many who receive from ten to twenty stings a day, without any ill effects; but if one will work carefully he will receive almost no stings.

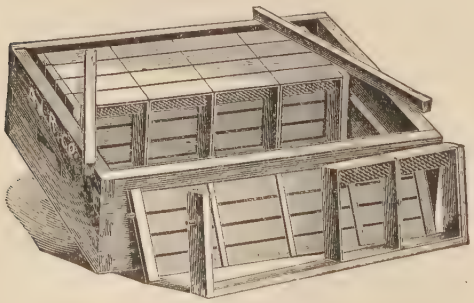
Marketable Products of the Hive.—These are beeswax, comb and extracted honey, propolis or



Section of Comb Honey.

bee-glue (sometimes used for making shoe polishes), and "apis mellifica," a homeopathic preparation taken from the poison sacs at the root of the stings of bees. While beeswax is an important product, and commands a good price in the United States, comb and extracted honey are the main sources of revenue to the bee-keeper.

Comb honey is usually put up in little square or oblong boxes, of which something like 50,000,000 are made and used in the United States annually. The honey in these boxes retails all the way from 12 to 20 cents. Extracted is honey in the liquid form, thrown from the combs by means of centrifugal force in a honey-extractor, hence the name. There are bee-keepers who make a specialty of producing honey in the comb, and others the same product free from the comb. The first mentioned can not be adulterated nor manufactured, newspaper reports to the contrary. One bee-keeper of considerable standing and prominence has had a standing offer of $1,000 for a single

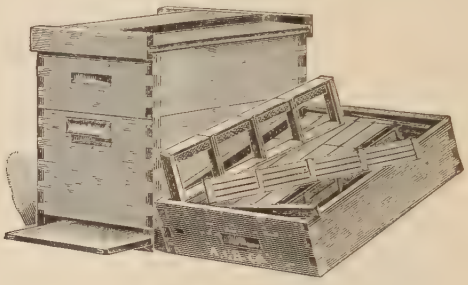


Comb Honey Super.

sample of artificial comb honey so perfect as to deceive the ordinary consumer. Notwithstanding that this offer has been broadly published over the United States for over twenty years, no one has ever claimed it.

It may be well to explain that a partial basis for these canards lies in the fact that bee-keepers use a commercial product known as "comb foundation," which is nothing more or less than sheeted wax, about an eighth of an inch thick, embossed on both sides with indentations having the exact shape and form of the bottom of the cells of honey-comb — hence the name. It is put into the hive, where the bees draw it out into comb. This is as far as the skill of man can go; hence there is no such thing as artificial comb; much less, artificial comb honey.

The business of producing comb honey re-



Bee Hive for Comb Honey.

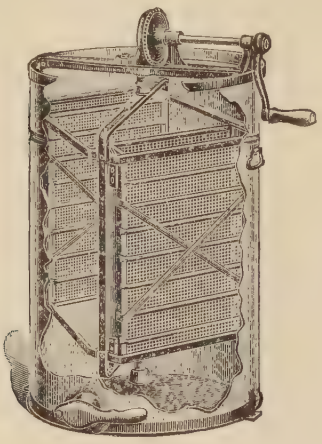
quires some knowledge of the trade. Hives and supers require to be specially constructed, and so arranged that the little boxes containing strips of comb foundation shall be accessible to the bees where they can construct the foundation into comb, fill the cells with honey, and seal them over. When their owner finds that his little servants are busily at work in the

Uncapping Can.

fields; that the combs are beginning to whiten and to be bulged with honey in what is called the brood-nest, he puts on his honey-boxes in

the part of the hive he calls the «super.» These are allowed to remain on during the height of the honey-flow until they are filled and capped over, when they are removed and others put in their place.

The business of producing extracted (or liquid) honey requires the same intelligent care and attention. Instead of section-boxes, however, an extra set of combs, or «brood-frames,» as they are called, are put in the upper story, the same being placed above the lower or brood part of the hive. When these are filled with honey, and capped over, they are removed from the hive by first shaking the bees off, taken to the extracting-house, and extracted. The thin film of wax covering the comb is shaved off with a thin-bladed knife specially designed for the purpose. After the combs are uncapped they are put in the honey-extractor, and revolved at a high rate of speed. The honey flies out of the comb by centrifugal force against the



Honey Extractor.

sides of the extractor, when the combs are reversed, exposing the other surfaces, which are emptied in a like manner. They are next returned to the hive to be filled by the bees, when the process may be repeated as long as the season lasts.

Swarming.— At the beginning of or during what is called the honey-flow, when the colony has reached a high state of prosperity, and the combs are being filled with honey, a swarm is liable to come forth between the hours of nine and three o'clock. Three-fourths of the bees, including the queen, are pretty sure to come out with a rush, filling the air with thousands and thousands of them. The bees hover about in the air for fifteen or twenty minutes, when they will in all probability cluster on some bush or tree. They will wait here for two or three hours, or perhaps as many days, at the end of which time they will take wing again and go direct into some hollow tree or cave where they will take up new quarters and start housekeeping anew. The young bees, with one or more young queens, are left to take care of the old hive.

In ordinary practice it is a custom for the bee-keeper to rehive the swarm by taking the bunch of bees, as soon as it clusters, and putting it into another hive. Or he can, if he chooses, clip the old queen's wings, preventing her flight with the swarm; and when the bees come forth she will crawl out of the entrance to be captured by her owner; and as soon as her subjects return, which they will do to find their royal mother, they are allowed to go into a new hive on the old stand, while the old hive is carried to another location in the bee-yard.

Robbing.—There are certain times during the season when no nectar is secreted by the flowers. It is during such periods as this that the bees will rob each other if they can, or help themselves at candy-stands or to the housewife's fruit-preserves during the canning season. When sweets can be obtained in considerable quantity, either from a weak colony unable to defend itself, or from man, the bees are apt to become furious, and their craze is not unlike that of gold-hunters when gold is discovered in large quantities. There is a rush; and when the sweets are suddenly cut off, the bees are inclined to be cross, and to sting. The wise and careful bee-keeper will see to it that the entrances of his weak colonies are properly contracted so that the sentinels or guards can protect themselves from intrusion from other bees.

Feeding.—The bee-keeper may, perhaps, take all the honey away from his bees, or nearly so, as his honey will bring two or three times as much as any cheap syrup costs him. Sometimes he finds it profitable to take the honey all away and give them syrup made of granulated sugar. The purpose of this, of course, is to keep them from starving during the time no honey is coming in from natural sources or during the winter.

Uniting.—After the honey-flow, and just before winter comes on, there are liable to be many weak colonies. It is a common practice to put two or more of these together so as to make one strong stock. The combs from two or three different hives are put into one hive, and the bees are confined for several days with wire cloth over the entrance, when they are allowed to fly. Some of them will return to their old stands, but the majority of them will remain.

Wintering.— Two methods are in vogue in the colder portions of the United States. One is, to put the colonies in double-walled hives, packed under chaff cushions, and contracting the entrances down to shut out as much cold as possible. The other is, to put the summer hives into a dry dark cellar as soon as cold weather comes on, leaving them there till spring.

Diseases of Bees.— Bees are subject to diseases, like all domestic animals, such as dysentery, paralysis, and foul and black brood. Dysentery, as its name signifies, is a sort of bowel trouble due to the retention of the feces for an extended time during winter. If the bees are shut up without a chance for flight (for they never void their feces inside of the hive except when confined), their intestines become distended, and this finally results in purging. The only remedy is warm weather and a flight. Paralysis is a form of palsy that seems to affect the adult bees. Their bodies become swollen and shiny, the affected individuals crawling out of the entrance, and running into the grass to die. The remedy is to sprinkle powdered sulphur over the combs. Foul brood and black brood are germ-diseases that affect bees in the

larval or imago state. The little maggots become brown or black, and die, the dead matter finally assuming a sodden, gelatinous, or ropy condition. When it attacks a colony shake the bees into a clean hive, and put them on frames of foundation. For three or four days feed them sugar syrup. The old combs, including the frames, must be burned. If the hive has been soiled by the tainted honey or dead matter, it must be scalded out or held over flames for a few seconds. Any honey taken from the hive may be rendered safe to give to the bees by boiling it for two hours.

Bibliography.— Root, 'A B C of Bee Culture' (1903); Miller, 'Forty Years Among the Bees;' Langstroth, 'The Honey-Bee,' revised edition (1889); Hutchinson, 'Advanced Bee Culture' (1902); Cook, 'Manual of the Apiary' (1902); Root, 'Quinby, New Bee-keeping;' and the following periodicals: 'American Bee Journal,' published in Chicago, Ill.; 'Gleanings in Bee Culture,' Medina, Ohio; 'Bee-keepers' Review,' Flint, Mich.; 'American Bee-keeper,' Fort Pierce, Fla.; 'Progressive Bee-keeper,' Higginsville, Mo.

E. R. Root,
Author of 'A B C of Bee Culture' and Editor of 'Gleanings in Bee Culture.'

Bee-killer, one of the robber-flies (q.v.), of the dipterous family *Asilidæ,* some of which are known to seize with their sharp lancet-shaped beak bumblebees and honeybees, and suck their blood. This species *Trupanea apivora,* the bee-killer, captures the honeybee while on the wing, and one such fly has been known to kill 141 bees in a single day. These flies are stout-bodied, hairy or bristly, with a long abdomen; the mouth-parts are much developed and adapted for piercing. The maggots live in the soil, preying on the grubs of beetles, or on the roots of plants.

Bee-larkspur. A well-known flowering plant, *Delphinium grandiflorum.*

Bee-line. The shortest route to any place, that which a bee is assumed to take; though, in fact, it often does differently in its flight through the air.

Bee-louse (*Braula coeca*) is a parasite on the honeybee, occurring on the thorax especially of the queen bee — rarely on the drones. Benton states that he has at one time removed as many as 75 from a queen, though the numbers do not generally exceed a dozen. It is the sole member of a family (*Braulidæ*) of flies closely allied to the horse flies (*Hippoboscidæ*) and the bat-ticks (q.v.). The bee-louse is about one twentieth of an inch in length, entirely without wings, and somewhat spider-like in appearance. On the day the maggot or larva hatches from the egg it sheds its skin and turns to an oval puparium of a dark-brown color. It has frequently been imported to this country on queens with attendant bees but has gained no foothold.

Bee Moth, or **Wax Moth,** a moth belonging to the family *Galleridæ;* specifically, *Galleria mellonella,* the larva of which feeds on wax in hives. The worm is yellowish-white with brownish dots. It constructs silken galleries running through the comb of the bee-hive on which it feeds. When about to transform it spins a thick white cocoon. Two broods of the moth appear, one in the spring, the other in August, and the caterpillars mature in about three weeks. It may become a most troublesome pest in the apiary.

Bee-orchis, the name of a species of orchis, the *Ophrys apifera* It is so called because a part of the flower resembles a bee. It is large, with the sepals purplish or greenish-white, and the lip brown variegated with yellow.

Bee-tree, a forest tree inhabited by honey-making bees, which have taken possession of some natural hollow and filled it with combs. Such a tree may be found by accident, or by deliberate hunting. Those in search take to the edge of the woods a box of diluted honey, and when they see bees near them, open the bait to which one by one the bees will be attracted. The direction of their flight is then carefully observed; the bait is moved to another point, and new observations taken, and the converging lines followed until they intersect at the tree. As most of these bee-tree colonies are escaped swarms the capture of the bees themselves is more important than merely to get such honey as may be there. The best plan is therefore to climb to the nest, if possible, and gather the combs and contents to be let down in a pail or basket, or else saw out the whole section of the tree containing the nest and lower it to the ground. Full directions for this complicated proceeding are given by Root, 'A B C of Bee Culture' (1903).

Beech, a small genus (*Fagus*) of handsome forest trees of the natural order *Fagaceæ,* divided by some botanists into two genera: Eufagus, containing five species natives of the northern hemisphere; and Nothofagus, embracing 12 species indigenous to the southern hemisphere. The American beech (*Fagus ferruginea*), and the European or common beech (*F. sylvatica*), are closely similar. They often attain heights exceeding 80 feet, and diameters greater than 3½ feet. The former has smooth, light-gray bark, a broad round head, and leaves which turn yellow before they fall in the autumn; the latter has dark-gray bark, is more ovate in general outline and has shining leaves which persist during most of the winter. The tree scarcely bears fruit before the 50th year of its age, and then not every year. After the 140th year, the wood-rings become thinner. The tree lives for about 250 years. Some stems are fluted, some even twisted. The roots stretch far away, near to the surface of the soil, partly above it. Young beeches are useful for live hedges, as they bear pruning, and as their branches coalesce by being tied together, or by rubbing each other. Amputations of limbs, and deep incisions in the tree, soon become obliterated by the bark, which contains a peculiar periderma. The dead leaves are often used by the poor of Europe for stuffing beds and pillows. Each yields pleasant, edible, three-angled nuts, usually in pairs in prickly involucres. These nuts are eaten by swine, deer, and poultry, and in France, and to some extent elsewhere, are pressed to extract a mild culinary long-keeping oil. Both species thrive in light, limy loams, upon which formations they often become the leading species of tree, covering large tracts. They do not grow in damp situations. Their reddish-brown, solid, hard but brittle wood makes excellent fuel, and is largely used

1. Young branch with male and female flowers.
2. Single male flower.
3. Single female flower.
4–5. Fruit and fruit case.
6. Twig with two buds.
7–8. Varieties of the Beech.

BEECH TREE (Fagus sylvatica).

for making tool handles where bending and twisting are not expected. The wood is not durable in contact with soil, but since it is remarkably lasting when immersed in water, it is largely used in dams, water-mills, sluices, etc. The wood of the European species is preferred to that of all other species, except walnut, for making shoes (*sabots*), in France, since it is remarkably resistant to the entrance of water. The bark is sometimes used in tanning. Both species are used in ornamental planting on account of their symmetrical forms, the colors of their bark and foliage, which latter is remarkably free from the attacks of disease and insects. The European species has produced a large number of varieties, of which the copper or purple beech is probably the best known in America. *F. Sieboldi,* a native of eastern Asia, is sometimes planted for ornament. *F. Cunninghami,* the "myrtle tree" of Tasmania, is a large tree with leathery birch-like leaves. *F. betuloides,* a Terra del Fuegian species, is a striking feature of the winter landscape on account of its evergreen foliage. Its wood is used for flooring vessels, and is exported to the Falkland Islands and elsewhere for roofing. Blue or water beech, better known as American hornbeam (*Carpinus americana*), is a common tree in damp woods and along streams. It is not a member of this genus. See HORNBEAM.

From the wood of the beech an especially pure form of creosote is obtained that is largely employed in the treatment of chronic lung disorders. See CREOSOTE.

Beech Drops, a plant parasite on beech tree roots. See CANCER ROOT.

Beecher, Catherine Esther, American educator and philanthropist, eldest daughter of Lyman Beecher: b. East Hampton, L. I., 6 Sept. 1800; d. Elmira, N. Y., 12 May 1878. Her faith and life were nearly wrecked at 22 by the loss of her betrothed, Prof. A. M. Fisher of Yale, in a shipwreck, and she lived unmarried, plunging into work as a relief; but she had the Beecher energy which could hardly have remained quiet in any case. From 1822 to 1832 she managed a girls' school in Hartford, Conn., with remarkable success and repute; she wrote some of her own class-books, one on mental and moral philosophy being afterward used in colleges. From 1832 to 1834 she kept a similar school in Cincinnati, in order to be with her father, who was at the head of Lane Seminary; but her health compelled her to abandon it. For the rest of her life she worked with heart and soul to advance the education of women and girls, physical and social, as well as intellectual and moral, for she believed in the full harmony of all inborn human qualities. She organized a "National Board of Popular Education," to train women teachers, especially for the South and West, and traveled and wrote extensively in this behalf. As with most persons of much force, she had many "fads" and eccentricities; but she was a high-minded, accomplished, and charming woman, full of wit and executive capacity. Her first work was on the 'Difficulties of Religion' (1836); among others were 'True Remedy for the Wrongs of Women' (1851); 'Physiology and Calisthenics' (1856); 'Common Sense Applied to Religion' (1857); 'Woman's Profession as Mother and Educator, with Views in Opposition to Woman Suffrage' (1871).

Beecher, Charles, American clergyman, son of Lyman Beecher: b. Litchfield, Conn., 7 Oct. 1815; d. Haverhill, Mass., 21 April 1900. He was educated successively at the Boston Latin School, the Lawrence Academy at Groton, Mass., and at Bowdoin College, graduating 1834. He then studied theology under his father at Lane Seminary, Ohio, and in 1844 was ordained pastor of a Congregational church at Fort Wayne, Ind. Leaving there in 1851, he was pastor in Newark, N. J., till 1854, and in 1857 took charge of a church in Georgetown, Mass. He lived in Florida, 1870–7, and was State superintendent of public instruction there for two years, and was stated supply at Wysox, Pa., in 1885. His best work was in the selection of the music for the famous 'Plymouth Collection' of hymns, he having fine musical taste. He wrote 'The Incarnation' (1849); 'David and His Throne' (1855); 'Pen Pictures of the Bible' (1855); 'Redeemer and Redeemed' (1864); 'Spiritual Manifestations' (1879); and 'Eden Tableau' (1880). He also edited his father's autobiography and correspondence (1863).

Beecher, Charles Emerson, American palæontologist: b. Dunkirk, N. Y., 9 Oct. 1856; d. New Haven, Conn., 14 Feb. 1904. He graduated at the University of Michigan 1878, studied under Prof. James Hall at Albany, N. Y.; in 1888 was given a position in this department at Yale; in 1892 was made professor of historical geology; and in 1892 succeeded Prof. O. C. Marsh as professor of palæontology and curator of the geological collections. He has written over 50 papers for scientific periodicals, and the proceedings of scientific societies, chiefly on evolution, especially as illustrated by the growth and structure of trilobites, and on the classification of trilobites and brachiopods; a number of these and similar studies on other organisms were collected as 'Studies in Evolution' (1901), one of the Yale bicentennial publications. He also published a memoir on the *Brachiospongidæ* in the Yale Peabody Museum Memoirs (1889).

Beecher, Edward, American clergyman, son of Lyman Beecher: b. East Hampton, L. I., 27 Aug. 1803; d. Brooklyn, N. Y., 28 July 1895. Graduating at Yale 1822, he studied theology at Andover and New Haven, and in 1826 was ordained over Park Street Church in Boston; which he left in 1830 to take the presidency of Illinois College, Jacksonville, Ill., a theological school, whence many of Dr. Beecher's pupils went to be pastors and teachers in the new West. He returned to Boston in 1844 as pastor of the Salem Street Church; in 1856 went to the Congregational church at Galesburg, Ill., remaining till 1872, also holding for some years a professorship of exegesis at Chicago Theological Seminary. He had been a regular writer for the *Christian Union* since 1870, and in 1872 retired from the ministry, removed to Brooklyn and devoted himself entirely to writing and missionary work, contributing to the *Christian Union,* and editing the *Congregationalist* for six years. Of his books, the two most discussed were 'The Conflict of Ages' (1853), and 'The Concord of Ages' (1860), a transference into terms of Christian theology of the doctrines of pre-existent and continuously existent souls and the dualism of good and evil, the struggle of the two being prolonged into a future life and good finally triumphant. Besides sermons, etc.,

he also published a 'History of the Alton Riots' (Cincinnati 1837); 'Baptism' (1850); 'Papal Conspiracy Exposed' (1855); 'History of Opinions on the Scriptural Doctrine of Future Retribution' (1878).

Beecher, Henry Ward, American clergyman, eighth son of Lyman Beecher: b. Litchfield, 24 June 1813; d. Brooklyn, N. Y., 8 March 1887. He was the offspring of a union which has produced some of the world's greatest influences, and in theory ought always to produce them — of a stern, energetic, high-principled father, with a sweet and beauty-loving mother, giving power and continuity to sensibility and sympathetic emotion. Macaulay and Victor Hugo are notable instances in this respect. He had a rather bare, hard childhood, under a father and stepmother who both considered duty and enjoyment hardly compatible. The great genial orator who shouted down and won over hostile mobs was a shy and sensitive boy; the editor, author, and book-lover had a wretched memory, disliked study, and wanted to go to sea. But the religious atmosphere was around him: "converted" in a revival, he decided to train for the ministry, entered the Boston Latin School in 1826, then the Mount Pleasant School at Amherst, graduated from Amherst College 1834, and began a theological course under his father at Lane Seminary. He revolted at his father's sulphurous theology, however, and for a short time in 1837 was editor of an anti-slavery paper in Cincinnati, fervid love for humanity holding first place with him then as always. Later in the year he took charge of a country church at Lawrenceburg, Ind., and married Eunice White Bullard, of West Sutton, Mass., to whom he had been seven years engaged. In 1839 he was called to a church in Indianapolis, then a town of 4,000 people, remaining there eight years and becoming widely known both as a revivalist of great power and a preacher of delightful humor and originality. In 1847 he was called to Brooklyn to take charge of a new church of nine members, called Plymouth Church. He held this pastorate for 40 years, lacking a few months; and for the most of the time the church was not only a Mecca to the vast class seeking to retain Christianity while forced to discard very much in the way of theology, but the fountain of a stream of influence acting powerfully on the moral and social, and sometimes the political tendencies, of the age. He preached on whatever related to the public welfare, probed every evil and championed every reform, especially of intemperance and slavery. His outspoken courage, strength of thought, and felicity of expression, his exhaustless wealth of eloquent rhetoric, humor and pathos, dramatic force, and apt analogy and illustration, not only drew to hear him one of the largest permanent congregations in the United States — his immense church with its seating capacity of nearly 3,000 being constantly crowded — but made his pulpit one of the most famed and influential of the English-speaking world; his utterances forming a basis of action for many. He was not a theologian in any sense, and his influence rested on his abstinence from credal logic: he was the spokesman of those who fear that if they compute their doctrinal latitude they may discover much more than they wish to know, and prefer to keep the fruits of faith by evading exact definition rather than lose them by a rigid self-inquiry. To the orthodox of his day he seemed an underminer; though to many at the present he seems conservative enough. He believed in the divinity of Christ, in immortality, in special providences and miracles, in the Bible as a divine revelation by fallible human instruments; he did not believe in eternal punishment (which he publicly denied in 1878), election and reprobation, the fall of Adam, the vicarious atonement, or imputed sin and righteousness; and he declared the orthodox Deity "barbaric, heinous, hideous." He gave his whole soul to the work of preaching, often delivering several discourses in a single day; but such was his physical and mental vigor that he accomplished work in several other directions sufficient in each case for an able and lusty man. He was one of the giants in oratory of the anti-slavery time; and none of the champions of the cause was more hated and reviled than "the abolitionist Beecher," whose work was excelled only by that of his great sister, and who left his pulpit in the Fremont campaign to denounce the Kansas crime, joining the Republican party on its inception and traveling great distances to speak at its meetings. Yet he was not an abolitionist like Phillips and Garrison: and like Lincoln and the mass of the Republicans, held that Congress could not interfere with slavery in the South, but only prevent its extension. The pro-slavery party drew no fine distinctions, however, and the northern Democratic papers all through this period are filled with denunciation and caricature of him. His series of speeches in England in the fall of 1863 helped to turn the tide of English opinion in favor of the North. The prime element of his success was his enormous physical vitality: he tired out the mobs which howled him down, by actual bodily endurance and power of lungs, before he began the splendid addresses which made them at least enthusiastic admirers of himself, if not perhaps converted believers in the Union. He had the "rapture of the strife" which Attila knew: he loved to be the target of a ring of opponents as well as John Quincy Adams, though without his bitterness, and was as instant and unfailing in retort; a dozen taunts hurled at him in a breath met a dozen crushing but never malicious answers. He was for many years one of the most popular lecturers and after-dinner speakers in America. Of his set orations, those at the Burns centennial of 1859, and by government request at Fort Sumter, in April 1865, on the anniversary of its capture by the Confederates are most famous. He occupied several editorial positions: editing the *Independent* 1861–3; founding the *Christian Union,* editing it 1870–81; was a fertile sketch writer, and wrote a novel and a 'Life of Christ.' Besides this, he was an enthusiastic amateur farmer, and loved outdoor nature passionately, as well as art and the drama. His open, impressible, sensitive nature responded readily to all things that stimulate the intellect, the heart, or the soul. He was essentially a man of impulses and inspirations, trusting to the spontaneous suggestion of the moment, often not even making notes for a sermon; but like all men who make any impress on the world, kept himself filled with material for inspiration to work on,

HENRY WARD BEECHER.

both from books and life. He always lamented that it had not been permitted him to lead a life of scholarship; but in fact he did not lead it because he was not willing to pay the price for it, of abstinence from leadership in the political and social life of the time. He never lacked courage to take a side, right or wrong, and often grieved and alienated large bodies of his friends by doing so when passions were hot. He was a firm adherent of the Seward-Johnson policy of reconstruction in 1866, despite the terrible results to which its prematurity led; sympathized with the Greeley movement in 1872; and braved a threatened disruption of his church in 1884 by voting and speaking for Cleveland. He believed in and advocated free trade and woman suffrage. So brave and impulsive a nature was always shocking the conventions of his order. Naturally, he was forever perpetrating indiscretions in speech, to the delight of his enemies and the discomfiture of his friends. Tact was unfortunately not a large inheritance of most of Lyman Beecher's children, and the paucity of Henry Ward's share was the cause of many an inept and unfortunate public utterance; while his fertility of comparisons and analogies often led him into pithy exaggerations and a humorous extravagance of language which his opponents could easily disprove in the letter.

In 1874 Mr. Beecher's former associate and later successor in the editorship of the *Independent,* Theodore Tilton, charged him with criminal intercourse with Mrs. Tilton. A committee of Plymouth Church examined the case and exonerated Mr. Beecher; but Tilton had brought suit for $100,000 against him, and after a six months' trial the jury disagreed, a week's confinement and 52 ballots showing three for the plaintiff and nine for the defendant. The long public scandal seriously affected Beecher's influence with the outside public, but his own congregation stood loyal to him; and while his 'Life of Christ' was unsalable, and the last two volumes not published till long after his death, his sermons and some of his essays remain popular.

Mr. Beecher's first literary work was done in his Indianapolis pastorate, where he edited an agricultural paper, and wrote for it articles afterward republished as 'Fruits, Flowers, and Farming'; and published his first book, 'Lectures to Young Men' (1844). For 20 years after coming to Brooklyn he contributed regularly to the *Independent,* signing with a (*), whence the two-volume collections of 1855 and 1858 were termed «Star Papers.» He was also for some time a regular contributor to the New York *Ledger* of «Thoughts as They Occur,» collected in 1864 as 'Eyes and Ears'; and wrote serially for it his one novel, 'Norwood' (1867). His sermons were reported in full after 1859, and the collected volumes are termed 'Plymouth Pulpit.' A two-volume selection revised by the author was issued by Lyman Abbott in 1868; other compilations from them are 'Life Thoughts' and 'Notes from Plymouth Pulpit' (1859); 'Pulpit Pungencies' and 'Royal Truths' (1866); 'Morning and Evening Devotional Exercises' (1870); and 'Comforting Truths' (1884). For some years, also, his prayers, of great charm and high quality as compositions, were taken down by stenographers and a collected volume issued in 1867. Other of his works are: 'Freedom and War' (1863); 'Aids to Prayer' (1864); 'Lecture-Room Talks' (1870); 'Yale Lectures on Preaching' 3 vols. 1872–4); 'Evolution and Religion' (1885). Individual sermons and addresses were published also, such as 'The Strike and Its Lessons' (1878); 'Doctrinal Beliefs and Unbeliefs' (1882), 'Wendell Phillips' (1884); 'A Circuit of the Continent' (1884). He also edited the famous 'Plymouth Collection' of hymns (1855); and 'Revival Hymns' (1858). His life was written before his death by Lyman Abbott (1883), and Samuel Scoville (1888); see also 'Autobiographical Reminiscences of Henry Ward Beecher,' by T. J. Ellinwood, who was his private stenographer for 30 years.

Mr. Beecher's wife, EUNICE WHITE BULLARD, was born in West Sutton, Mass., 26 Aug. 1812; d. Stamford, Conn., 8 March 1897. She wrote articles for periodicals, some of them afterward collected: also 'From Dawn to Daylight' (1859), a story of her early married life; 'Motherly Talks with Young Housekeepers' (1875); 'Letters from Florida' (1878); 'All Around the House' (1878); and 'Home' (1883).

Beecher, James Chaplin, American clergyman, son of Lyman Beecher: b. Boston, Mass., 8 Jan. 1828; d. Elmira, N. Y., 25 Aug. 1886. He graduated at Dartmouth 1848, studied theology at Andover, and in 1856 was ordained a Congregational clergyman; thence till 1861 was chaplain of the Seamen's Bethel in Canton and Hong Kong, China. Entering the Civil War as a chaplain, he rose to the rank of brevet brigadier-general and subsequently held pastorates in Owego, N. Y., 1867–70, Poughkeepsie 1871–3, and Brooklyn 1881–2. After 1864, a sufferer from mental troubles, his last three years were passed in much distress, and he finally committed suicide.

Beecher, Lyman, American theologian: b. New Haven, Conn., 12 Oct. 1775; d. Brooklyn, N. Y., 10 Jan. 1863. He was a blacksmith's son and himself a blacksmith's helper and farmer's lad in boyhood. Entering Yale College at 18, he graduated in 1797, studying also theology under President Dwight till 1798, when he became supply at East Hampton, L. I., and was ordained there 1799, remaining till 1810. His remarkable pulpit oratory gained national repute from a sermon in 1804 on Alexander Hamilton's death at Burr's hands — an occasion which made more than one reputation, all utterances being eagerly scanned from the excitement and party feeling. In 1810 he was called to Litchfield, Conn., the seat of a celebrated law school and other educational institutions, at a time when New England was the intellectual autocrat of the country, and towns were few and small; and soon became recognized not only as the foremost man in the Congregational body, but one of the greatest of American preachers. About 1814 a half-dozen sermons of his against intemperance, then a common vice among even the clergy, were not only widely read in America and England, but were translated into several foreign languages. He also took a foremost part in organizing Bible and missionary societies, etc.; and his courage, power, and energy made many look to him for guidance and succor in trouble. This came in a flood during the next decade, when the Unitarian movement, under Channing and its other great early leaders, was sweeping the Congregational churches

around Boston off their feet; and Mr. Beecher, in 1826, at the urgency of influential clergymen, accepted a call to the Hanover Street Church in Boston to stem the tide, which his polemic ardor perhaps aided in doing. In 1832 he accepted the presidency of Lane (Theological) Seminary near Cincinnati, Ohio, which had been endowed on the express condition of his taking charge of it, to strengthen Calvinism in the rapidly growing West; he remained there till 1852, holding also the chair of sacred theology, and was its titular president till death. He was also pastor of the Second Presbyterian Church in Cincinnati 1832–42. In 1833 the famous philanthropist Arthur Tappan, the chief founder of Lane, sent the students a report of the proceedings of the Philadelphia abolition convention of that year; the students, partly southern, at once fell into disputes on the subject of slavery. The trustees vainly tried to check the meetings and discussions; Kentucky slaveholders came over and urged violent suppression of these meetings and threatened the destruction of the seminary. The trustees in terror forbade all further discussion of slavery, and therefore all the students deserted in a body. The most of the anti-slavery wing refused to return, and their supporters founded Oberlin College; a few came back, and Mr. Beecher and his son-in-law Calvin E. Stowe tried for many years to build up the seminary again, but in vain. Shortly after this, in 1835, he was tried as a heretic and hypocrite, first before his own church and then before the Presbyterian Synod, for his "moderate Calvinism"; he was acquitted, but the Old School and New School controversy finally split the church in 1838, Mr. Beecher adhering to the New School party. In 1852 he resigned the presidency of Lane and returned to Boston, to prepare his works for publication; but was striken with a slow paralysis of the brain, which enfeebled his mind for many years before his death. Despite the impressions of the extreme orthodox party, he was of the firmest doctrinal faith, though his theology was of his own make, and his humorous audacities of speech often shocked dignified propriety. His boundless energy, boldness, unconquerable will, and personal magnetism, were those of a natural leader of men; while his unsurpassed logical power, his intense and compact expression, and above all his entire sincerity and spirituality of purpose, winged with his racy and picturesque wit, set him above every other American clergyman of his time in popular influence. See his 'Autobiography and Correspondence,' edited by his son Charles, 1865.

Beecher, Thomas Kinnicutt, American clergyman, son of Lyman Beecher: b. Litchfield, Conn., 10 Feb. 1824; d. Elmira, N. Y., 14 March 1900. He studied at Illinois College, of which his brother Edward was president, graduating in 1843. He was principal of a Philadelphia grammar-school 1846–8, of the Hartford (Conn.) High School till 1852. He then removed to Williamsburg (Brooklyn), N. Y., and founded a Congregational Church, which he left two years later for the pastorate of a church in Elmira, N. Y., where he spent the rest of his life, well-known as an unsectarian philanthropist and moral teacher, writer, and lecturer, editing for many years a weekly department in Elmira newspapers to discuss current questions, often with rasping originality and always with independence. He was nominated for a variety of offices by nearly every known political party, but never elected. He was a chaplain in the Army of the Potomac four months in 1863. In 1870 he published a series of lectures as a book, entitled 'Our Seven Churches' (of Elmira); and in 1901 a posthumous collection of his juvenile stories was issued, 'In Tune with the Stars.'

Beecher, Willis Judson, American clergyman and author: b. Hampden, Ohio, 29 April 1838. He was graduated from Hamilton College in 1858, and from Auburn Theological Seminary in 1864, and filled several Presbyterian pastorates. From 1865–9 he was professor of moral science and belles-lettres in Knox College, Ill., and in 1871 became professor of the Hebrew language and literature in Auburn Seminary. He has published: 'Farmer Tompkins and his Bible' (1874); 'Drill Lessons in Hebrew' (1883); 'Index of Presbyterian Ministers in the United States 1706–1881' (1883); 'Old Testament Notes' (1897); and hundreds of articles in newspapers, periodicals, cyclopædias and reference books.

Beecher Family, The, an extraordinary American family of religious and humanitarian leaders, mostly of such salient and frequently eccentric originality, combined with immense energy and independence of thought, that the human race was once said to consist of "men, women, and Beechers." They were all descendants of Lyman Beecher of New Haven, Conn., himself one of the most notable of them; a famous clergyman, orator, and controversialist, who had 13 children, so many of whom rose to national or even international distinction that he was said to be "the father of more brains than any other man in America." Eight of them were boys, seven living to maturity, and nearly all of them to extreme old age, all becoming Congregational ministers; and the greatest, Henry Ward, said of them that "only one tried to escape the ministry, and he did not succeed." But so great was the intrinsic force of the blood that the daughters were no whit inferior in persistence of energy and originality of ideas, that marriage did not in the least quench their outside work and influence, and that one of them has shown the highest creative genius and left the most enduring memorials of the entire family. The difference in work and sympathies of father and children resulted from difference of generation rather than of spirit. Lyman Beecher's problems were mainly religious. He lived at the threshold of the new material development of the country, when it seemed that the engrossing task was to prevent its relapsing to heathenism; at the beginning of the great liberalizing flood of new scientific knowledge, when there seemed a danger of all Christianity being swept away with the cosmology it rested on; and before the humanitarian questions in this prosperous country had come to the fore. He was nearly 60 when the slavery problem first showed signs of becoming acute; more than 60 when Father Mathew established his first temperance society across the water; and at no period would he ever have favored woman suffrage, which one even of his notable daugh-

ters wrote against. But his influence was intensely strong in creating the lofty spirit that fed humanitarianism. It is an encouragement to large families, as so often in history, that the greatest of his children were among the younger ones: Mrs. Stowe was the sixth and Henry Ward Beecher seventh, while the most forceful of the others, Isabella (Mrs. Hooker), was the eleventh. In their order, the ones who grew up were Catherine, William Henry, Edward, Mary, George, Harriet, Henry Ward, Charles, Isabella, Thomas, and James. Catherine, robbed of the betrothed of her youth, gave herself to work for her sex, though not with quite the aspirations of most recent women of her type, and perhaps did as much good in training cultivated wives and mothers as if they had remained unmarried teachers. William Henry was a home missionary and clergyman in Ohio, and a clergyman in the East. Edward was a clergyman, editor, and theological writer, who tried to pour antique Zoroastrianism into modern molds. Mary married in Hartford, Conn., and became the mother of Frederick Beecher Perkins and grandmother of Charlotte Perkins Stetson. George died by accident at 34, while filling a western pastorate. Harriet, author of 'Uncle Tom's Cabin,' and of a mass of other works which would give any other author one of the foremost places in American letters, has a secure immortality from her masterpiece. Henry Ward, creator of the greatness of Plymouth Church, a Moses of liberal Congregationalism, anti-slavery and temperance leader, ardent in all work for humanity and the elevation of the mass, need not be further characterized. Charles, clergyman and admirable musician, is gratefully remembered for his work in compiling the 'Plymouth Collection' of hymn-tunes. Isabella married John Hooker, a Hartford lawyer fully in sympathy with her, and has been for many years one of the stanchest champions of woman's rights and upholder of all good causes. Thomas, for some 40 years located in Elmira, N. Y., was noted as an able and independent thinker on all public questions, which he discussed with ability and high-mindedness. James C. was clergyman, soldier, and clergyman again, till shadows overclouded his mind and brought on a tragic death. Altogether, the family is one of the most useful as well as distinguished of the American intellectual aristocracy.

Beechey, Frederick William, English admiral, the son of Sir William Beechey the painter: b. London 1796; d. 28 Nov. 1856. He entered the navy at the age of 10, and in 1811 was present in an engagement off Madagascar, in which three French frigates were captured. In 1818 he accompanied Lieut. (afterward Sir John) Franklin in an expedition to discover the northwest passage, and the following year took part in a similar enterprise with Capt. Parry. In 1821 he was commissioned, with his brother H. W. Beechey, to examine by land the coasts of north Africa. During the years from 1825 to 1828 he was engaged as commander of the Blossom in another Arctic expedition, by way of the Pacific and Bering Strait. Of this he published an account: 'Narrative of a Voyage to the Pacific and Bering Strait' (1831), and subsequently a description of the botany and zoology of the regions visited. In 1854 he was raised to the rank of rear-admiral.

Beechey, Sir William, eminent English portrait painter: b. Burford, Oxfordshire, 12 Dec. 1753; d. Hampstead, 28 Jan. 1839. He entered a conveyancer's office, but soon abandoned it, and determined to make painting his profession. In 1772 he was admitted to the Royal Academy. A large equestrian picture of George III. secured his election as a Royal Academician and procured him the honor of knighthood. He was afterward constantly and lucratively employed. He died in 1839 at the advanced age of 86. His attitudes and expression are generally good, but marks of carelessness are apparent in some of his latest pictures. Two portraits by him are contained in the Metropolitan Museum of Art in New York.

Beeching, Henry Charles, English clergyman and author: b. 15 May 1859. He was educated at Balliol College, Oxford, was rector of Yabbendon, Berkshire, 1885–1900, and has been professor of theology at King's College, London, from 1900. He has published editions of Milton, Vaughan, Daniel, Drayton, and several anthologies of verse, and is author of 'Love in Idleness' (1883); 'Love's Looking Glass' (1891); 'Seven Sermons to Schoolboys' (1894); 'In a Garden and Other Poems' (1895); 'Pages from a Private Diary' (1898); 'Conferences on Books and Men' (1900); 'Inns of Court Sermons' (1901); 'Religio Laici' (1902); 'Jane Austen' (1902); 'Two Lectures on Poetry.'

Beef. See MEAT.

Beef-eater. See BUFFALO-BIRD.

Beef-eaters, a popular name for the yeomen of the guard of the sovereign of Great Britain, a body instituted in 1485. There are now one hundred in service, and seventy supernumeraries. They are dressed after the fashion of the time of Henry VII. The warders of the Tower of London, who wear a similar uniform, are also so called.

Beef-tea, a preparation made from raw beef and often employed in nursing. It is serviceable for stimulation or for nourishment largely according to the method of its preparation. As usually made, or as prepared from ready-made beef extracts, it has very little food value, but is a strong heart stimulant. When fresh beef is finely chopped and its juice squeezed from it and flavored, to take away the raw taste, the extract obtained is rich in the muscle juices and is highly nutritious. It is often thus prepared for infants and invalids. If, however, the juice thus obtained is mixed with water and the compound is boiled, as is the usual manner, all of the muscle proteids are coagulated, as a scum, and the muscle salts, or extractives remain in solution. The nutritious portions, the scum, is thrown away and the extractives retained in the tea. In this form the nutritive value is slight unless the coagulated proteid is retained. Ordinary meat extracts are mixtures of the meat extractives, xanthin, hypoxanthin, creatin, creatinin, etc. These are heart tonics but not nourishing. Their use is contraindicated in irritable hearts, in gout, and in any condition in which it is thought that the patient is not breaking down the normal amount of proteid matter. Broths are made of other meats. See also DIETETICS; FOODS FOR THE SICK.

Beef-wood, a popular name for the wood of several Australian trees of the genus *Casuarina* (q.v.), which forms the type of a family *Casuarinaceæ*. The trees have been compared to gigantic horse-tails. They have pendent leafless branches, and apetalous monœcious flowers, the male ones being in spikes, and the female in heads. The wood is of a reddish color (whence the name), hard, and close-grained, and used chiefly for fine ornamental work.

Beehive Houses, the archæological designation given to ancient dwellings of small size and somewhat conical shape, found in Ireland and Scotland. They are formed of long stones without cement, each course overlapping that on which it rests. Sometimes they occur singly, at other times in clusters, and occasionally have more than one apartment. Some of them are found near ancient oratories, and were therefore probably priests' dwellings, and certain groups are encircled by a stone wall for defense. They are assigned to various dates between the 7th and the 12th century.

Beelzebub, bē-ĕl'zĕ-bŭb (Hebrew, "the god of flies"), a deity of the Moabites or Syrians. This term is applied in the Scriptures to the chief of the evil spirits (Matt. xii. 24; Mark iii. 22, etc.). The correct form is probably Beelzebul, but in the Syriac and Vulgate the final letter is *b*. The alteration in that letter from *b* to *l* may have been due to euphonic reasons, or, as has also been maintained, *zebul* may have signified "dwelling" or "dung." In order to conceive how this name came to be given to one of the greatest of the imaginary spirits of evil it must be remembered what a terrible torment insects often are in the East. We find that almost all nations who believe in evil spirits represent them as the rulers of disgusting, tormenting, or poisonous animals — flies, rats, mice, reptiles, etc. The Greeks worshipped several of their chief deities under the character of protectors against these animals; for instance, Apollo Smintheus, the destroyer of rats. Christ was charged by the Jews with driving out demons by the power of Beelzebub (Matt. xii. 24). Compare 2 Kings i. 2.

Beer, bār, Adolf, Austrian historian: b. Prossnitz, Moravia, 27 Feb. 1831. His publications include: 'History of International Commerce' (1860–64; 'Holland and the Austrian War of Succession' (1871); 'The First Partition of Poland' (1873–4); 'The Austrian Commercial Policy in the Nineteenth Century' (1891).

Beer, Michael, German dramatist, brother of the composer Meyerbeer: b. Berlin, 1800; d. Munich, 22 March 1833. He became known to the literary world by five tragedies, of which his 'Struensee' is the best. His complete works were published at Leipsic in 1835, and his 'Correspondence' in 1837.

Beer, Wilhelm, German astronomer: brother of the preceding: b. 4 Feb. 1797; d. 27 March 1850. He was a Berlin banker, and in 1849 became a member of the Prussian Diet. His astronomical labors were associated with those of the astronomer, Mädler. He built an observatory, chiefly devoted to the observation of the planet Mars and the moon. The crowning labor of the two astronomers was a map of the moon, published in 1836, upon which the Lalande prize was conferred by the French Academy.

Beer, bē'ĕr. See Ale and Beer; Brewing.

Beer-money, in the British army, a payment of one penny a day, formerly given to non-commissioned officers and soldiers when on home service, instead of a daily portion of beer and spirits. The custom was established in 1800, and abolished in 1873, when the stoppages for rations were also abolished.

Beere, bē'ĕr, Mrs. Bernard (Fanny Mary Whitehead), English actress: b. Norwich, England, 1859. She was the daughter of Wilby Whitehead and began her stage career in 1878 at the London Opera Comique. On her marriage she retired a short time from the stage, presently returning to it as Mrs. Bernard Beere, and her acting in 'Fedora' and 'Diplomacy' attracted much favorable comment. In 1892 she visited the United States professionally. In 1900 she married H. C. S. Olivier.

Beers, bē'ĕrz, Ethel Lynn, American poet: b. Goshen, N. Y., 13 Jan. 1827; d. 10 Oct. 1879. She was the author of 'All Quiet Along the Potomac, and Other Poems' (1879), and was a descendant of John Eliot, the apostle to the Indians.

Beers, Henry Augustin, American author: b. Buffalo, N. Y., 2 July 1847. He graduated from Yale in 1859; became tutor there in 1871, and professor of English literature in 1880. He has published, among other works, 'A Century of American Literature' (1878); 'The Thankless Muse,' poems (1886); 'From Chaucer to Tennyson' (1890); 'Initial Studies in American Letters' (1892); 'A Suburban Pastoral, and Other Tales' (1894); 'The Ways of Yale' (1895); 'History of English Romanticism in the Eighteenth Century' (1899); 'History of English Romanticism in the Nineteenth Century' (1901).

Beers, Jan van, bārz, yän vän, Flemish poet: b. 22 Feb. 1821; d. 14 Nov. 1888. From 1860 he was professor at the Athenæum in Antwerp. His principal works, full of sentiment and melodious quality, are 'Youth's Dreams' (1853); 'Pictures of Life' (1858), and 'Sentiment and Life' (1869).

Beers, bē'ĕrz, Nathan, American soldier: b. Stratford, Conn., 1753; d. New Haven, 10 Feb. 1849. While still quite young he went with his father to New Haven and was a member of a military company formed there in 1774, which was commanded by Benedict Arnold. Immediately on the receipt of the news of the battle of Lexington the company was called together by their captain, and Beers with 39 others volunteered to accompany him to the seat of war. They immediately set out, and, as they passed through Pomfret, were joined by Gen. Putnam. Beers received a lieutenant's commission in the army in 1777, and served until 1783. He afterward engaged in mercantile affairs, and in 1798 was chosen steward of Yale College, a position which he resigned in 1819.

Beers, William George, Canadian dentist: b. Montreal, 5 May 1843. He was educated in his native city, and having entered the dental profession, he founded the first dental journal in Canada, and remained its editor for several years. In 1900 he was editor of 'The Dominion Dental Journal' (Toronto), and dean of the

Provincial Dental College, as well as professor of dental pathology, therapeutics, and materia medica in McGill University. He wrote the first book on the game of lacrosse, and is regarded as its originator. He organized and captained the first lacrosse team that visited England in 1876, and also the second one in 1883. He is noted as a lecturer and public speaker, and since 1862 has been a constant contributor to the principal American magazines.

Beersheba, bē-ėr-shē'ba (now Bir-es-Seba, "the well of the oath"), the place where Abraham made a covenant with Abimelech, and in common speech representative of the southernmost limit of Palestine, near which it is situated. It is now a mere heap of ruins near several wells, though it was a place of some importance down to the period of the Crusades.

Beeswax, a solid fatty substance secreted by bees, and containing in its purified state three chemical principles — myricin, cerin, and cerolein. It is not collected from plants, but elaborated from saccharine food in the body of the bee. It is used for the manufacture of candles, for modeling, and in many minor processes.

Beet (AS. bete; Lat. *beta*), a plant of the genus *Beta,* natural order *Chenopodiacæ.* There are several species, mostly biennials, with stalked, smooth, ovate leaves, with flowers borne on tall leafy stems. *B. vulgaris* is generally recognized as the only species of economic importance; the slender-rooted variety, or sea-beet, is found growing wild in sandy soil, near the sea, in Europe and western Asia. De Candolle regarded it as the original type. It has been in cultivation since 200–300 B.C., and to-day the numerous varieties may be classified under one of five sections, although the divisions are arbitrary and of no great importance.

Garden Beets.— These usually have small tops, with turnip-shaped to tapering roots of medium size, fine-grained, smooth, regular, generally red but sometimes yellowish or whitish in color. Among popular varieties are Early Blood, Eclipse, Bassano, and Egyptian turnip. The soil best suited is a loose, rich, deep, clean, well-tilled loam. Well-rotted barnyard manure with some potassic fertilizer is often applied. Seed is sown as soon as possible in the spring, for the early crop, with other sowings until June to ensure a succession; in rows, varying from one foot apart, where intensive gardening is practised, to three feet where horse labor is used. The plants are thinned from four to six inches asunder in the rows, care being taken to leave only one plant in a place. Thinning is often done when the young plants are large enough to sell as "greens." The late crop, if required for winter use, must be stored before frost. Beets are sometimes forced under glass.

Mangold Wurzels or *Mangels* are a large, coarse form raised for cattle-feeding. Standard varieties include Mammoth long red, Golden tankard, and Globe. Seed is sown as early as possible in the spring, in rows two to three feet apart, and the plants allowed to stand 12 to 16 inches asunder in the row. To ensure a good crop the land must be in a high state of cultivation and well supplied with plant-food. They may be grown on alkali soils.

Sugar-Beets.— The varieties are rather small-growing, and nearly always yellowish or whitish in color. They contain a high percentage of sugar, which has been increased by selection and cultivation. They are extensively grown in Europe and in the northern and western States.

Chard or *Swiss Beets* have comparatively large leaves with succulant leaf-stems, which are cooked and eaten like asparagus. See Chard.

Foliage Beets are grown for ornamental purposes. The luxuriant foliage is of many colors and varied in markings. Brazilian, Chilean, Victoria, and Dracena-leaved are well-known varieties. They may be raised from seed, like other beets, and the roots lifted in fall and kept over winter.

Uses and Feeding Value.— As a vegetable the root of the garden beet is boiled, pickled, and used as a salad; and the tops are boiled as "greens." The contain on an average 88.5 per cent water; 1.5 per cent protein; 8 per cent nitrogen-free extract; 1 per cent ash; 0.1 per cent ether extract, and 0.9 per cent crude fibre. Mangels are fed to cattle; they contain from 7 per cent to 15 per cent dry matter, of which about 88 per cent is digestible; an average percentage composition may be taken as: water, 90.9; protein, 1.4; nitrogen-free extract, 5.5; ether extract, 0.2; ash, 1.1; crude fibre, 0.9. About 77 per cent of the protein or 96 per cent of the nitrogen-free extract is digestible. The dry matter of mangels and corn silage are of about equal value for feeding, but as the cost of production in mangels is double that in corn, stockmen in the United States have not paid much attention to them.

Enemies.— Beets are sometimes injured by the beet-fly, otherwise they have few insect enemies. They are sometimes attacked by rust, rot, leaf-spot, and scab. Spraying with Bordeaux mixture will prevent the leaf diseases. Scab attacks the root, and as it also attacks the potato these crops should not be grown in succession.

Beet pulp is a by-product of sugar-beet factories, consisting of sliced sugar-beets after the sugar is removed. It contains about 10 per cent dry matter, the remainder being water, and in the wet condition must be fed at once or held in silos. It may be fed to milch cows, fattening steers, and sheep, and ranges in value from half to two thirds the value of corn silage. Some of the factories have erected sheds and feed large quantities of it to stock with the addition of hay and grain.

Samuel Fraser,
Instructor in Agronomy, Cornell University.

Beet Sugar, the sugar obtained from the beet, similar to cane sugar; but inferior in sweetening power. The discovery of sugar in the beet was made by a German chemist, Margraff, as early as 1747. No practical results followed his discovery, however, as the cost of obtaining sugar from the beet by laboratory methods was too high as compared with that of cane sugar. Little progress was accomplished until about 50 years later, when another German chemist, Achard, succeeded in extracting sugar from the beet root on a comparatively large scale. In 1812 a manufactory was in operation in Silesia, in which, under Achard's direction, about 20 quintals of beets were worked up daily, and about five pounds of raw sugar extracted from every quintal. The high price of sugar prevailing at that time all over the European continent by reason of the blockade, and the great interest and favorable attitude taken by the different continental governments toward the new experiment, caused

it to be a success for a short time. Napoleon issued an imperial decree in the early part of his reign, establishing this industry in France, and in 1812 he ordered the building of 10 factories and placed Delessert in charge of their construction. In 1830 attempts were made in the United States to introduce the cultivation of the sugar-beet. It was not, however, till 1876 that the first successful beet-sugar factory was built, being erected in Alvarado, Cal., since when the production of beet sugar in the United States has increased by leaps and bounds.

Beet-sugar Industry, The. The production of sugar-beets and of beet sugar in the United States is now assuming such proportions that, with the increase of factories and the marked popular interest, it has become one of the leading subjects demanding consideration from agriculturists. There is probably no other industry in this country that has developed so rapidly and now absorbs so large a share of public attention as that of beet sugar.

Attempts were made to establish the industry in Massachusetts in 1841. There were also efforts in this direction in Illinois, Wisconsin, and California between 1863 and 1876, and much was claimed for the industry at this time by newspaper writers, capitalists, and leading farmers. In California, after a long period of unprofitable production, it achieved its first success. The failure of these early attempts seems now very natural as we look back over the history of agricultural progress in the United States. The beet-sugar industry belongs to the domain of agriculture, and the problems it presents are agricultural. These early efforts were simply ahead of their time in the course of agricultural development, and they failed in the establishment of the beet-sugar industry for want of the proper methods of farming and the proper conditions underlying the farming industry.

At the time of the first attempts at sugar-beet production, agriculture comprehended simply the primary features. Its products were confined mainly to cereals, forage crops, and live stock, and the production and marketing of raw materials was its main object. The farmer in those early days did not concern himself with enterprises dependent on the concentration of efforts in the production of finished products. Land could be purchased for a few dollars per acre. If the prospective farmer did not have the money to buy the land he could enter a claim on Government land. His whole ambition was to produce something quickly and pay for the lands and primary improvements. This was accomplished by raising corn, wheat, oats, cattle, and hogs. The open public domain offered a free pasture. Gradually the eastern sections became more densely settled, and farm lands became more expensive. Crude production was accomplished more cheaply by the Western farmer. Later, owing to development of transportation facilities, the agriculture of this country had to compete with the cheap labor of Europe. The colonial extension of European countries brought areas into competition with American farms in turning out crude products, and with labor much cheaper even than that of Europe. The problem became, how to turn crude material into something that would represent not merely the labor but the skill and ingenuity of the American people, thus supplying our own markets and those of the world with finished products. The American farmers found, as the manufacturers had found before them, that their success depended upon the superior skill and artisan ability of Americans as compared with Europeans and their colonists. «Necessity is the mother of invention,» and demand and necessity united in the evolution of a new system. This began in the East, working westward, in the production of butter, cheese, prepared meats, flour, eggs, poultry, etc. Later came the establishment of other industries, working up crude products of the farm into finished articles. We became producers of syrups, canned vegetables, canned fruits, etc., until manufacturing reinforced farming from ocean to ocean. When all this was accomplished, the time was ripe for the success of the beet-sugar industry.

Industrial Features.— It is one of the marked features of American industrial life that the people as a mass have always shown a readiness to forego immediate benefits, and, even at considerable expense to themselves, to encourage industrial development. As a result this country has made a record among the nations of the earth unparalleled in rapid development, accumulation of wealth, and hold on the trade of the world.

One of the chief items of cost in the production of anything is labor. In this country it is contended that the laborer is not only entitled to earn a living, but to live comfortably, to be able to educate his family, and to acquire a comfortable home. There is no position in life, social, financial, or political, to which the laboring man may not aspire. While this means much for the citizen, it adds materially to the cost of production. This country to-day is the concern of the nations of the earth in being able to maintain a balance of trade in its favor through its agricultural and industrial productions, and this balance is constantly increasing. The sugar industry is supported by American enterprise and spirit, and under this American policy it is rapidly assuming a prominent position in the long list of successful industries.

There are two sides to the proposition of establishing a sugar factory in any particular community: (1) That of the farmer, involving agricultural conditions; and (2) that of the manufacturer or those financially interested in the enterprise.

Problems for the Farmer.— The leading difficulties of the farmer may first be noticed. To begin with, he is unacquainted with the methods of cultivating the sugar-beet plant, and his first experience usually proves unsatisfactory. He is accustomed to certain methods in farming. As a rule he is conservative, and thinks, from his long experience in farming, that he knows how to farm. He undertakes to apply methods successful in the cultivation and production of other crops. He is not inclined to listen to those who are posted in methods applicable to the new crop. Eventually he finds out his mistake. He finds that in growing sugar-beets he must apply principles, in many case, the reverse of those necessary to other crops. For instance, he has been accustomed to growing large ears of corn, large hogs, and large steers; but in the case of sugar-beets he finds that the first question is not one of size, but of quality. He must grow beets of a certain size, purity, and sugar content. In order to accomplish this he must give careful attention to the work of preparing the land,

planting the seed, bunching, thinning, and cultivating. He finds that attention to details counts in results at the harvest in the profits on the crop. He learns that the whole process is a very laborious and expensive one, entirely unlike anything he has attempted before. To be successful he must apply the methods of the gardener to a field crop. He must have a rich soil, and the proper rain conditions at the proper time. These facts can only be learned through experience.

The Question of Labor.— The labor problem is important in the cultivation of sugar-beets. At certain stages of their growth they require a considerable amount of labor. This labor is very tiresome. As a rule, the farmer, if he grows beets to any extent, does not have on his farm sufficient labor to do the work of thinning and bunching, hoeing, and harvesting the sugar-beets; nor does any farming community possess to any considerable extent the labor necessary to grow the beets that a factory will require in a campaign. It will cost about $30 an acre in sections where sugar-beets are grown under rainy conditions, and about $40 to $45 an acre in sections where beets are grown by irrigation, to cover the cost of seed, preparation of seed-bed, bunching and thinning, hoeing, cultivating, harvesting, and delivering to the factory. These estimates apply to growing sugar-beets when it is properly done. In the farming communities of foreign countries, as a rule, a large amount of suitable labor can be secured in the neighborhood, because these neighborhoods are more thickly settled; the whole population is willing to do the laborious, tedious work required, and whole families work at it, including the father, mother, and children. In this country, as a rule, the farmer, his older sons, and hired hands must attend to the outdoor work. It has been found necessary for sugar-beet growers to resort to the cities and towns for the extra labor required. Most of this work comes about the time the public schools are closed, and boys from 12 years up are employed for bunching and thinning the beets, for hoeing them during the season, and to aid in the harvesting by pulling, cleaving the tops, and loading the beets into wagons. In the cities also live many foreigners from Holland, Russia, Sweden, and other places, who are thoroughly familiar with this kind of work. These people are willing to move out into the fields and live in tents; they make contracts at so much per acre for bunching and thinning, hoeing, weeding, and harvesting. Since the agitation and starting of the beet-sugar industry in this country, foreigners are coming here with a view to securing employment of this kind. While the labor question is a serious one, it is one capable of solution by careful and detailed attention.

Problems for the Manufacturer.— The manufacturer or the capitalist who builds a factory finds that he has even more problems to work out than the farmer, and, like the farmer, he usually discovers that he is entering a field that is entirely new to him. Before establishing his plant the prospective manufacturer must thoroughly investigate certain conditions: (1) The water supply, for he must have an abundant supply of pure water for the use of the factory. (2) The fuel supply, as the factory must be located in a section where cheap fuel can be secured (the fuel usually used is coal, but on the Pacific coast petroleum is used to a large extent, and in some of the mountain States it is found that wood is the cheapest fuel). (3) A market for the product (this factor should be thoroughly canvassed and settled prior to establishing a factory; the fact that the manufacturer is proposing to establish a factory on a particular line of railroad can generally be used to secure by contract low freight rates for the future in shipping both beets and the finished product — sugar). (4) The supply of lime (the local quarries of lime rock must be investigated to see if the quality is suitable and the supply sufficient, as a large amount will be required).

The general conditions having been found satisfactory, and the factory being built, other problems arise. In the beginning only a limited amount of skilled labor is employed. Eventually every employee of the factory will become skilled in his particular part. After two or three campaigns have passed the factory will have worked out the details of producing the best product at the least cost with the machinery which it has. When this point shall have been reached those interested will be prepared to estimate the cost of production of beet sugar. The difference in cost of production at a new factory and at one operated for a considerable time is much greater than one unacquainted with the subject would suppose.

Statistics of the Industry.— The recent census shows the rapid growth of the beet-sugar industry in this country. Thirty-one factories had been established before the end of the century. Since that time 11 other factories have been put in operation, located at the following places, and having the daily capacities named: Lyons, N. Y., 600 tons; Rockyford, Col., 1,000 tons; Sugar City, Col., 500 tons; Bingham Junction, Utah, 350 tons; Provo, Utah, 350 tons; Lansing, Mich., 600 tons; Saginaw, Mich., 600 tons; Salzburg, Mich., 400 tons; Loveland, Col., 1,000 tons; Menomonee Falls, Wis., 500 tons; and Logan, Utah, 400 tons.

At the following places factories are either in process of erection or preparations have been made for building in 1902: Sebewaing, Mich., 600 tons; Carrollton, Mich., 600 tons; Mount Clemens, Mich., 600 tons; Crosswell, Mich., 600 tons; Greeley, Col., 800 tons; Eaton, Col., 500 tons; Fort Collins, Col., 500 tons.

At the following places companies have been organized and capitalized, and there is every indication that they will mature their plans and erect factories in time to engage in the beet-sugar campaign of 1902 or 1903: Saginaw, Mich., two factories, 500 tons each; Chesaning, Badaxe, Grand Rapids, and Lapeer, Mich.; Sioux City, Iowa; Longmont, and Lamar, Col.; Bear River Valley, Utah; Phœnix, Ariz.; Cheyenne, Wyo.; Los Angeles, Cal.

At many other places preliminary organizations have been formed which are only awaiting developments assuring more settled conditions affecting the sugar industry.

Methods of Growing Sugar-Beets.— It would be quite difficult to give general directions and rules for growing sugar-beets applicable to all localities and conditions. Often expert sugar-beet growers, at public meetings and in the agricultural press, give minute directions covering all the details of this intricate process. Others, each well versed in the process of growing sugar-beets, get into arguments and disputes as to the right method. In such cases each

may be correct in a measure. The occasion for such disagreements lies in the fact that each person has in mind the right method for a particular locality or set of conditions. A careful study of the different sections of the United States where sugar-beets are grown will lead to the conclusion that there is no single road to success in growing sugar-beets. Every locality has settled conditions which will materially modify any set of methods that might apply to some other one. There are some settled rules, of course, but it is an actual fact that the various agricultural districts of this country will have to work out each for itself the right method. The person who argues that the ground must be plowed in the fall in order to receive the benefit of winter frosts is not offering any argument to the Pacific coast, for instance, where many beets are grown, and he who insists that the ground should be rolled in all instances after planting will hazard the crop if his directions are followed in many parts of Nebraska and other sections where the soil is sandy and there are strong winds. In such cases a smooth surface offers an excellent opportunity for the wind to carry along the sharp grains of sand, cutting off the plants and destroying the crop.

There can be no general fixed rules applying to the kinds and application of fertilizers. General principles are all right when accompanied with the underlying reasons, but they must always be modified to meet local conditions.

With the development of the industry in all the sections which have the necessary conditions, and the acquirement of ample experience both by the farmers in the production of beets and by manufacturers in the making of sugar, there will come many improvements, and eventually a cheapening of production, a result of great importance to all concerned in the success of the industry, because eventually the beet-sugar industry in the United States will have to meet a sharper competition with foreign sugar producers.

There are some things settled, however, about growing sugar-beets. It will generally be conceded that the ground should be plowed deep, and in most instances subsoiled. Before the seed is planted, the ground must be thoroughly pulverized by harrowing and by rolling, even if the surface has to be afterward roughened. Advantage must be taken of the general and prevalent rain conditions. The ground must be moist enough to germinate the seed, either by rainfall or irrigation. Rainfall is best when it can be obtained. In some localities either is used, according to circumstances. Seeds are planted at depths of from half an inch to two inches, according to the prevailing conditions in the particular locality. The beets must be planted near enough together to produce a beet of a certain size. This spacing depends, again, upon the locality and the nature and fertility of the soil. The size and quality of the beet depend materially on the right kind of spacing. The beets must be thoroughly cultivated, hoed, and hand-weeded, because cultivation tends to conserve the moisture of the soil, and clean fields permit favorable action of sun and air. This close cultivation should be kept up until the beet tops thoroughly shade the ground and reach a size when it would be injurious to operate among them further with a plow and hoe. The beets should be harvested as soon as possible after they are ripe, because then they contain the most sugar and the highest purity. It is evident that the entire crop of beets in the neighborhood of a factory cannot be harvested at once. In many localities some will have to be siloed. Harvesting-time will depend a great deal upon circumstances connected with the operation of the factory. The sooner the beet is harvested after it is ripe the better, because further rainfall may start a new growth, producing new lateral roots and new leaves, thus greatly reducing the sugar content and purity of the beets.

Benefits to the Farmer.— No statement of facts with reference to any new crop would be complete or would indicate the advisability of its introduction unless it showed the benefits to be derived. Of course, profit and loss in any enterprise is the first consideration.

It has already been stated that it costs about $30 per acre to produce sugar-beets and to market the crop where rain conditions prevail. This is without taking into consideration the rent of the land, but it includes the farmer's time and everything else that enters into the cost of production. The average yield is about 12 tons per acre. Probably this cost of production will be gradually reduced because of improvements in implements and methods. The beets grown have a gross value at the factories of $4 to $4.50 per ton (in States paying no bounty). This gives a gross return per acre of $48 to $54, and a net profit of $18 to $24. It must be kept in mind that these are averages of gross and net proceeds. It is never very encouraging to consult the average of agricultural crop statistics; indeed, it is often said that "the average crop does not pay." If one should take the figures of the average crop of corn in Iowa, for instance, or the average crop of wheat in Minnesota or Kansas, and compute the proceeds at the average market price, and deduct therefrom the cost of production, the results would show a very small remuneration or an actual loss, quite discouraging to one who has not investigated this subject.

Taking what seem to be the most authentic figures, the cost of producing sugar-beets in sections where they are grown by irrigation is about $40 per acre. An average of 13 tons per acre can be produced, having a higher sugar content, and worth $4.50 to $5 per ton, making the gross proceeds $58.50 to $65, and the net profit $18.50 to $25 per acre. These figures give to the farmer in each case a profit greatly more satisfactory than in the case of other crops. But the successful farmer will never be satisfied with the average proceeds of any crop, and it is to him we must look for the results that give the more encouraging inducements to beet culture. Many growers receive as high as $75 and some as high as $100 per acre for their beets, these high results depending upon the superior quality of the land and the superior skill of the one producing the beets. If a farmer has poor land or is a poor farmer, he is not in a position to expect much in planting any kind of crop. These statements are sufficient to give a farmer who is experienced in all other kinds of crops a fair insight into the situation.

There are indirect benefits in sugar-beet growing that the farmer must take into consideration, along with the direct, as follows: He

learns that sugar-beets are a very valuable crop to grow for his stock. It is estimated that they are worth two thirds as much for feeding as for production of sugar. They may enter into a food ration for any kind of stock. The farmer growing beets for a sugar factory retains for feeding the beets that have been «docked,» or that are liable to be. He constructs root-cellars and stores them away, and they enter largely into all animal food rations for winter feeding. For stock-feeding sugar-beets have both a nutritive and a sanitary value.

The high cultivation that must be given to the land through deep plowing, thorough harrowing, and constant weeding and cultivating finally makes the land of superior quality for any purpose. It will grow better corn or wheat, and at a less expense, on account of the absence of weeds and grass. Finally, through rotation, other fields are brought under this high state of cultivation, until the whole farm is at its best condition of soil fertility and productiveness.

The method that has brought this about serves as an object-lesson to the farmer and the farming neighborhood. A better cultivation will prevail, and the science of farming will become several degrees higher on account of experience in sugar-beet cultivation.

After the beets are delivered to the factory, and the sugar has been extracted, it is found that the pulp (which will amount to 50 per cent in weight of the beets worked) is almost as valuable for feeding purposes as the original beets themselves. It is a very cheap feed and sells for 35 to 50 cents per ton. It enters naturally and profitably into the food rations of all kinds of stock. It is especially valuable for steers, lambs, brood mares, and brood sows, but reaches its highest use as animal food when fed to the dairy cow. The farmers in the neighborhood of a beet-sugar factory feed large quantities of it. They appreciate its nutritive and sanitary value. Pulp feeding gives an impetus to animal industry of all kinds. It offers a stimulus to the establishment of butter and cheese factories, to the erection of feeding-pens, and to the whole stock-feeding industry. Its use is one of the strong reasons for establishing the industry.

The beet-sugar industry opens up at once a large demand for labor, not only in the factory itself, but on the farm. It is one of the things in which the farmer can invest with the assurance that he has a sure market and a fixed price for his crop to begin with.

Benefits to Other Industries.— The establishment of a beet-sugar factory opens up not only a large field for the employment of labor, but also a field for the employment of capital. It becomes at once a market for considerable crude material to be used in conducting the business. First and most important it furnishes a market for the beets. Then the factory is a large consumer of coal, and as the factories are often established in communities having local coal fields they become at once local markets for a local product. The amount of coal necessary to work up a certain amount of beets is generally computed at about 17 per cent by weight, or, in case of an ordinary factory of 350 tons capacity, about 60 tons of coal per day, or 6,000 tons for a full campaign of 100 days. A factory also consumes a large amount of lime rock, which of necessity must also be a local product. It usually consumes lime rock to the extent of about 10 per cent of the crude weight of beets worked, which in the case of a 350-ton factory would be 35 tons of lime rock per day, or 3,500 tons for the campaign. It consumes about one fifth as much coke as lime, or a little less than 700 tons during a campaign.

The establishment of a factory in a community necessitates considerable transportation of crude products — beets, coal, and lime rock — to the factory, and in carrying the finished product to the market. It stimulates banking and almost all kinds of mercantile business throughout the community.

The Future of the Industry.— The following figures will give an idea of the possibilities for the expansion of the beet-sugar industry in the United States:

CONSUMPTION, PRODUCTION, AND IMPORTATION OF SUGAR.

		TONS.
For 1901 the total consumption of sugar in the United States was		2,372,000
Adding to this the average yearly increase, based on an estimate for twenty years, the consumption of sugar for 1902 will be		2,478,000
To meet annual requirements there must be imported into the United States proper this 2,478,000 tons, less what this country manufactures. The home production for 1902 should be about as follows:		
Cane sugar of the South	300,000	
Beet sugar of the North and West	185,000	
		485,000
Balance imported		1,993,000
Requirements from outside for 1902 will be in round numbers		2,000,000
Of this amount from insular possessions, free of duty, there will be received —		
From Porto Rico about	100,000	
From Hawaii about	300,000	
		400,000
There must be secured from strictly foreign sources, duty paid		1,600,000

It is the ambition of those encouraging the beet-sugar industry to establish factories enough at least to furnish this foreign importation. Making due allowance for failure of factories to reach in actual production their full capacity under ideal conditions, it would require 500 factories having a daily capacity of 500 tons of beets to produce the sugar imported, or a sufficient number of cane-sugar factories to produce an equal amount of sugar. As a matter of fact, there is likely to be a rapid increase in both beet-sugar and cane-sugar factories. But for convenience the calculations here made are based on the supposition that the increase will be in beet-sugar factories only. In order to equip and build these factories it will require an investment of capital of $250,000,000. This vast sum of money must be expended in this country for building materials and machinery and in the employment of the labor necessary to construct and equip the factories. The annual requirements of these factories will be as follows:

ANNUAL REQUIREMENTS OF 500 BEET-SUGAR FACTORIES.

They will	require of beets	tons..	18,750,000
	pay farmers for the beets		$84,375,000
	require of coal	tons..	3,187,500
	pay the coal-dealers	$	9,562,500
	require of lime rock	tons..	1,875,000
	pay to the quarries for lime rock	$	3,750,000

They will require of coke	tons..	375,000
pay to the coke-dealers for coke		$ 3,000,000
expend for labor in the factories		$19,000,000

In addition to the foregoing list large amounts of money will be paid for mill supplies, transportation, etc. As working capital to operate these factories $135,000,000 will be required. This sum being in use, however, for about four months in the year, the interest charged thereon is equal to an interest charge on $45,000,000 for one year. It should be remembered that the above estimates do not include the capital already invested in the business and the operations of the factories already built, the statement of which is as follows:

PRESENT DEVELOPMENT OF THE BEET-SUGAR INDUSTRY.

Capital invested in factories, equipment, and grounds		$30,000,000
Beets purchased annually	tons..	1,875,000
Cash paid for beets purchased annually		$ 8,437,500
Coal consumed annually	tons..	318,750
Cash paid for coal annually		$ 956,250
Lime rock purchased annually	tons..	187,500
Cash paid for lime rock annually		$ 375,000
Coke purchased annually	tons..	37,500
Cash paid for coke annually		$ 300,000
Cash paid for labor annually		$ 1,900,000
Operating capital annually employed		$ 5,000,000

Also there is a considerable amount annually expended for crude material and various other things. It hardly seems possible that an industry which affects so many people over such a wide scope of country can fail to receive anything but the most friendly, careful, and fostering consideration on the part of those who shape industrial affairs.

The immensity of future demands, it seems, answers effectually those who feel that the industry might be overdone. Attention should be called to the fact that not only are present demands great, but that the rate of increase of consumption is considerable. According to careful statistics for the last 19 years, consumption of sugar in this country has been increasing at the average rate of about 6⅓ per cent annually.

CHARLES F. SAYLOR.

Beethoven, Ludwig Van, the greatest orchestral composer of the 19th century: b. Bonn 16 Dec. 1770; d. Vienna 26 March 1827. While classed among the German masters, the Dutch Van in his name (which is not a sign of nobility) indicates his descent from a family in the Netherlands, the world's musical centre in the 15th and 16th centuries. This family moved in 1650 from Louvain to Antwerp. Beethoven's grandfather was a bass singer and a conductor; his father was a tenor, who did not lead an exemplary life; his income was only $150 a year, wherefore it is not surprising that he eagerly availed himself of his son's musical talent and exploited it. He personally taught Ludwig to play the violin and the clavier, in the hope of making of him a "wonder-child" like Mozart. While Ludwig was not remarkably precocious (he even shed tears over his music lessons), he is said to have written a funeral cantata at 11, and in the same year was taken on a concert-tour by his father, who, to make his performances seem more remarkable, represented him as being two years younger. Before he had reached his 12th year the organist Neefe spoke of him as "playing with force and finish, reading well at sight, and, to sum up all, playing the greater part of Bach's 'Well Tempered Clavier,' a feat which will be understood by the initiated. If he goes on as he began, he will certainly become a second Mozart."

Mozart himself appears to have been of this opinion, for when he heard young Beethoven improvise in Vienna he exclaimed to the by-standers, "Keep your eyes on him! He will give the world something to talk about!" This was in 1787. Beethoven had been sent to Vienna in the hope that he might be able to take lessons of Mozart; apparently he did take a few, but the illness of his mother made him hasten back to Bonn. Although Bonn was a small town, it had quite a musical atmosphere, and Beethoven had good opportunities to become acquainted with the operas and the concert pieces then in vogue. He was only 13 when he got a position as assistant court organist, and subsequently he played the pianoforte accompaniments at the rehearsals of the opera orchestra. He also played the viola. His first salaried position ($63 a year) was as assistant organist under Reicha. The most important occurrence of the Bonn period was the formation of an intimate friendship with Count von Waldstein, to whom he subsequently dedicated one of his best sonatas. The Count had promptly recognized his genius, and it was probably owing to his suggestion that the elector of Cologne, Max Franz, decided to provide the young musician with the means for going to Vienna again and there continuing his studies with Haydn, to whom Beethoven had already been introduced when Haydn stopped at Bonn, in 1790, on his way to London. It was in November, 1792, nearly a year after Mozart's death, that Beethoven entered Vienna, which was to remain his home till the end of his life. The lessons from Haydn were duly arranged for and the first was given in Haydn's house on Dec. 12, the payment being eight groschen (about 20 cents). But Haydn, like most creators, was not a good teacher and although Beethoven took lessons of him more than a year, he soon began to take his exercises for correction to Schenk before showing them to Haydn. He subsequently took lessons of the pedantic contrapuntist Albrechtsberger, who, however, complained that his pupil was unwilling to "do anything in decent style" and had too little respect for rules — this last being a peculiarity which he, fortunately, soon began to manifest in his compositions. To these compositions he was so lucky as to be able to devote nearly all his time. From his father he received no pecuniary assistance, but there were several sources of income. Prince Lichnowsky gave him an annual stipend of 600 florins, and when, in 1809, an attempt was made to entice him to Kassel, where a position as Kapellmeister was offered him, some of his princely friends gave him an additional annuity of 4,000 florins, to chain him to Vienna. This lasted only till 1811, but at this time he was already deriving a considerable income from the sale of his works. Many of his letters show that he knew how to make a good bargain. Had it not been for a spendthrift nephew, of whom he was very fond, and for whom it was found at the time of his death he had even placed 7,000 florins in the bank, he would have never suffered any financial tribulations such as Mozart and Schubert had to endure all their lives.

BEETHOVEN.

It was fortunate that the Kassel offer was refused, and that an earlier attempt (in 1796) to win him for Berlin had also led to naught; for Vienna was the proper place for Beethoven. It was at that time the world's musical centre, owing largely to the unusual interest taken in music by the aristocratic circles. To understand the significance of this fact we must bear in mind that at that time there were few public concerts; it was the nobility who maintained the orchestras and patronized the great artists, the audiences being invited guests. Beethoven brought with him from Bonn letters of introduction to leading members of the aristocracy, and thus found himself at once "in the swim." He had not yet done anything very remarkable as a composer and was at first admired chiefly for his improvisations on the pianoforte; but gradually a sense of his greatness dawned on his patrons, who bore patiently all his eccentricities. While recognizing the advantage of being intimate in the houses of the aristocracy, he never truckled to rank and refused to submit to the intricate and artificial rules of court etiquette. At the same time he expected the aristocrats to behave like ladies and gentlemen; one day when a young man talked loudly while he was playing, he suddenly stopped and exclaimed: "I play no longer for such hogs." His attitude toward wealth is illustrated by his once sending back his brother's card on which "Johann van Beethoven, land proprietor" was printed, after writing on the back: "Ludwig van Beethoven, brain proprietor."

In the homes of some of his aristocratic friends he gave lessons to the women and girls. He did this unwillingly, looking at the time thus spent as filched from his compositions. He often failed to keep his appointments and was apt to be irascible and bearish; but his fair pupils were only too glad to put up with all this for the sake of the benefit they got from his lessons. He was, at the same time, a great admirer of women and often in love, although none of his infatuations appear to have lasted more than seven months. He was never married, for although he repeatedly proposed he was each time refused. These love affairs call for mention because they had an influence on not a few of his compositions. A well-regulated household was a blessing he greatly needed. His eccentric habits were forever forcing him to change his lodgings and he seldom could keep a servant longer than a few weeks. If his cook brought him a bad egg he threw it at her. He often got angry when the servants laughed at the sight he presented while composing—tossing his hands about, beating time with his feet, and singing or rather, growling. His rooms presented scenes of great disorder. His gastronomic habits were unwise, and the dyspepsia they gave rise to was responsible for much melancholy and for many of the outbreaks of ill-temper for which he became notorious as he grew older. While naturally of an affectionate disposition (as instanced in his fondness for his nephew) and always fond of jokes, he would, on occasion, insult and abuse his best friends on slight provocation; but these outbursts of irascibility were usually followed by the most abject apologies. He was, in short, like his music, highly emotional and regardless of rules.

The chief cause of his growing moroseness and irritability was the difficulty of hearing which began in 1798 and gradually ended in complete deafness. In 1802 (25 years before his death) he wrote in his last will: "O ye, who consider or declare me to be hostile, obstinate, or misanthropic, what injustice ye do me! Ye know not the secret causes of that which to you wears such an appearance"; and he proceeds to speak of his hearing, which had been growing more and more defective for six years, and which made him shun people, as he did not wish to say constantly: "Speak louder—bawl—for I am deaf." His last appearance in public in concerted music was in 1814. Two years later he began to experiment with ear-trumpets, his collection of which is now in the Royal Library of Berlin. His attempts to conduct after this usually led to mortifying and pathetic scenes. The last was in 1824, when, although totally deaf, he insisted on conducting his ninth symphony; he could not even hear the applause which followed it. All communication with him was, in the last years of his life, carried on with the aid of pencil and paper. The autopsy showed that not only were the auditory nerves practically paralyzed, but there were other advanced troubles (the liver was tough as leather and shrunk to half its normal size), which made it remarkable that he should have retained his vitality so long. The immediate causes of death were inflammation of the lungs and dropsy. A week before his death he was still busy with letters and with plans for new compositions, including a tenth symphony, a requiem, and music to Faust. He died during a violent thunder and hail storm, about six o'clock on March 26, 1827. The Viennese, who had been neglecting him during the last few years, because of the Rossini furore (in 1823 no operas but Rossini's were sung in Vienna, and the whole musical atmosphere was affected by them), now realized their loss and a crowd of 20,000 persons attended the funeral. He was buried in the Währinger Friedhof, but in 1888 his remains were transferred, with those of Schubert, to the Central Cemetery. Statues of him were erected at Bonn in 1845, in Vienna in 1880, in Brooklyn in 1894, at Leipsic (Max Klinger) in 1902. In 1815 the freedom of the city of Vienna had been conferred upon him.

A certain wildness was given to Beethoven's appearance by his long, abundant hair, which was always in a state of disorder. He was strongly built and muscular, but below medium stature, his height being five feet five inches. His small black eyes were bright and piercing, his forehead broad and high, his complexion ruddy. His friend Schindler wrote that when a musical idea took possession of his mind, "there was an air of inspiration and dignity in his aspect; and his diminutive figure seemed to tower to the gigantic proportions of his mind." Already in Bonn his friends used to note the occasions when he was "in his *raptus*." These moments of inspiration would come to him at any time and anywhere — in his room, in the streets of Vienna, and particularly in the country. He was extremely fond of nature and country life, and spent his summers in the picturesque regions near Vienna. A sketch

book was always in his pocket, and into this he jotted his ideas as they came. Afterward he revised and re-revised these sketches. "There is hardly a bar in his music", says Grove, "of which it may not be said with confidence that it has been rewritten a dozen times. Of the air 'O Hoffnung,' in 'Fidelio,' the sketch books show 18 attempts, and of the concluding chorus 10." These sketches have been collected by Nottebohm and printed; they give an interesting and instructive insight into the workshop of genius. Another curious fact regarding his creative power is that like Wagner's, it matured slowly. Mendelssohn wrote his best piece, the 'Midsummer Night's Dream' overture at the age of 17; Schubert was 18 when he wrote his wonderful 'Erlking;' but Wagner was 28 when he wrote his first really original opera ('The Flying Dutchman'), and Beethoven 29 when he composed his first symphony, and that might have been almost as well written by Mozart or Haydn.

It is customary to divide Beethoven's compositions into three groups, following the suggestions of a Russian, W. von Lenz, who, in 1852, issued a book entitled 'Beethoven et ses trois styles.' The first group, in which the influence of his predecessors is still more or less obvious, includes, among many other things, the first two symphonies, the septet, the first six string quartets, the aria 'Ah perfido' the song 'Adelaide,' etc.; the second, which shows Beethoven in the full vigor of his manhood, originality and creative power, begins after the year 1800, and includes six symphonies, from the third (Eroica) to the eighth, the opera 'Fidelio,' the violin concerto, the Coriolan overture, the Egmont music, the Rasumovsky quartets, the Kreutzer sonata, the 'cello sonata in A, 14 sonatas for pianoforte, etc.; the third, which begins after a period of great tribulation and depression in his life, includes the last five pianoforte sonatas, the string quartets op. 127, 130, 131, 132, 135, the 'Missa solemnis,' the ninth symphony, the 'Ruins of Athens,' etc. Concerning some, at least, of the works of this third period opinion is still divided. There are critics who think that, partly in consequence of his deafness, Beethoven had become garrulous, incoherent, and vague, whereas others profess to find in the compositions of this period the highest summit of all musical creativeness.

A better way than Lenz's of considering the achievements of Beethoven's genius is to cast a glance at each class of his compositions by itself. The eminent English critic, Dr. Hueffer, wrote that "Beethoven is in music what Shakespeare is in poetry, a name before the greatness of which all other names, however great, seem to dwindle." This is an exaggeration. There is, in reality, only one department of music — the symphony — in which Beethoven is incontestably pre-eminent; in all the others he has his equals, and in some his superiors. In the Lied, or art-song, he is far inferior to Schubert and half a dozen other masters; in the grandeur of choral writing he never equalled Bach and Handel; his 'Fidelio' is not equal to the best operas of Mozart, Weber, Wagner, Gounod, Bizet, and Verdi; his pianoforte compositions are harmonically less fascinating, and less idiomatic in style, than Chopin's and Schumann's, and in the realm of chamber music there are works of Haydn, Mozart, Brahms, and particularly Schubert and Schumann, quite equal to the best of Beethoven's. His weakest works are in the department of vocal music, especially the Lied. He once said to Rochlitz: "Songs I do not like to write." He looked on them as bagatelles into which it was hardly worth while to put his best ideas. Hence, among his songs, there are only a few which show his genius to advantage. The best of them are 'Adelaide,' 'Die Ehre Gottes,' and 'In questa tomba.' (Consult Finck's, 'Songs and Song Writers,' pp. 28–34.) One of the most judicial biographers, Wasielewski, remarks: "While Beethoven wrote a good deal for the voice, he cannot be considered a vocal composer in the proper sense of the word. Full appreciation of the real nature of the human voice, the subtle knowledge of its resources which we admire in Handel and Mozart, he did not possess. His realm was instrumental music." Nevertheless, there is much that is of great beauty in his vocal works, which include the opera 'Fidelio,' the oratorio 'Christus am Oelberg,' two masses, a sonata, 66 songs with pianoforte, 18 canons, 7 books of English, Scotch, Irish, Welsh, and Italian songs with pianoforte, violin, and 'cello; etc. He himself considered his second mass — 'Missa solemnis' — his most successful work, but the musical world is much more enamored of his 'Fidelio,' which, while conventional in the first act, rises in the second to such a sublime level of dramatic expressiveness that it is to be much regretted he never found time to execute his other operatic plans, which included a Macbeth, a Faust, and an Alexander. The history of 'Fidelio' and its four overtures is of particular interest, but the limits of space forbid its insertion.

For pianoforte there are 38 sonatas, 5 concertos, 21 sets of variations, and more than 50 short pieces — bagatelles, rondos, preludes, ländlers, etc. Hans von Bülow spoke of Bach's 'Well-Tempered Clavichord' as the Old Testament of music and Beethoven's sonatas as the New, "in both of which we must believe;" and he declared that the mere technical mastery of these sonatas is "the task of half a life-time." They mark a tremendous advance over all his predecessors excepting Bach. In wealth of melodic ideas and rhythmic variety, as well as in structural finish, and especially in emotional expressiveness, they far surpass all previous works of their kind; yet it was not till several decades after the composer's death that they began to be generally appreciated and played in public. The pendulum then swung to the opposite extreme, and every Beethoven sonata was supposed to be a peerless masterwork which is far from being true. (Read the admirable comments on all these works in chap. VII of J. S. Shedlock's 'The Pianoforte Sonata'). In the matter of form Beethoven was by no means the pedant many of his admirers would have him. The orthodox sonata is supposed to consist of four movements; but of his 38 sonatas only 15 have four movements; 11 have 3, and 6 have only two; moreover, his two-movement sonatas are by no means "torsos," as some have foolishly called them; they include op. 90 and op. 111, two of his very

best works, the op. 111 being in fact, his last word on the subject.

The chamber music includes 8 trios for piano and 'cello; 5 trios, 16 quartets, and 2 quintets for strings; 10 sonatas for piano with violin, 5 with 'cello, 1 with horn, 3 sextets and 1 septet for strings and wind instruments; 2 octets for wind. The quartets have been made tolerably familiar, but among the other works here referred to there are many gems of which the public is still unaware. But it is when we come to the orchestral works — the 11 overtures, and 9 symphonies — that we see Beethoven in his real grandeur. Of these works Richard Wagner, who worshipped Beethoven, has written most eloquently; (see index to vol. I of Glasenapp's 'Wagner Encyclopädie,' or to Ellis's translation of Wagner's prose works; Grove's 'Beethoven's Nine Symphonies' gives an excellent analysis for amateurs). Concerning the symphonic works, Wagner wrote: "He developed the symphony to such a fascinating fulness of form and filled this form with such an unheard-of wealth of enchanting melody, that we stand to-day before the Beethoven Symphony as before the boundary line of an entirely new epoch in the history of art; for with them a phenomenon has appeared in the world, with which the art of no time and no nation has had anything to compare even remotely." It is not only that Beethoven's symphonies are longer than those of Haydn and Mozart, or broader and richer in melody, more varied in rhythm, and fuller in minute details of elaboration; what particularly distinguishes them is their greater emotionality and more powerful contrasts of moods. On the one side we have (as in the pianoforte sonatas) those soulful, tearful adagios which are a specialty of Beethoven; on the other the humorous scherzo, which he put in place of the dainty, graceful minuet of his predecessors. This symphonic scherzo was really a new thing in music, for while there is much fun in Haydn, it is of a much lighter quality. In Beethoven's there are elements of grimness and the grotesque; with an undercurrent of melancholy, as in the scherzos of Chopin. In the art of dyeing the music in deeper and more varied orchestral colors Beethoven's symphonies and overtures also mark a great advance over his predecessors.

While Beethoven stands at the head of composers of the classical school, an almost equal claim to distinction lies in this that in his works are to be found many of the germs which Weber, Schubert, Mendelssohn, Schumann, and others developed into the German romantic school. Among these germs are his inclination to shatter the sonata form (particularly in the last movement of the ninth symphony, which is epoch-making in its bold unconventionality); his disposition to allow his ideas to shape the form in which they are to be uttered; the subjective expressiveness of his music, which has five times as many expression marks as Mozart's; the use of characteristic (realistic) orchestral colors; his way of playing the pianoforte and conducting an orchestra, with tempo rubato, or frequent modification of pace; and above all, his sanctioning of Programme music by his 'Pastoral Symphony,' which illustrates episodes in the country — a scene at a brook, the merrymaking of peasants, the song of birds, and a thunderstorm. It is also significant of his romantic inclinations that toward the end of his life he conceived a plan of giving poetic titles to all his sonatas and even to the separate movements. The 'Moonlight sonata,' it is well to remember, did not get its inappropriate name from him. Of the books relating to Beethoven several have already been referred to. Of the biographies the best was written in English by the American A. W. Thayer and published, in a German version only, in three vols. (1866–77). An English edition, revised, with a final volume, is in preparation. Thayer also furnished a useful 'Chronologisches Verzeichniss' of Beethoven's works, of which a complete edition was printed by Breitkoff and Härtel in 1864–67. Pending the appearance of Thayer's great work, the best treatise is Grove's, in his 'Dictionary of Music and Musicians' (vol. I, pp. 162–209). Crowest's biography is a fair compilation in one volume. Other biographers are Wasielewski, Schindler, Marx, Nohl, Wilder, Wegeler, and Ries. Nohl's 'Beethoven and his Contemporaries' contains many literary "snap-shots." Analyses of his sonatas and symphonies have been written by Elterlein (English version) and Reinecke. Kullak's 'Beethoven's Piano-playing' is excellent. Other critical and analytical works are by Ulibischeff, Wagner (essay), Harding, Dürenberg, Alberti, Lorenz, Helm, Nottebohm, and Frimmel. His letters have been printed in several volumes by Nohl, Köchel, Schöne, Hadden. They are not nearly so interesting as Schumann's, Mendelssohn's, Wagner's, Liszt's, and Berlioz's.

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Beetle, an insect of the order *Coleoptera*. Beetles are distinguished from all other insects by the elytra or thickened fore wings, which are not actively used in flight, the hind wings being especially adapted for that purpose. The elytra cover and encase, thus protecting, the posterior segments of the thorax and the abdomen. The prothoracic segment is greatly enlarged, often exarated in front, to receive the head. These characters are very persistent. There are few aberrant forms and the order is remarkably homogenous and easily limited. The head is free from the thorax; it is scarcely narrowed behind, and its position is usually horizontal. The eyes are usually quite large, and there may be one or two oceli — not more. The antennæ are usually inserted just in front of the eyes, and rarely between them. They are either filiform where the joints are cylindrical, as in the ground beetles (*Carabidæ*), not enlarging toward the end, or serrate, as in the *Elateridæ*, where the joints are triangular and compressed, giving thereby a serrate outline to the inner edge; or clavate as in the *Silphidæ*, where the enlarged terminal joints give a rounded, club-shaped termination; or lamellate, when the terminal joints are prolonged internally, forming broad, leaf-like expansions, as in the *Scarabæidæ*, while the geniculate antenna is produced when the second and succeeding joints make an angle with the first. The mandibles are always well developed as biting and chewing organs, becoming abnormally enlarged in the stag-beetles (*Lucanus*), while in certain *Scarabæidæ* they

are small and membranous. The maxillæ prepare the food to be crushed by the mandibles. The greatly enlarged prothorax is free and movable.

In the running species, as *carabidæ,* the hind wings being useless are aborted, and very rarely in some tropical *Lampyridæ* and *Scarabæidæ* both pairs of wings are wanting in both sexes, though, as in the glow-worm and some of its allies the females, are apterous. The legs are well developed, as the beetles are among the most powerful running insects; the hindermost pair of legs becoming oar-like in the swimming *Dytiscidæ* and some *Hydrophilidæ,* while in the *Gyrinidæ* both pairs of hind legs become broad and flat. The number of tarsal joints varies from the normal number five, to four and three joints, the terminal joint as usual being two-clawed. These claws are known to be wanting only in *Phanæus,* a scarabæid, and the aberrant family, *Stylopidæ.* According to the number of the tarsal joints the families of the *Coleoptera* have been grouped into the *Pentamera* (five-jointed) the *Tetramera* (four-jointed), the *Trimera* (three-jointed), and the *Heteromera,* which are four-jointed in the hind pair, while the first and second pairs are five-jointed. The abdomen, usually partially concealed by the wings, is sessile, its base broad; in form it is usually somewhat flattened.

A few genera are capable of producing sounds by rubbing the limbs or elytra over finely wrinkled surfaces, which in *Trox* are situated on the side of the basal segments of the abdomen, and in *Strategus* on the tergum of the penultimate segment of the abdomen, while such a surface is found in *Higyrus* on the surface of the elytra.

The larvæ when active and not permanently enclosed (like the curculio) in the substances that form their food, are elongated, flattened, wormlike, with a large head, well developed mouth-parts, and three pairs of thoracic feet, either horny, or fleshy and retractile, while there is often a single terminal prop-leg on the terminal segment of the body and a lateral horny spine. The wood-boring larvæ of the *Cerambycidæ* are white, soft, and more or less cylindrical, while those of the *Curculionidæ* are footless or nearly so, and resemble those of the gall-flies, both hymenopterous and dipterous.

The pupæ have free limbs, and are either enclosed in cocoons of earth, or, if wood-borers, in rude cocoons of fine chips and dust, united by threads, or a viscid matter supplied by the insect. None are known to be coarctate, though some *Coccinellæ* transform within the old larva-skin, not rejecting it, as is usual in the the group, while other pupæ are enclosed in the cases in which the larva lived. In some *Staphylinidæ* the pupa shows a tendency to become obtected, the limbs being soldered to the body, as if were enclosed in a common sheath. Generally, however, the antennæ are folded on each side of the clypeus, and the mandibles, maxillæ and labial palpi appear as elongated papillæ. The wing-pads being small are shaped like those of the adult *Meloe,* and are laid upon the posterior femora, thus exposing the meso- and meta-thorax to view. The tarsal joints lie parallel on each side of the middle line of the body, the hinder pair not reaching to the tips of the abdomen, which ends in a pair of acute, prolonged, forked, incurved horny hooks, which must aid the pupa in working its way to the surface when about to transform into the beetle.

The number of known living species is between 100,000 and 200,000, and over 10,000 species are known to inhabit the United States. About 1,000 fossil species are known.

Coleoptera have been the favorites of entomologists. They have been studied when in their perfect state, more than any other insects, but owing to the difficulty of finding their larvæ and carrying them through the successive stages of growth, the early stages of comparatively few species are known. The metamorphoses are complete, and in this respect the beetles are much in advance of the orders of net-veined insects in which the transformations are incomplete. Many beetles, as the species of *Cetonia,* etc., visit flowers to collect and eat the pollen, and in doing so bring about the fertilization of those flowers.

Classification.— The systematic arrangement of the *Coleoptera* is in an unsettled state. The tiger and ground beetles are generally considered to be the "highest" *Coleoptera,* but in reality they appeared to be allied to what were the more primtive and generalized types, while what are by some authors regarded as the "lowest" beetles, that is, the weevils, are the most specialized or most highly modified. As all our classifications begin with the more primitive or earliest forms, and end with the most specialized, we should begin with the *Carabidæ* or ground beetles, as being the nearest representatives of what are supposed to be the earliest beetles. We would, therefore, adopt provisionally Sharp's primary divisions of *Coleoptera,* with some important changes. His first division or series comprises the lamellicorns (May beetle, etc.), and his second the *Adelphaga* or ground beetles. This order should be reversed.

Series 1. *Adelphaga* (*Carabidæ* of some authors). Antennæ long, slender, filiform; tarsi five-jointed; maxillæ highly developed, three-lobed, the outer palpus shaped. (Ground and tiger beetles.)

Series 2. *Lamellicornia.* Antennæ short, the terminal joints leaf-like; tarsi five-jointed.

Series 3. *Polymorpha.* Antennæ either club-like or serrated, variable in shape, as are the number of joints of the tarsus. (*Buprestidæ,* spring-beetles, etc., including many families.)

Series 4. *Heteromera.* Front and middle tarsi five-jointed, hind tarsi four-pointed; other characters very variable. *Tenebrionidæ, Cantharidæ,* or blister-beetles (q.v.), etc.

Series 5. *Phytophaga.* Tarsi four-jointed but with a small additional joint at the base of the fourth joint; sole usually densely pubescent. (Boring or longicorn beetles; *Cerambycidæ,* leaf-beetle, potato beetle.)

Series 6. *Rhyncophora.* (*Weevils.*) Head prolonged in front to form a beak; palpi much reduced; tarsi four-jointed, but with an additional minute joint at the end of the fourth. The term *Isomera* was applied by Le Conte and Horn to a combination of series 1, 2, 3, and 5.

Phylogeny.— The *Coleoptera* are supposed by Braver and also Packard to have descended from some type allied to a *Campodea*-like ancestor. The larvæ of the ground beetles are

allied by their long legs and biting mouth-parts to the common *Campodea*-like progenitor; they appear to have undergone the least modification from the shape of the primitive coleopterous larva; the footless grubs of boring beetles, longicorns and weevils, being secondary forms. Thus the *Coratidæ* and next after them the rose-beetles (*Staphylinidæ*) have been regarded as the nearest to the earliest type of beetles.

Fossil beetles.— The earliest known remains of Coleoptera are five specimens from the carboniferous strata of Silesia, of which four are wing covers and one is a pronotum; these have been referred by Karsch to the families *Carabidæ* or *Tenebrionidæ*. In the lower Jurassic, however, comparatively well preserved remains of six families (*Carabidæ, Dytiscidæ, Elateridæ, Scarabæidæ, Ceramoycidæ,* and *Chrysomelidæ*) have been detected showing that early in the Mesozoic era, nearly all the principal types of beetles had appeared; whence we naturally suppose that their ancestors evolved during the Carboniferous period, though their remains have not yet been discovered. During the Tertiary age beetles became more abundant, and a greater number of species belonging to existing genera have been found. The Oligocene fresh-water deposits of Aix and Provence, of Florissant, Colorado, contain many kinds of beetles, as also does the Miocene amber of the Baltic coast in Prussia, and the lignite of Bohemia, as well as the fresh-water marls of Germany, Utah, and Wyoming. Of the weevils 350 Tertiary species have been described, their hard bodies accounting for their preservation.

Bibliography.— The writings of Say, Harris, and others; especially Le Conte and Horn; 'Rhynchophora of America north of Mexico' 'Classification of the Coleoptera of North America.'

Beetlehead. See BLACK-BELLIED PLOVER.

Beets, bāts, **Nicolaus,** Dutch poet and writer: b. Haarlem, 13 Sept. 1814. He studied theology at Leyden, and after serving at Heemstede, near Haarlem, he was in 1854 appointed to the pastorate of Utrecht, and in 1874 to the chair of theology there. His poetical works have been collected (4 vols., 1873–81). Through the earlier pieces runs a strong vein of misanthropic sentiment, due probably to Byron, some of whose works he translated into Dutch (2 vols., 1835–7). His prose writings include 'Camera Obscura' (13th ed., 1880), a series of tales and sketches of life and scenery in Holland, published under the pseudonym of HILDEBRAND; they display keen observation and considerable humor. Besides several critical works, he published in theology, notes on the life of St. Paul (3d ed., 1858), and 'Stichtelijke Uren' (new ed., 8 vols., 1872).

Befana, bā-fä'nä (Italian, *Befania*, "*Epiphany*"), a figure, generally representing an old woman, which is exhibited in Italy on the day of Epiphany by children, or in shops, etc., where things for children are sold. In Germany presents are given to children on Christmas Eve, and in France on New Year's evening, but in Italy on the day of Epiphany, and it is said that the *befana* brings them to good children.

Beg, or **Bey,** bā, a title of honor among the Turks, meaning "lord." The beg is, in some parts of the empire, inferior to a pasha.

Bega, bā'gą, **Cornelius,** Dutch painter: b. Haarlem, 1620; d. 16 Aug. 1664. He was a pupil of Ostade, whose manner he imitated. The subjects of his paintings are commonly the amusements of the Dutch peasantry and the interior of cottages and taverns. When the plague in 1664 visited Holland, a young lady, whom he loved, was attacked by it, and was abandoned by her friends. Bega remained by her side, rendering her every attention till her last moment, but caught the fatal infection and died.

Begarelli, bā-gä-rĕl'lē, **Antonio,** Italian designer, styled ANTONIO OF MODENA: b. Modena, about 1498; d. 1565. By his contemporaries he was considered the greatest designer of his day. He was a friend of Correggio and co-operated with him in decorating the cathedral at Parma, furnishing many of the designs and models for the artist's pictures. His groups were commonly of life size or heroic, and were greatly admired by Michael Angelo. He influenced strongly the succeeding Lombard artists in the matter of design. His 'Descent from the Cross,' the most significant of his remaining works, still adorns the Church of San Francesco at Modena.

Begas, bā'gąs, **Karl,** Prussian painter: b. Heinsberg, near Aix-la-Chapelle, 30 April 1794; d. Berlin, 23 Nov. 1854. He studied first under Philippart, and in Paris under Gros. His first work, a copy of the Madonna della Sedia, attracted the attention of the king of Prussia, who appointed him painter of the Prussian court. His productions comprise historical, genre, and portrait paintings, of which the most important are 'Henry IV. at the Castle of Canossa'; the 'Sermon on the Mount'; 'Christ on the Mount of Olives'; the 'Lorelei'; and the portraits of Humboldt, Schelling, Ritter, Rauch, Cornelius, and Meyerbeer. He was a member of the Berlin Academy of Fine Arts.

Begas, Karl, German sculptor (son of the preceding): b. 1845. He studied in the studio of his brother Reinhold and at the Berlin Academy of Art. Among his most important works are the Franco-Prussian memorial unveiled at Cassel in 1898; the groups in the Berlin "Siegasalle," of Margrave Otho IV. and Frederick William; the statue of Knobelsdorf in the Berlin Museum, and those of Columbus and Aristotle in the University of Kiel.

Begas, Oscar, German artist (eldest son of Karl Begas, 1794–1854); b. 1828. d. 1883. He painted portraits with astonishing ability at the age of 12, and in 1852 won a scholarship which gave him two years of study in Italy, where he painted his 'Hour of Gossip,' now in the Berlin National Gallery. His work is mainly portraiture.

Begas, Reinhold, German sculptor (son of Karl Begas, 1794–1854): b. Berlin, 1831. He studied in Rome, and in 1866 settled in Berlin, where he has not only executed many important works in the strict line of his profession, but painted many portraits of women, and produced important architectural designs. Among his most characteristic works are a statue of Schil-

ler (1863); 'Borussia,' a colossal statue in the Ruhmeshalle in Berlin (1885); 'The Fountain of Neptune,' in the Schlossplatz, Berlin (1882); the sarcophagus of Emperor Frederick III., in the Potsdam Mausoleum (1892); 'Germania,' a colossal equestrian statue on the new Reichstag building; and a statue of Bismarck.

Begg, Alexander, Canadian author: b. Quebec, 19 July 1840. He was educated in Aberdeen, Scotland, and in St. John's, P. Q. He was the pioneer of Canadian trade (1867) in Manitoba and in the Northwest Territories. During the rebellion of 1869 he advocated representative government for the people. In 1878–84 he was deputy treasurer of the province of Manitoba. He was commissioner for Manitoba to the Dominion Exhibition in 1879, and had charge of the Manitoba exhibits through Ontario, Quebec, and the Maritime Provinces in 1879–80. His works include 'Dot it Down'; 'The Creation of Manitoba'; 'A Story of the Saskatchewan'; 'A Practical Guide to Manitoba'; 'Ten Years in Winnipeg'; 'A History of the Northwest' (3 vols.), etc.

Begg, James, Scottish Free Church theologian: b. New Monkland, Lanarkshire, 1808; d. Edinburgh, 29 Sept. 1883. Entering the ministry in 1829 he joined the Free Church ranks in 1843, at the time of the Disruption, and was minister for the rest of his life at Newington, a suburb of Edinburgh. He was one of the most narrow of theological leaders and bitterly antagonistic to anything distantly approaching liberality. He opposed the use of hymns and church organs and did much to keep the Free Church as unprogressive as possible. Among his writings are 'A Handbook of Popery' (1852); 'Seat Rents Brought to the Test of the Scripture, Law, Reason, and Experience' (1838); 'The Use of Organs and Other Instruments of Music in Christian Worship Indefensible' (1866).

Beggar-my-neighbor, a game at cards, usually played by two persons, who share the pack, and, laying their shares face downward, turn up a card alternately until an honor appears. The honor has to be paid for by the less fortunate player at the rate of four cards for an ace, three for a king, two for a queen, and one for a knave; but if in the course of payment another honor should be turned up, the late creditor becomes himself a debtor to the amount of its value.

Beggar-Tick, a troublesome weed. See Burr Marigold.

Beggars, a term first applied to the 300 Protestant deputies under Henri de Brederode and Louis de Nassau, who protested against the establishment of the Inquisition in Holland in April 1566. The Dutch patriots assumed this designation when they rebelled against Spain in 1572.

Beggar's Lice, a coarse weed also called Dog's Tongue.

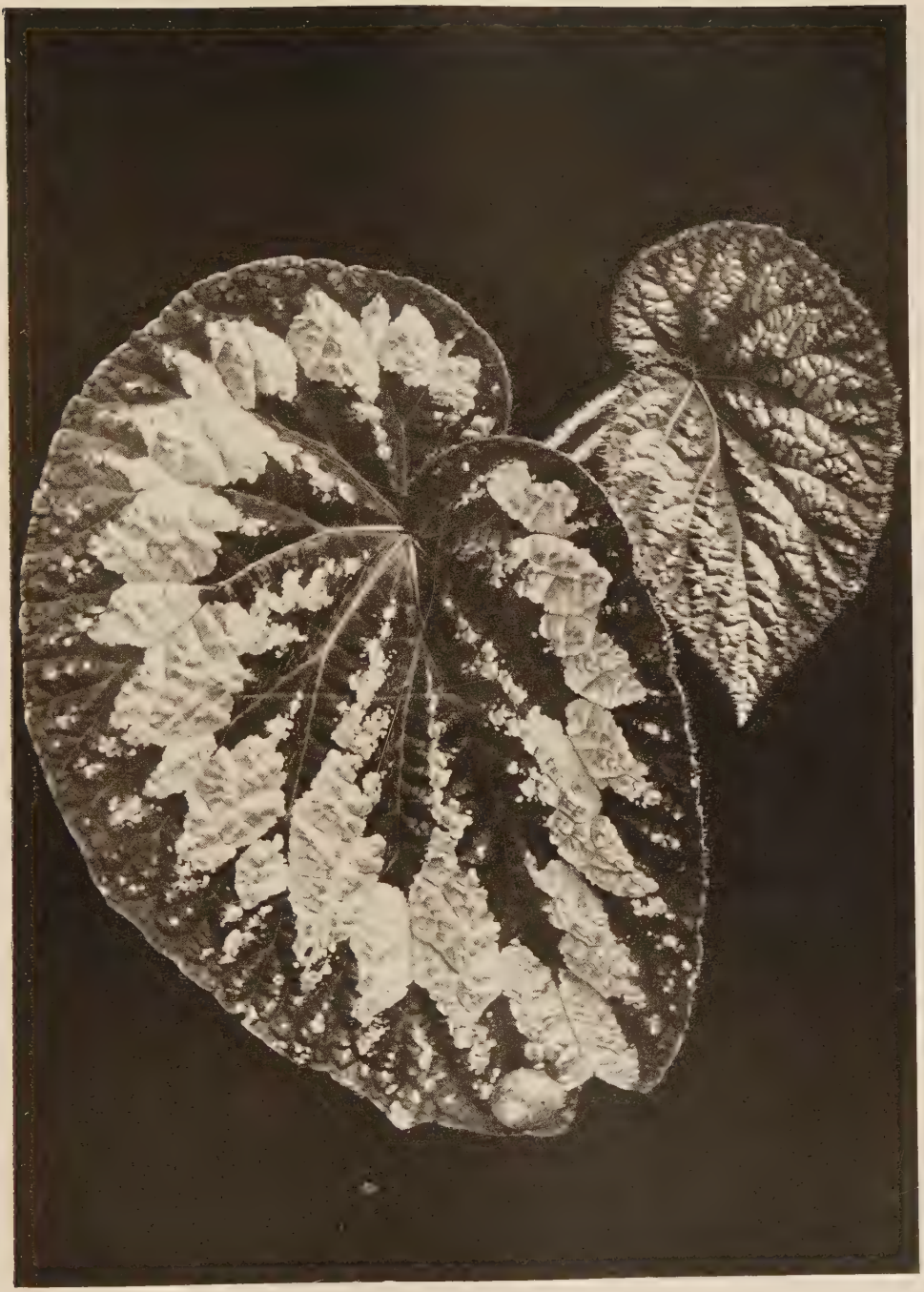
Beggar's Opera, The, a play by John Gay, was first presented in 1728, exciting a «tempest of laughter.» Its object was to satirize the predatory habits of «polite» society in thief-infested London, and to hold up to ridicule Italian opera. The chief characters are thieves and bandits. Captain Macheath, the hero, the leader of a gang of highwaymen, is loved by the ladies and feared by all but his friends — with whom he shares his booty. Peachum, the «respectable» patron of the gang, and the receiver of stolen goods, betrays his confederates from self-interest. Macheath is married to Polly Peachum, a pretty girl, who really loves her husband, and remains constant under many vicissitudes. Macheath engages to marry others, but this gets him into trouble. Being betrayed, he is lodged in Newgate. His escape, recapture, trial, condemnation to death, and reprieve, form the leading episodes in his dashing career. After his reprieve he makes tardy acknowledgment of Polly, and promises to remain constant to her for the future. Polly is an interesting dramatic character, at least three actresses having attained matrimonial peerages through artistic interpretation of the part. Gay's language often conforms to the coarse taste and low standards of his time; and the opera, still occasionally sung, now appears in expurgated form. Its best-known piece is Macheath's famous song when two of his inamoratas beset him at once:

> "How happy could I be with either
> Were t'other dear charmer away!"

Beggarweed, or **Tick Trefoil** (*Desmodium*), a genus of about 150 species, mostly herbs of the natural order *Leguminosæ,* natives of warm and temperate climates. Some of the species, notably the Florida beggarweed (*D. tortuosum* or *molle*) are used in Florida and elsewhere as fodder plants and as green manures on light soils. Like the clovers these plants can assimilate free nitrogen from the air. The species mentioned yields heavy crops of highly nutritive hay which is relished by stock. At the Louisiana Experiment Station six tons of hay per acre is reported. The plant is an annual from 3 to 10 feet tall, has pinnate leaves, small flowers in racemes and flat, jointed pods which adhere to clothing and animals by their hooked hairs. The plant has been found to do well in the West Indies and as far north as Virginia. About 10 native species worthy a place in the flower-garden have been offered for sale by dealers in native plants, but not generally by seedsmen. *D. gyrans,* the telegraph plant, a purple flowered perennial, native of southern Asia, is sometimes raised in hot-houses on account of the interesting movements of its leaflets when exposed to favorable temperature and sunshine.

Beggiatoa, one of the bacteria of the family *Beggiatoaceæ.* They are of sanitary interest as indicating the character of the water in which they grow,— it usually contains sulphur,— and their presence in large quantities in a water supply is usually held to mean that the water is contaminated and should be investigated. Their growth in natural sulphur waters is to be expected.

Begging the Question, in logic, is the assumption of a proposition which in reality involves the conclusion. Thus, to say that parallel lines will never meet because they are parallel is simply to assume as a fact the very thing you profess to prove. The phrase is a translation of the Latin term, *petitio principii,* and was first used by Aristotle.



Leaf of the Countess Pandolfini Begonia.

Bégin, bā-zhăń, **Louis Nazaire,** Canadian clergyman; educated at the College of St. Michael de Bellechasse, the Seminary of Quebec, Laval University, and the Grand Seminary of Quebec. About the time of his graduation from the last institution its trustees decided to found a theological department in connection with Laval University, and it was their wish that the faculty of this theological school should be educated in Rome. Therefore Dr. Bégin, who had been elected a member of the faculty, was sent to Rome in 1863, and remained abroad till 1868. During this time he traveled extensively and studied many branches of theology. On his return to Quebec he was appointed professor of dogmatic theology and ecclesiastical history in Laval University and held the chair till 1884. He became principal of the Laval normal school in 1885; was appointed bishop of Chicoutimi in 1888; coadjutor to Cardinal Taschereau, with the title of archbishop of Cyrene, in 1891; and in 1894 became administrator of the Province of Quebec. His works include 'La Primauté et l'Infaillibilité des Souverains Pontifes,' 'La Sainte Ecriture et la Régle de Foi' (1874); 'Le Culte Catholique' (1875).

Beglerbeg, bā-lĕr-bā', or more accurately, **Beylerbegi,** bā-lĕr-ba'ē, "prince of princes," or "lord of lords," is the title among the Turks given to the governor of certain provinces, but is not very commonly employed at the present day. The governors of Rumili, of Anatolia, and of Syria, in particular, have this title. See Beg.

Begon, Michel, bė-gŏń, mē-shĕl, French administrator: b. Blois, France, 1638; d. Rochefort, 4 March 1710. He was a naval officer, and successively intendant of the French West Indies, of Canada, of Rochefort, and La Rochelle. He is celebrated for his love of science, and the well known genus of plants, *Begonia,* was named in his honor.

Begonia, *Beefsteak Geranium,* or *Elephant's Ear.* A genus of about 350 species of succulent tropical herbs or under-shrubs of the natural order *Begoniaceæ,* most abundant in Mexico and Central and South America. Since the introduction of the first species (*B. nitida*) into England in 1777 about 150 species have been utilized by horticulturists, who have produced thousands of varieties noted for the superb coloring of either or both their flowers or foliage. In general the plants are characterized by variable, lop-sided (except in one group), alternate, entire, or lobed leaves; axillary cymes of usually large monœcious flowers, varying in all shades of red, also white and yellow; numerous stamens free or basally united; two to four styles; branched or twisted stigmas; and three-winged capsular, often colored, fruits containing numerous tiny seeds. The cultivated varieties may be grouped into: (1) Summer-flowering or tuberous-rooted, which produce large single and double flowers; (2) winter-flowering or fibrous-rooted; (3) semi-tuberous or *Socotrana,* with peltate leaves; (4) ornamental-leaved, or rex, Asiatic species and their descendants, with remarkably handsome or striking foliage. There are also hybrids between members of these groups. Each group demands somewhat different cultural treatment, but in general the tuberous sorts are started from seeds, and the tubers thereafter used from year to year; other varieties are usually increased by means of cuttings, either of the stem or of the leaf, by various methods almost confined to this group of plants. The varieties are usually easy to cultivate, but some, especially the tuberous sorts, are somewhat sensitive to dryness of atmosphere and hot sun, which usually accounts for the poor behavior of these plants in houses heated by hot air, steam, or hot water. For description of species grown in America, and for details of propagation, cultivation, etc., consult Bailey and Miller, 'Cyclopedia of American Horticulture' (N. Y. 1900–2). Consult also: Drysander, 'The Genus Begonia,' in 'Transactions of the Linnean Society,' Vol. I (1789); Klatsch, 'Begoniaceen-Cattungen und Arten,' 12 plates (1855); De Candolle, 'Prodromus,' Vol. XV. (1864); Ravenscroft, 'Begonia Culture for Amateurs' (1894); Wynne, 'Tuberous Begonias.'

Béguines, beg-ēn', **Béguins,** bĕg-ĭnz, or **Béguinæ,** bĕg-wĭ-nē, the women who live in communities, the members of which dwell not in one household, as in convents, but in a group of small cottages surrounded by a wall, with a chapel in the centre. They vow poverty and chastity so long as they remain in the béguinage as their village is called. They are the associations of praying women which arose in the Netherlands in the 13th century, the first being formed at Nivelles, Brabant, in 1226, and spread rapidly in the adjoining countries. They said they originated from a certain St. Begga, Duchess of Brabant, in the 7th century; but it is believed that they were founded by Lambert le Begue, a priest of Liége, in the 12th century. Mosheim rejects both statements. They used to weave cloth, live together under a directress, and leave on being married, or indeed whenever they pleased. They still exist in some of the Belgian towns, notably at Ghent, also in Germany, and at least in one béguinage in France, where they are renowned as makers of lace, though under different rules from those formerly observed. The corresponding communities of men were called Béghards, but these were suppressed in 1650 by Pope Innocent X.

Begum, bā'gŭm (a feminine form corresponding to beg, or bey), an Indian title of honor equivalent to princess, conferred on the mothers, sisters, or wives of native rulers. The Begum of Oudh is well known in Indian history.

Behaim, bā'hīm, **Martin,** a famous cosmographer: b. Nüremberg about 1430; d. Fayal, 29 July 1506. He is distinguished as one of the most learned mathematicians and astronomers of his age. He was engaged in commerce, and traveled for the purpose of carrying on his business, from 1455 to 1479; but also devoted himself to the study of the mathematical and nautical sciences. He went from Antwerp to Lisbon in 1480, where he was received with marks of distinction. He sailed in the fleet of Diego Cam on a voyage of discovery (1484–6), and explored the islands on the coast of Africa as far as the river Zaire. He is also said to have discovered, or at least to have colonized, the island of Fayal, where he remained for several years, and assisted in the discovery of the other Azores. He was afterward knighted, and returned to his native country, where he constructed a terrestrial globe in 1492, which bears the marks of the imperfect

acquaintance of that age with the true dimensions of the earth. Some ancient Spanish historians assert that he made many discoveries, and that he gave to his friend Columbus the idea of another hemisphere. Robertson (in his 'History of America') and others contradict this statement. It is also rejected by Irving.

Beham, bā'ham, **Bartel,** German painter and engraver: b: Nüremberg, 1496; d. Rome, 1540. He studied painting under Albert Dürer and later in Italy, and engraving under Marc Antonia Raimondi. Among his paintings are 'Christ Bearing the Cross,' 'A Woman Raised from the Dead by the True Cross,' and 'Marcus Curtius Leaping into the Gulf.' Among his prints are a portrait of William, Duke of Bavaria,' 'Adam, Eve, and Death Before a Tree,' 'The Virgin Suckling a Child,' 'Lucretia,' 'Cleopatra,' 'Apollo Causing Marsyas to be Flayed,' and 'Christ Giving His Charge to Saint Peter.'

Beham, Hans Sebald, German painter and engraver: b. Nüremberg, 1500; d. Frankfort, 22 Nov. 1550. He studied under Albert Dürer, and was one of his ablest scholars, but rendered his talents worse than useless, both to himself and society, by employing his pencil for the most profligate purposes. The disgust produced by his licentiousness drove him from his native town to Frankfort-on-the-Main, where dissipation made his downward progress very rapid.

Behar, bĕ-här', an extensive province of British India, now a part of the presidency of Bengal; pop. about 25,000,000 in 1901. It was ceded to the British by the Mogul shah Alum in 1765, on condition of an annual payment of 26 lacs of rupees. It is intersected by the Ganges, and produces much opium, indigo, sugar, cotton, and saltpetre. Gaya, the birthplace of Buddha, and the scene of one of Vishnu's incarnations, is in the province, and is visited by vast numbers of pilgrims. Other places of importance in the province are Baha, Chapra, and Patna.

Be'hemoth, the name of an animal described in Job xl. 15, to the end. It is evidently an herbivorous animal; but commentators and naturalists are not agreed as to the particular species. Bochart, Gesenius, and the generality of English commentators think the description most applicable to the hippopotamus; others think it was the elephant. Nor would it militate much against this interpretation that the elephant is not a native of the country in which the scene of the poem is laid. The author of the book of Job, whether Moses or not, may have been familiar with life in Egypt and Arabia, and if so, would naturally introduce scenery and adjuncts Egyptian or Arabian, or both combined; and that the elephant was well known in Egypt is proved not only by the use of ivory in the arts, specimens of which are preserved in abundance, but also by the representation of the animal itself on early Egyptian monuments.

Behistun, bā-hĭs-toon', a mountain near a village of the same name, not far from Kermanshah. in Persian Kurdistan, celebrated for the sculptures and cuneiform inscriptions cut upon one of its rocky sides, which rises almost perpendicularly to the height of 1,700 feet. These works are about 300 feet from the ground, and were executed by the orders of Darius I., king of Persia. The inscriptions set forth his genealogy, enumerate his 19 victories obtained against the rebels in different provinces of his empire, and proclaim the final pacification of the latter, and his gratitude to God. The sculptures consist of a large tablet, on which are represented a king with his foot upon a prostrate man, two long-speared warriors behind him, nine captives chained together by the neck before him, and above the whole a mythological figure. The inscriptions are executed with great neatness, and the whole monument is very well preserved, the rock, which had been carefully polished, having been coated with a hard silicious varnish, much harder, indeed, than the limestone beneath. The mountain was well known in ancient times, being mentioned by Diodorus under the name of Bagistanon. The same writer states also that an inscription and figures were engraved upon the rock by the orders of Semiramis, but these if they ever existed, have now disappeared. Rawlinson was the first to copy and decipher the Behistun inscriptions.

Behm, bām, **Ernst,** German geographer: b. Gotha, 4 Jan. 1830; d. there, 15 March 1884. In 1856 he became Dr. Petermann's chief assistant in editing the famous geographical periodical 'Mitteilungen,' to the editorship of which he succeeded on his chief's death in 1878. In 1872 he began, in conjunction with H. Wagner, the useful 'Population of the Earth,' intended as a statistical supplement to the 'Mitteilungen'; and from 1876 he undertook the statistical department of the 'Almanach de Gotha.' His more extended writings of this nature are marked by fullness, accuracy, and marked lucidity of arrangement.

Behn, bān, **Aphra,** or **Aphara,** English novelist and dramatist: b. Wye, Kent, 1640; d. London, 16 April 1689. She went to Surinam when she was very young, and remained there some years, during which time she became acquainted with the American prince, Oroonoko, whom she made the subject of a novel, subsequently dramatized by Sothern. On her return to England she married Mr. Behn, a London merchant, but was probably a widow when selected by Charles II. to acquire intelligence on the Continent during the Dutch war. She took up her residence at Antwerp, and it is said that, by means of one of her admirers, she obtained notice of the intention of the Dutch to sail up the Thames, and transmitted the news to England. This intelligence being discredited, she returned to England, and devoted herself to intrigue and writing for support. She published three volumes of poems, by Rochester, Etherege, Crisp, and others, with some poetry of her own; and wrote 17 plays, the heartless licentiousness of which was disgraceful both to her sex and to the age which tolerated the performance of them. She was also the author of a couple of volumes of novels, and of the celebrated love-letters between a nobleman and his sister-in-law (Lord Gray and Lady Henrietta Berkeley). Pope, in his 'Character of Women,' alludes to Mrs. Behn, under her poetical name of ASTREA.

> 'The stage how loosely does Astrea tread,
> Who fairly puts her characters to bed.'

She was buried in the cloisters of Westminster Abbey. An edition of her works was published in 1872.

Behrends, bā'rĕns, **Adolphus Julius Frederick,** American clergyman: b. Nymwegen, Holland, 18 Dec. 1839; d. Brooklyn, N. Y., 22 May 1900. He was successively pastor of a Baptist church at Yonkers, N. Y., 1868, and of the First Baptist Church in Cleveland, Ohio, 1873; of the Union Congregational Church, Providence, R. I., 1876, and of the Central Congregational Church in Brooklyn, 1883–1900. He published 'Socialism and Christianity' (1886); 'Philosophy of Preaching' (1890); 'The Old Testament Under Fire'; 'The World for Christ.' He was a forcible writer and very popular as a pulpit orator.

Behrens, bā'rĕns, **Bertha,** popular German novelist, who has written over the signature, W. Heimburg: b. Thale, 1850. She completed 'Das Eulenhaus,' a posthumous novel by E. Marlitt, whose successor as contributor to *Die Gartenlaube* she became, and among her own novels may be named 'Aus dem Leben meiner Alten Freunden' (1878, 8th ed. 1890); 'Lumpenmüllers Lieschen' (1879); 'Ihr einziger Bruder' (1882); 'Waldblumen' (1882); 'Dazumel' (1887); 'Trudchens Heirat' (1884); 'Umfreund Schuld' (1895); 'Antons Erben' (1898).

Behring, bā'rĭng, **Emil Adolf,** German physician: b. Hansdorf, 1854, and since 1895 director of the Hygienic Institute in Marburg. He has published 'Die Blutserumtherapie' (1892); 'Bekämpfung der Infektionskrankheiten' (1894) and is widely known for his discovery of diphtheria serum.

Behring, bā'rĭng or bē'rĭng. See Bering.

Beige, a light, woolen fabric, made of wool of the natural color; that is, neither dyed nor bleached.

Beijerland, bī'ĕr-lant, a fertile island in the Netherland province of South Holland at the mouth of the Maase. It produces great quantities of flax. Pop. 13,300.

Beilan, bā-län', a town and pass in the north of Syria, on the Gulf of Iscanderoon. The pass has more than once been of military importance, and was in 1832 the scene of a battle between Turks and Egyptians. The town, 1,584 feet above the Mediterranean, has 5,000 inhabitants.

Beilstein, bīl'stīn, **Freidrich Konrad,** Russian chemist: b. St. Petersburg, 1838. In 1866 he became professor of chemistry in St. Petersburg Institute of Technology. He has published 'Anleitung zur qualitaten Chemische Analyse,' which has been widely circulated (1867); 'Die Chemische Grossindustrie auf der Weltausstellung in Wien' (1873); and a celebrated 'Handbuch der Organischen Chemie' (1800–1901).

Beira, bā'ra, a province of Portugal, bounded chiefly by the River Douro on the north, by Spain on the east, and by the Tagus and Portuguese Estremadura on the south, and by the Atlantic on the west. It was formerly divided into Beira Alta (High Beira), and Beira Baixa (Low Beira). Its extent is 9,248 square miles, and the pop. (1900) 1,518,406. The capital is Coimbra. It is traversed by the Serra d'Estrella, and well watered by the Douro, Tagus, etc. Though not fertile in grain, the produce of wine and olives is considerable. The heir-apparent of the Portuguese crown is styled Prince of Beira. For purposes of administration the province is subdivided into the districts of Aveiro, Visien, Coimbra, Guarda, and Castello Branco.

Beira, a seaport on the coast of Portuguese East Africa, at the mouth of the Pungwe River, a little to the north of Sofala. It is the nearest port to the gold-fields of Mashonaland, and a railway through Fontesvilla, Chimoio, Massikesse, and New Umtali to Salisbury was completed in 1899. Beira has a good harbor protected by a sand-bank. There is a hospital, an English church, and about 1,600 inhabitants, of whom about 700 are Europeans.

Beiram, bā'räm. See Bairam.

Beirut, or **Beyrout,** bê-rut, or bā-root', (ancient Berytus), a flourishing seaport of Syria, 60 miles northwest of Damascus. It stands on a tongue of land projecting into an open bay, and spreading out toward the land into a beautiful plain, backed by the mountains of Lebanon. It consists of the old town, composed generally of narrow dirty streets, the residence of the poorer classes, and the business place of the merchants; and of the new town, which stretches around it. The latter, with its modern houses, carriage roads, and gardens,—its churches, colleges, schools, and hotels,—has little or nothing of the Oriental in its composition. Beirut has rapidly increased since 1844 when its population was only 8,000, its rise being largely due to the extension of the silk trade, of which it is the centre. The better protection afforded both to foreigners and natives by its being the residence of the consuls-general has also contributed to its prosperity. It is the seat of a consulate of the United States. Besides silk its principal exports are olive oil, cereals, sesame seed, tobacco, and wool. Shipbuilding is carried on here; an English company completed waterworks here in 1875 and gas works were built by a French company in 1886. Besides a Scottish school for Jews, there is an American-Syrian mission in Beirut, printing annually thousands of Arabic Bibles and having a school and hospital connected with it. In ancient times Beirut was a large and important Phœnician city, and under the Romans was long celebrated for its school of jurisprudence. The Byzantine Emperor Theodosius II. raised it to the rank of a metropolis. After being destroyed by an earthquake in 551, it again rose to a considerable town in the time of the Crusades. In later times it was long in the possession of the Druses. It was bombarded and taken by the British on 29 Aug. 1840. There is a railway to Damascus. Pop. estimated (1901) 120,000.

Beisa, bī'sa, a large Abyssinian antelope (*Oryx beisa*), differing from the gemsbok principally in lacking the tuft of hair on the throat and by the black patch on the front of the face being completely separated from the cheek stripe. This is probably the animal called oryx by the ancients, and may be the animal from which is derived the legend of the unicorns. Its straight horns (about 36 inches long) when seen in profile might easily appear as one. Herds of beisas are still numerous upon the plains of Somaliland. See also Gemsbok; Oryx.

Beissel, bī'sĕl, **Johann Conrad,** German mystic: b. Eberbach, 1690; d. Ephrata, Pa., 1768. He studied theology at Halle, but having been banished in 1720 for his Pietistic opinions he emigrated to Pennsylvania, settling first at Germantown and later in Lancaster County. In 1724 he returned to Germantown and adopted the Dunker faith, but his views as to celibacy and his observance of Saturday as the Sabbath were unacceptable to his neighbors, and he therefore established a sect of Seventh Day Dunkers. He attempted a hermit life, but his fellow believers gathered about him and in 1735 he founded the famous Settlement of Ephrata, Pa. (q.v.), and remained at its head till his death. He was the author of the earliest volume of German poetry published in America, 'Gottliche Liebes und Lobestöne' (1730), and published several collections of hymns, such as 'The Voice of the Lonely and Forsaken Turtle Dove — that is, of the Christian Church; by a Peaceable Pilgrim traveling to Tranquil Eternity' (1747); and 'Paradisiacal Wonder-Play' (1766). In the latter are found the 'Brother Song' of the sect with its 215 stanzas, and the 'Sister Song' with 250. He was known at Ephrata as Friedsam, and on his tomb may be read the inscription: "Here rests an outgrowth of the love of God, 'Friedsam,' a solitary Brother, afterward a leader, ruler, teacher of the Solitary and the Congregation of Christ in and around Ephrata." See 'Chronicon Ephrateuse' (1786); Sachse, 'German Sectarians of Pennsylvania' (1899–1900).

Beit, Alfred, German colonial financier: b. Hamburg, Germany, 1853; d. London, England, 16 July 1906. He was educated in the schools of his native city, emigrated to South Africa in 1873, and was a diamond merchant in Kimberley 1875–88. He became partner in the banking firm of Werner, Beit & Co. in 1888. On the discovery of gold in the Transvaal he purchased mining lands on an extensive scale, and prior to the Boer war in 1899 was chief partner in mines producing annually $90,000,000 of gold. He was a director of the Rand and Bulfontein mines, of the Rhodesia railways, of the Bechuana Railway Trust, and the Transvaal Consolidated Lands Company. His business offices were in Bishopsgate Street, London, and his wealth was estimated at over $100,000,000.

Beit-el-Fakih, bāt-ĕl-fā'kẹ, a town of Arabia, in Yemen, 32 miles south-southeast of Hodeidah, and 77 northeast of Mocha. It is celebrated for its trade in Mocha coffee, which is chiefly grown in the neighborhood. Pop. about 8,000. The word *Beit,* signifying a house or hut, is prefixed to the name of various other small towns and villages in Arabia.

Beitullah, bāt-ûl'la, the name of the building in Mecca within whose enclosure the Caaba (q.v.) is located.

Beitzke, bīts'kĕ, **Heinrich Ludwig,** German historian: b. Muttrin, 15 Feb. 1798; d. 10 May 1867. His publications include 'History of the German War for Freedom' (1855); 'History of the Russian War — Year of 1812' (1856); 'History of the Year 1815' (1865), etc.

Beja, bā'zha (anciently PAX JULIA), a town of Portugal, in the province of Alemtejo, 85 miles southeast of Lisbon. It stands on a height, surrounded by walls flanked with 40 towers, and is defended by an old fort. It was founded by the Romans, and some Roman remains are still visible. The town has two annual fairs and has an extensive trade in cattle and agricultural products. Pop. (1900) 8,895.

Bejapur, bē-ja-pōr' (anciently VIJAYAPURA, the impregnable city), a town of Hindustan in the Bombay presidency, near the borders of the Nizam's dominions, about 245 miles southeast of Bombay, and near the right bank of an affluent of the Krishna. From the great extent of the ruins here it would seem to have been formerly one of the largest cities of India. In its present state it may be described as two towns adjoining each other — the fort on the east, and the old town on the west. The former, though much less than the latter, has one entire and regular street 50 feet wide and nearly 3 miles long. Some of the mosques and mausoleums of Bejapur are elaborately elegant, but the prevailing character is solid and massive. The great dome of Mahomet Shah's tomb is visible far off. The fretwork on the ceilings and verandahs, the panels covered with passages of the Koran in bas-relief, and the stone trellises pierced with a mesh-work of Arabic characters, are all in the richest style of Oriental sculpture. Among the religious structures is a Hindu temple, built in the earliest style of Brahmanical architecture. There are here some guns of enormous size; one cast in 1549 is the largest piece of brass ordnance extant. Bejapur has become the chief town of Kaladgi district, and some of the old palaces are now used for public purposes. Pop. about 17,000. See Ferguson, 'Ancient Architecture in Hindustan' (1847); Ferguson, 'The Study of Indian Architecture' (1867).

Bejar, bā'jär, a town of Spain, in the province of Salamanca, 41 miles south of the town of that name. It is surrounded by old walls, and has considerable manufactures of cloth. Lord Hill defeated a French force here in 1813. In its vicinity are warm sulphur springs. Pop. (1895) 12,140.

Beke, Charles Tilstone, English traveler: b. Stepney, Middlesex, 10 Oct. 1800; d. Bromley, Kent, 31 July 1874. In his 20th year he entered on a business career, and was thus led to visit Italy. On his return he studied law at Lincoln's Inn, and in 1834 he followed up several archæological articles in periodicals by publishing 'Origines Biblicæ, or Researches in Primeval History.' In 1837–8 he was British consul at Leipsic, and in 1840 set out on his first journey to Abyssinia. Returning in 1843 he was awarded the gold medals of the Royal Geographical societies of London and Paris, and again engaged in business. He subsequently made several efforts to open up commercial intercourse with Abyssinia, and in 1861–2 he traveled in Syria, Palestine, and Egypt. When the news of the detention of several British subjects by the king of Abyssinia arrived in 1864, Beke went out to secure their release, and was temporarily successful, but ultimately King Theodore had to be coerced by war. In the direction of the military operations Beke's knowledge of the country proved of the utmost value, and in 1870 he received a civil list pension of $500 per annum. In 1873 he set out for Egypt in order to explore the country traversed by the Israelites, and to locate Mount Sinai. His published works com-

prise: 'The Sources of the Nile' (1860); 'The British Captives in Abyssinia' (1865); 'King Theodore and Mr. Rassam' (1869); 'The Idol in Horeb' (1871); 'Jesus the Messiah' (1872); 'Discoveries of Sinai in Arabia, and of Midian' (1878).

Bekes, bā'kāsh, a market town of Hungary, and capital of the county of the same name, at the junction of the Black and White Körös, 41 miles southwest of Grosswardein; formerly strongly fortified. Chief productions — flax, cattle, wheat, wine, and honey, in all of which the trade is considerable. Pop. (1900), 25,087.

Bekker, bĕk'kĕr, **Elizabeth,** Dutch novelist: b. Vlissingen, 24 July 1738; d. The Hague, 5 Nov. 1804. She married Adriaan Wolff, a Reformed Church minister at Beemster, who died in 1777, and lived afterward in closest friendship with Agathe Deken, who also collaborated in her most important works, 'History of Sara Burgerhart' (1782); 'History of William Leevend' (1784–5); 'Letters of Abraham Blankaart' (1787–9); 'Cornelia Wildschut' (1793–6).

Bekker, Immanuel, German scholar, distinguished by his recensions of the texts of Greek classics: b. Berlin, 21 May 1785; d. there, 7 June 1871. He studied in Halle, and, in 1811, became professor of philology in his native city. The results of his researches in the libraries of France, Italy, England, and Germany, appear in his numerous recensions of texts derived solely from MSS., and independently of printed editions. The writers included in these recensions are Plato, the Attic orators, Aristotle, Thucydides, Theognis, Aristophanes, as well as Livy and Tacitus.

Bél, bāl, **Karl Andreas,** Hungarian historian, son of Matthias Bél (q.v.): b. Presburg, 1717; d. 1782. He was professor of poetry at Leipsic and was author of 'De Vera Origine et Epocha Hunnorum, Avarum Hungaronum in Pansonia' (1757); 'De Maria Hungariæ non Rege sed Regina' (1744).

Bél, Matthius, Hungarian historian: b. Orsova, 1684; d. 1749. He was distinguished as a theologian and historian, and became rector of the Protestant schools at Neusohl. He wrote on the history of Hungary alone, and achieved much distinction. His writings are even now much valued for reference purposes.

Bel, bĕl, one of the most important gods of the Babylonian mythology; mentioned in Scripture, in Is. xlvi. 1; Jer. i. 2; li. 44; in the Septuagint, in Baruch vi. 40, and in the apocryphal additions to the Book of Daniel, as well as by classical authors. Much light has recently been thrown on Bel's characteristics and position in the heavenly hierarchy, by the examination of the cuneiform tablets and sculptures. It has been ascertained that, prior to 1600 B.C., the highly interesting Turanian people called Accadians, the inventors of the cuneiform writing, who wielded extensive authority in western Asia before the Semitic Assyrians and Babylonians had come into notice, worshipped as their first triad of gods, Anu, ruling over the heaven; Elu, Belu, or Bel, over the earth; and Ea, over the sea. Bel's three children, or three of his children, were Shamas, the sun-god; Sin, the moon-god; and Ishtar, the Accadian Venus. Sayce shows that some first-born children were vicariously offered in sacrifice by fire to the sun-god. From the Accadians the observance of human sacrifice passed to various Semitic tribes and nations. Bel's name Elu identifies him with the Phœnician El, who, in a time of trouble, offered his first-born son, "the beloved," on a high place, by fire. It is not settled whether or not Bel was the same also as the Phœnician Baal. To the wrath of Bel the deluge was attributed. In Scripture times he was known exclusively as a Babylonian divinity, being distinguished from both Nebo and Merodach. In the later Babylonian empire, however, Merodach came to be generally identified with Bel, though sometimes distinguished from him, being called "the lesser Bel."

Bel and the Dragon, certain apocryphal chapters added to the canonical Book of Daniel. The Jews do not consider them part of their Scriptures. They were penned probably by an Alexandrian Jew, the language used being not Hebrew, nor Aramæan, but Greek. The story of Bel and the Dragon tells how Daniel enlightened Cyrus, represented as having been a devout worshipper of Bel, by proving that the immense supplies of food laid before the idol were really consumed, not by it or by the inhabiting divinity, but by the priests and their families. On Cyrus urging that the dragon, also worshipped, was at least a living God, Daniel poisoned it, for which he was thrown into a lion's den, where the Prophet Habakkuk fed him. Ultimately he was released, and his persecutors put to death.

The above narrative must not be confounded with one called also 'Bel and the Dragon,' translated by Fox Talbot from the cuneiform tablets. Mr. Talbot believes that the dragon, seven-headed, like the one in Revelation, would, if the tablets were complete, prove the same being that seduced some of the heavenly "gods," or angels, from their allegiance (Rev. xii. 4; Jude vi), for which he was slain by Bel. The resemblance is not to the apocryphal book now under consideration, but to the combat between Michael and the Dragon in Rev. xii. 7–17.

Bela, bā'lŏ, the name of four Hungarian kings of the Arpad dynasty. BELA I., son of Ladislaf, competed for the crown with his brother Andrew, and was obliged to take refuge in Poland. Having there obtained assistance, he returned at the head of a powerful force, defeated his brother, who perished in the action, and mounted the throne in 1061. He immediately began a series of important reforms, and was contemplating others when he was suddenly cut off in 1063. BELA II., surnamed the Blind, because his eyes had been put out in early life by his uncle, succeeded to the throne in 1131, and at first seemed inclined to act with moderation and justice, but the vindictive spirit of his queen involved him in quarrels with his nobles, and his own intemperate habits brought on a disease which terminated his life in 1141. BELA III. succeeded his brother, Stephen III., in 1173, and held the reins of government with a strong hand, vigorously correcting the abuses and putting down the turbulent spirit which the troubles of previous reigns had engendered. He also repelled incursions of Bohemians, Poles, and Austrians, and retaking the towns of which the Venetians had possessed themselves, compelled them to accept of peace in 1189. He died

in 1196, and was succeeded by Emeric, one of two sons by his queen, a sister of Philip Augustus, king of France. Bela IV. succeeded his father, Andrew II., in 1235, and was shortly after obliged to collect an army to oppose the Tartars, who had invaded the country. In the battle which ensued he was signally defeated, and obliged to take refuge in Austria, where he was detained prisoner, and only recovered his liberty by the payment of a heavy ransom. The Tartars having retired in 1242 Bela regained his throne, and made it his object to repair the results of their invasion. He subsequently established his rule over Bosnia and northern Servia, and died in 1270.

Bela'rius, a character of prominence in Shakespeare's 'Cymbeline.' Exiled by King Cymbeline, he carries away with him the two sons of the monarch and rears them as his own.

Belas'co, David, American dramatist: b. San Francisco, 25 July 1859. He appeared on the stage in 1874, but soon forsook it for playwriting. Alone and in collaboration, he is the author of the plays 'Lord Chumley'; 'The Wife'; 'The Charity Ball'; 'The Girl I Left Behind Me'; 'The Heart of Maryland'; 'Zaza'; 'May Blossom'; 'Men and Women'; 'La Belle Russe'; 'Valérie'; Du Barry'; 'Hearts of Oak'; 'Naughty Anthony'; etc.

Belbeis, bĕl-bās', a town of Egypt, 29 miles north-northeast of Cairo, near the railway to Suez and on the border of the desert, formerly of some importance as being on the route to the East. The ruins of the ancient Bubastis are in its neighborhood. Pop. about 8,000.

Belch, Sir Toby, a roistering character in Shakespeare's comedy, 'Twelfth Night.'

Belcher, Sir Edward, English admiral and hydrographer: b. Halifax, N. S., 1799; d. 18 March 1877. Having taken part as midshipman in the defense of Gaeta and the battle of Algiers, he was in 1819 appointed to the Myrmidon sloop, destined for the African station, and in 1825 became assistant surveyor to the Bering Strait discovery expedition under Capt. Beechey. In 1829 he was promoted to the rank of commander, and served on the coast of Africa, and of Portugal, rendering on the latter occasion valuable services to the British residents by protecting their property during the political troubles in Portugal. Subsequently he was engaged for a number of years in a voyage round the world in the surveying vessel, Sulphur. In 1841 he explored the inlets of the Canton River, and materially assisted in securing the triumph of the British army. In acknowledgment of these services, he was knighted. Afterward he was employed on board of the Samarang, on surveying service in the East Indies, and was severely wounded while assisting the rajah of Sarawak, Sir James Brooke, to subdue the pirates of Borneo. From 1852 to 1854 he commanded the expedition in search of Sir John Franklin. On his return to England, he was tried before a court-martial for voluntarily abandoning the ships. The case against him, however, was not legally supported, he was acquitted, and his sword returned to him, but while some of the other officers were commended, his name was passed over in significant silence. In 1872 he became rear-admiral. He published 'The Last of the Arctic Voyages' (1855); 'Narrative of a Voyage to the East Indies.'

Belcher, Jonathan, colonial governor of Massachusetts: b. Cambridge, Mass., 8 Jan. 1681; d. Elizabethtown, N. J., 31 Aug. 1757. He was graduated at Harvard, in 1699, and spent six years in Europe before returning to Boston, as a merchant. From 1730 to 1741 he was governor of Massachusetts and New Hampshire, a dispute over his salary causing his removal. In 1747 he was made governor of New Jersey and gave it a successful administration. He enlarged the charter of the College of New Jersey (Princeton) and gave that institution, among other benefactions, his own valuable library. 'The Belcher Papers' were issued by the Massachusetts Historical Society, 1893.

Belcher, Thomas Waugh, Anglican clergyman: b. Bandon, Ireland, 1831. He was educated at Trinity College, Dublin, and in the medical schools of Paris and Vienna and subsequently took orders in the Established Church. He has published 'Our Lord's Miracles of Healing Considered in Relation to Some Modern Objections and to Medical Science' (1872); 'Hygienic Aspects of Pogonotrophy' (1864); 'Reformation for Drunkards' (1862); 'Is Christ the Head of His Church in England' (1881); 'Apostolic Contumacy'; 'Life of Robert Brett' (1889). He has been rector of Frampton-Cotterell, Bristol, from 1886.

Belching, the raising of gases from the stomach. There is always a certain amount of air in the stomach, taken in by the act of swallowing and a certain amount of carbon dioxid is thought to be formed by the mucous membrane of the stomach; but under abnormal and diseased conditions new gases may be formed, causing much discomfort. Rapid eating, bolting one's food, and drinking large quantities of water very rapidly cause an abnormal amount of air to be swallowed. This often causes extreme distress until it is belched out. In abnormal states of digestion quantities of gas are formed from the fermentation of the food; some of these are acetylene gas, carbon dioxid, marsh gas, sulphuretted hydrogen, hydrogen, oxygen, and nitrogen. Lack of free hydrochloric acid is one of the most important factors in this gas formation. The symptoms are usually excessive escape of gases just preceding or closely following a meal. The gases gradually begin to form two to three hours after the meals eaten. They increase in amount, cause distress, and may be belched occasionally, making one taste one's meal. While eating, the new food dilates the stomach, causes distress, sometimes attacks of palpitation of the heart, and when the stomach is overdilated the gases are belched forth, sometimes in large gusts. The treatment consists primarily in more careful eating, but if one deliberately chooses to eat and suffer afterward, various digestants such as pepsin, or pancreatin, sodium bicarbonate, taken before the meal; weak hydrochloric acid may be be taken with the meal, as well as sips of very hot water. These all aid somewhat in diminishing the excessive amount of fermentation. See Indigestion.

Belchite, bĕl-chē'tā, a Spanish town, 22 miles south-southeast of Saragossa, noted as the scene of a victory gained 18 June 1809, by the

French, under Suchet, over the Spanish forces under Blake. Belchite has some manufactories of woolens. Pop. (1897) 3,409.

Belden, James Jerome, American politician: b. Fabius, N. Y., 30 Sept. 1825; d. Syracuse, N. Y., 1 Jan. 1904. He received a common school education, became a contractor and amassed a fortune in building railroads. Entering politics he became a local and State Republican leader; was elected mayor of Syracuse; elected to Congress from 1887 to 1896; and was chairman of the National Republican Committee.

Belding, Mich., city in Iowa County; on the Detroit, L. &. N. R.R.; 139 miles northwest from Detroit. It has silk mills, basket, casket and furniture factories, machine shops, paper box factories and other industries. The first silk mill in the West was erected here. Pop. (1900) 3,282.

Belem, bā-lĭn′, a town of Portugal, on the right bank of the Tagus, two miles west-southwest of Lisbon, of which it may be considered a suburb. It contains a fine church and a monastery, the former containing the remains of Camoens and Vasco da Gama.

Belem'nites, a name for straight, solid, tapering, dart-shaped fossils, popularly known as arrow-heads, thunder-bolts, finger-stones, etc., but in reality the internal shell or skeleton of a molluscous animal allied to the squid or sepia, and the type of an extinct family, *Belemnitidæ*. The fossil remains of the animal are met with in the rocks of the upper secondary, both in this country and other parts of the world; and they are particularly abundant in the strata of the green sand formation in New Jersey. The part preserved, often detached from the loose strata, is a pointed cone sometimes eight inches long, of brown color and stony material, resembling in shape the head of a dart or javelin, whence their name. Belemnites are one of the earliest known fossils.

Bele'rium, or **Bolerium,** the ancient appellation of Land's End in Cornwall, England, but the origin of the name is uncertain.

Belfast, the chief commercial and manufacturing city of Ireland, the capital of the province of Ulster, on the river Lagan at the head of Belfast Lough, about 86 miles north-northeast of Dublin. The greater part of it is built on low alluvial land on the banks of the Lagan, not more than six feet above high-water mark. The country around is extremely beautiful; the position of the town renders its appearance from a distance by no means imposing, but the Lough itself presents a fine scene; and the slopes of the hills that bound it and partly encircle the town are thickly studded with the villas and country houses of the merchants. The sewerage has been improved. The streets are spacious, regular, and well lighted and macadamized; the houses, mostly of brick, are well built — many of them very handsome. Tramways and the electric light have been introduced. Four bridges cross the river, one of them an elegant structure of five arches, each of 50 feet span. The public buildings and institutions are in keeping with a city of its size and importance. Among the numerous churches all the chief religious bodies are represented, the Presbyterians possessing the greatest number of places of worship. Many of the churches are handsome buildings. Saint Anne's, the oldest of the Episcopal (Church of Ireland) churches, is about to be removed and the site occupied by a cathedral, of which the foundation stone was laid in 1899. Trinity, a fine specimen of Gothic; and St. George's, adorned with a beautiful portico, are also deserving of notice among the Episcopal churches. The more modern of the Presbyterian churches, as well as those of other denominations, display increasing taste. St. Patrick's serves as the Roman Catholic Cathedral, but is architecturally inferior to St. Malachy's. The secular buildings include the new city hall, Queen's College, a massive pile in the later Gothic style, with a façade 600 feet in length, erected at a cost of £30,000; the Presbyterian Theological College; the Methodist College, a handsome building erected in 1868 at a cost of £30,000; the municipal buildings; the county court-house; the commercial buildings and exchange; the buildings for the customs and inland revenue; the post-office; the offices of the Ulster Bank, the Bank of Ireland, the Provincial Bank, the Belfast Bank, the National Bank, the Scottish Amicable, Scottish Provident, and North British and Mercantile Assurance companies; the grand opera house; the Theatre Royal; the county jail; the Ulster Hall; the Albert memorial clock tower, 143 feet high; etc. Of the educational institutions the most prominent is Queen's College, first opened to students in 1849, with a president and over 20 professors and lecturers. Candidates for the ministry of the Presbyterian Church of Ireland receive a training in the General Assembly's Theological College. The Methodist College and the Campbell College (a secondary school) are important institutions; while the Royal Academy and the Royal Academical Institution also deserve mention. There is a free public library belonging to the city. The charitable institutions are very numerous and important. In the city there are six extensive public parks, besides the borough cemetery. Belfast is the centre of the Irish linen trade and manufacture, having within itself the great majority of the spinning-mills and power-loom factories in Ireland, some of them of immense size and of imposing appearance. The spinning of flax and weaving of linen are indeed the staple industries of the city, and have increased at a remarkable rate in modern times. The cotton manufacture, once of importance, is now of little moment. There are two large shipyards, and in their yard and engineering works Messrs. Harland and Wolff employ some 10,000 hands, and have turned out some of the finest vessels afloat, one of their triumphs being the great steamer Oceanic, built for the White Star line. There are also breweries, distilleries, flour-mills, oil-mills, saw-mills, foundries, printing and lithographic works, tan-yards, chemical works, ærated waterworks, rope works, tobacco manufactories, felt manufactories, etc. The commerce of Belfast surpasses that of any other Irish seaport, and is rapidly increasing. By its customs revenue it is the fifth port in the United Kingdom. Belfast Lough, which forms the approach by sea, is a fine sheet of water between the counties of Down and Antrim, about 14 miles in length and 6 in breadth at the entrance, narrowing toward the city. By dredging, a straight channel has been provided to accommodate large vessels. New docks have been constructed, giving a total

harbor area of over 100 acres. One of the graving docks is 825 feet long. The most important branch of traffic by sea is across the channel. A large fleet of steamers ply regularly between Belfast and London, Plymouth, Bristol, Liverpool, Fleetwood, Morecambe, Barrow, Whitehaven, Ardrossan, Glasgow, Dublin, Waterford, etc. There is also an extensive direct trade with British North America, the Mediterranean, France, Belgium, Holland, and the Baltic. In 1786 only 772 vessels (34,287 tons) entered the port; whereas in 1899, 11,263 vessels, with a burden of 2,539,199 tons, entered in the foreign, colonial, and coasting trades, while 11,172 vessels of 2,454,829 tons were cleared. Over 2,000,000 tons entered in the trade with Great Britain. Much of the inland trade is carried on by the Lagan Navigation, which connects the town with Lough Neagh; the Ulster Canal, connecting Lough Neagh with Enniskillen; and by three systems of railway, namely, the Great Northern, the Belfast, and Northern Counties, and the County Down. Belfast is comparatively modern. In 1637 it obtained the privilege of levying certain duties on goods and became a regular seaport; but its prosperity subsequently was much impeded by the Civil War. Early in the 18th century it was described as a handsome, thriving town, but its period of modern prosperity dates from about 1830. The harbor is under the management of an independent board. Belfast returns four members to Parliament. An American consul is resident here. Pop. (1901) 348,965.

Belfast, Maine, a city and county-seat of Waldo County, at the head of Penobscot Bay, and on the Maine C. R.R.; 30 miles from the ocean, and 132 miles northeast of Portland. It has a fine harbor, a large domestic trade, and important manufactures, including iron works, shoe factories, lumber mills and chemical works. The public library contains 5,000 volumes. The most notable industry is ship-building, begun here in 1793. Belfast was settled in 1770; was invested by the British in 1815, and was given a city charter in 1853. Pop. (1900) 4,615.

Belfort, bĕl-fôr, a fortified town of France, department of Haut Rhin, on the Savoureuse, 47 miles northeast of Bésançon. It is well built, and has an ancient castle situated on a lofty rock, a fine parish church, barracks, town house, court of primary resort, public library containing 20,000 volumes, and a communal college. Manufactures — hats, clocks, wax tapers, iron wire, sheet iron, etc. There are also breweries, tanneries, and iron furnaces. The principal trade is in grain, wine, brandy, and liquors. Iron is extensively worked in the neighborhood. In 1814 Belfort was besieged by the allies without success. In the Franco-German war it was invested by the Germans, 3 Nov. 1870, and after holding out with great bravery, capitulated, 16 Feb. 1871. In recognition of the bravery which the garrison had shown in its defense, it was allowed to march out with full military honors. This defense is commemorated by the huge 'Lion of Belfort' in front of the citadel, the work of Bartholdi. Belfort, with the district immediately surrounding it, is the only part of the department of Haut Rhin, which remained to France on the cession of Alsace to Germany, 26 Feb. 1871. Pop. (1896) 27,715.

Belfry, a bell-tower or bell-turret. A bell-tower may be attached to another building, or may stand apart; a bell-turret usually rises above the roof of a building, and is often placed above the top of the western gable of a church, the terms bell-cote, bell-gable, being also used. The part of a tower containing a bell or bells is also called a belfry. Strictly speaking, a belfry is a civil and not an ecclesiastical one, and in the Middle Ages, the bells in the municipal belfry became the symbols of popular freedom. The detached bell tower is of frequent occurrence on the continent of Europe, and in England the cathedral of Chichester and a few parish churches possess such an adjunct. In the United States such structures are infrequent, but in the town of Waterville, N. Y., is a detached belfry or clock-tower with quarter chimes, and Brown University at Providence is soon to have a handsome detached clock tower erected within its grounds.

Belgæ, a group of German and Celtic tribes who inhabited the country extending from the Atlantic Ocean to the Rhine, and from the Marne and Seine to the southern mouth of the Rhine, which is united with the Meuse. From time to time, until the period of Cæsar, German nations pushed forward beyond the Rhine, partly expelling the Celts from their seats, partly uniting with them; and from this union sprang a mixed nation, which, in its language as well as in its manners, resembled the Germans more than the Celts. According to the testimony of Cæsar, they were the most valiant of the Gauls. Belgic tribes seem also to have settled in early Britain.

Belgard, bĕl'gärd, a town of Prussia, in Pomerania, at the junction of the Leitnitz with the Persante, with an old castle. Iron, cloth, and wood are manufactured, and there is an important horse market. Pop. (1895) 7,386.

Belgaum, bĕl-gâm', a town of Hindustan, in the district of Belgaum, Bombay presidency, on the eastern slope of the western Ghauts, 2,500 feet above the sea. It consists of a native town, fort, and cantonments, and contains the usual courts and offices, a school for the children of natives of rank, and various other schools. In 1818 the fort and town were taken by the British after a gallant resistance by the Peishwa's forces. From the salubrity of the climate and the purity of the water, Belgaum has been selected as a permanent military station. It carries on a trade in salt, dry fish, dates, etc.; and cotton is manufactured. Pop. (1901) 26,200.

Belgic Confession, a credal statement put forth in French in 1561 by Guido de Bres of Brabant and others, and sent to Philip II. of Spain to persuade him to tolerate the Calvinistic faith. In 1562 it was published in the vernacular, and subsequently in Dutch and German, and was acknowledged by the synods of Antwerp (1566) and Dort (1619).

Belgiojoso, bĕl-jō-yō'sō, **Cristina** (Princess of), Italian patriot: b. Milan, 28 June, 1808; d. there, 5 July 1871. She took a prominent part in the revolution of 1830, and was exiled by the Austrian government. She lived in Paris for several years and then returned to Italy in 1847, and in the revolution of 1848, offered her whole fortune to the patriot cause and equipped several hundred volunteers at her own expense. After a second exile of some years she returned

under the amnesty of 1856, regained her property, and supported the policy of Cavour. She was the editor of several different periodicals in the interest of Italian liberty, and was the author of several books, among them 'Souvenirs of Exile' (1850); 'History of the House of Savoy' (1860); and 'Reflections on the Actual Condition of Italy' (1869).

Belgiojoso, a town of northern Italy, in the province and eight miles southeast of Pavia. It is situated in a beautiful and fertile plain between the Po and the Olona, and is well built, containing a parish and an auxiliary church. The old castle, in which Francis I. was temporarily lodged after being taken prisoner at the battle of Pavia, in 1525, has been converted into a magnificent château, surrounded by fine gardens. Pop. 4,000.

Belgium (French, Belgique; German, Belgien), a kingdom of Europe, bounded north by Holland, northwest by the North Sea, west and south by France, and east by the duchy of Luxemburg, Rhenish Prussia, and Dutch Limburg; greatest length, northwest to southeast, 165 miles; greatest breadth, north to south, 120 miles; area, about 11,400 square miles. Belgium, in shape, resembles a triangle, which has its vertex in the west; the base resting on Germany on the east, the shorter side facing Holland and the sea, and the larger forming the frontier of France. For administrative purposes it is divided into nine provinces — Antwerp, South Brabant, East Flanders, West Flanders, Hainaut, Liége, Limburg, Luxemburg, and Namur. These provinces do not differ much in area, and are so arranged as to form a compact and commodious division of the kingdom. South Brabant, which from containing Brussels, the capital, may be considered the metropolitan province, occupies the centre, while the others cluster round, and, with the exception of the extreme provinces of Luxemburg and West Flanders, actually touch it.

The following table shows the areas of the different provinces, with their population, on 31 Dec. 1900:

Provinces	Area in sq. miles	Population
Antwerp	1,093	819,000
Brabant	1,268	1,263,807
Flanders, East	1,158	1,029,971
Flanders, West	1,249	805,236
Hainaut	1,437	1,142,954
Liége	1,117	820,175
Limburg	931	240,796
Luxemburg	1,706	219,200
Namur	1,414	346,512
	11,373	6,687,651

Physical Features.— A general idea of the surface of the country may be obtained by regarding it as an inclined plane, somewhat rugged, and considerably elevated in the southeast, from which it slopes, more or less gradually, north and west, till it sinks into low plains, only a few feet above the level of the sea. The elevated districts are formed by ramifications of the Ardennes, which, entering Belgium from France, stretch along the south of Namur, occupy the greater part of Luxemburg, and attain their culminating point in the southeast of Liége at Stavelot, in the neighborhood of Spa, where the height exceeds 2,000 feet. The rocks appear to rest on primary formations; but those which reach the surface generally consist of slate, old red sandstone, and mountain limestone. Proceeding northwest, in the direction of the dip, these rocks take a cover, and the coal formation becomes fully developed. This coal field is a continuation of that of the north of France, and stretches through Belgium in a northeast direction, occupying the greater part of the province of Hainaut, and a considerable part of that of Liége, and skirting the provinces of Namur and Luxemburg. It contains numerous workable seams, both of coal and iron. North and west, beyond the limits of this coal field, a more recent formation is found, covered by deep beds of clay and sand, the former prevailing more in the interior, and the latter near the coast, where it has been drifted into hillocks or downs, and forms the only barrier against the encroachments of the sea. Some of the clay in this district is fit for the manufacture of fine pottery; but the greater part of it is fit only for coarse ware, or for bricks.

In accordance with the general slope of the surface already mentioned, the main streams of Belgium have a northern direction; and the whole country lies within the basin of the German Ocean. In the southeast, where the surface is elevated and broken, numerous torrents descend with rapidity; and becoming confined within rocky, precipitous, and richly wooded banks, often furnish, if not the grandest, the most picturesque and enchanting of landscapes. On reaching the lower country their speed is slackened, and their augmented volume moves along in a slow, winding course. Only two of them,— the Meuse and the Scheldt,— have a magnitude which entitles them to the name of rivers; but so important are these two in themselves, and so numerous their affluents, that no country in Europe is better supplied with water communication. Besides the Scheldt or Schelde, and Meuse or Maas, the navigable streams are the Ambleve, Demer, Dender, Darme, Dyle, Lys, Great Nethe, Little Nethe, Ourthe, Rupel, Sambre, Yperlee, and Yser. The climate of Belgium bears a considerable resemblance to that of the same latitudes in England. Though subject to sudden change, it is on the whole temperate and agreeable. Luxemburg and Namur, where the surface is high, and the numerous hills and dales which diversify it both cheer the animal spirits and freely circulate an air at once keen and pure, are most favorable to health and longevity. The only parts of the country which can be considered unhealthy are the low flats which prevail in Flanders, and the polders or rich alluvial tracts which have been gained from the rivers by embankment, chiefly in Antwerp. There agues and other diseases engendered by a humid and sluggish atmosphere are prevalent.

Woods and Forests.— Nearly one fifth of the whole surface of the kingdom is occupied by wood. The distribution of it, however, is by no means equal; and hence, while the two Flanders and Antwerp fall far below the average amount, Luxemburg and Namur rise far above it, and are very densely wooded. In these provinces extensive tracts are covered with natural woods, in which the wolf and wild boar still have their haunts. These woods are the remains of the ancient forest of Ardennes, which Cæsar describes as stretching far out into France from the banks of the Rhine. They consist of hard wood, principally oak, which is often of great

size, and furnish large quantities of the most valuable timber. By carefully dressing the stools after it is cut, a fine oak copse is raised, the cuttings of which annually produces many tons of bark, which not only supplies the tanneries of the country, but leaves a considerable surplus for exportation, chiefly to England, while the wood unfit for the carpenter is partly employed as fuel and partly converted into charcoal for the use of the iron works, where the superiority of the iron smelted and wrought by it is well known. South Brabant also possesses several fine forests, among others that of Soignies, with which the field of Waterloo has made us familiar. In the other provinces scarcely anything deserving the name of forest is seen. Wood is distributed over them in occasional patches, and more frequently in the form of hedge-row. The timber thus grown is by no means small in aggregate amount, and forms a well-known feature in the rich rural landscapes which the old Flemish masters loved to paint; but taking into account the injury which the cultivated crops sustain from it, it is very questionable whether it ought to be regarded as a source of profit either to individual proprietors or to the country at large. The timber itself, consisting principally of various kinds of poplar, is soft and of an inferior description.

Agriculture.— The greater part of the country is well adapted for agricultural operations, and the inhabitants have so happily availed themselves of their natural advantages that they early began, and in some respects still deserve, to be regarded as the model farmers of Europe. In the high lands traversed by the Ardennes the climate is ungenial, and the soil so shallow and stony as almost to forbid the labor of the plow. Here the occupants display their skill, not so much by what they do, as by what they refrain from attempting. Instead of vain endeavors to force the growth of corn where it could never yield an adequate return, they have been contented to turn the natural pastures of the district to the best account by employing themselves chiefly in the raising of stock. In particular they produce a hardy breed of horses, which, being admirably adapted for light cavalry, are largely exported to France for that purpose, while vast herds of swine are fed almost at no expense on the mast of the forests. At the same time no part of the surface is allowed to lie waste. Where arable land occurs it is carefully applied to its proper use. Even the vine has not been forgotten, and sunny slopes on which little else could have been grown have been made to yield a tolerable wine. In the Ardennes valleys an inferior quality of tobacco is raised.

In the opposite extremity of Belgium, chiefly in the province of Antwerp, and partly in that of Limburg, an extensive tract occurs which strikingly contrasts in appearance with the hilly districts of the southeast, but is perhaps still less adapted for the ordinary operations of agriculture. This tract, known by the name of Campine, is a vast expanse of moorland waste of the most dreary appearance, a dead monotonous flat composed for the most part of barren sand, in which the ordinary heaths and lichens will scarcely grow. The greater part of this tract seems destined to remain forever in its natural state, but whenever a patch of more promising appearance occurs the hand of industry has been at work, and corn fields and green pastures have become not infrequent even in the Campine. Agricultural colonies, partly free and partly compulsory, have been planted in different parts of the district. The former consist of persons generally in poor circumstances who have voluntarily engaged in reclaiming barren tracts as the means of procuring a maintenance and saving them from the degradation of pauperism. The latter consist of convicts, who, having forfeited their liberty, give compulsory labor as the penalty of their offenses. By the united exertions of both a wondrous improvement has been made, and on parts of this waste some of the finest cattle of the country are raised, and much dairy produce of excellent quality is obtained. Still, however, about 300,000 acres remain untouched.

With the exception of the two districts just described, there is no part of Belgium in which agriculture does not flourish; but the husbandry which has been so much lauded is seen in its greatest perfection in the two Flanders. Its excellence is owing not to any superior knowledge of what may be called the theory of agriculture, nor to any remarkable ingenuity in the invention of implements by which its operations are more efficiently or more cheaply performed, but chiefly to an innate spirit of economy and industry — an economy which carefully appropriates every gain, however small, and an industry which grudges no labor, however great, provided it is possible, by the application of it, to obtain an additional amount of valuable produce. In fact, the Flemish husbandry partakes more of the nature of garden than of field culture. In many of its operations, no doubt, horse labor is employed. The plow and the harrow are in frequent requisition, but the implement on which the greatest dependence is placed is the earliest and simplest of all — the spade. To give full scope for the use of it, the ground is parceled out into small fields of a square form, which have their highest point in the centre, and slope gently from it in all directions toward the sides, where ditches of sufficient size carry off the superfluous water as it filters into them. To promote this filtration the ground is trenched to a uniform depth, so that the slope of the subsoil corresponds as nearly as possible to that of the surface. In performing this trenching a considerable degree of skill and ingenuity is displayed. The performance of the whole at once would be a formidable and not a very efficient process. In a few years a new subsoil would be formed, and the trenching would require to be renewed. This is rendered unnecessary in the following manner: The land is laid out in ridges about five feet wide, and when the seed is sown it is not covered as usual by the harrow, but by earth dug from the furrows to the depth of two spits, and spread evenly over the surface. By changing the ridges and throwing the furrow of the previous year into the ridge of the next, the whole ground becomes furrow in the course of five successive crops, and is consequently trenched to the depth of about 18 inches. This process of trenching never ceases, and is unquestionably one of the most important characteristics of the Flemish husbandry.

The only other process particularly deserving of notice is the care and skill manifested in securing an adequate supply of manure. Every farm is fully stocked, and the cattle, instead of

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BRUSSELS And Vicinity. SCALE OF MILES
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St. Gilles
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Hollum
Schiermonnikoog
Rottum
Bochplaat
Borkum
Ameland Zeegat
Pinkegat
Frankrijker Gat
Hoorn
Westerschelling
Vlie Stroom
Vlieland
Eijerland Gat
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Trexel
Den Burg
Harlingen
Leeuwarden
Franeker
Wierum
Lauwer Zee
Dokkum
Hallum
Het Bildt
Koltum
Zoutkamp
Reitdiep
Gruipskerk
Bierum
Onderdendam
Delfzijl
Appingedam
Dollart
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Roodeschool
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Bedum
Winsum
Groningen
Nieuweschans
Scheemda
Veenwouden
Buitenpost
Bergum
Bergumer Meer
Oude Diepte
De Lemmer
Marum
Roden
Hoogezand
Sappemeer
Veendam
Zuidlaren
Weiddam
Norg
Gieten
Borger
Assen
Beilen
Boertange
Smilde
Oranje Canal
Meppel
Staats Canal
Drenthe Canal
Wolvega
Vlietlijn
Vaart
Oldeboorn
Gorredijk
Tjeukemeer
Hindelopen Meer
Workum
Friesche Meer
Sneek
Oldeboorn
De Boorn
Dragten
Wommels
Weidum
Bolsward
FRIESLAND
Heerenveen
Tjeuke
Mecht
Sluiten
Stavoren
Wieringen
Onrust
Helder
Ralg zand
Callantsoog
Schagen
De Meer
Medemblik
Kamp
Winkel
Kwadijk
Hoogwoud
Andijk
Enkhuizen
ZUIDER ZEE
Alkmaar
NORTH HOLLAND
Oosterteek
Schardam
Hoorn
Edam
Marken
Monnickendam
Amsterdam
Haarlem
Zandvoort
Ymuiden Haven
Wijka an Zee
Uitgeest
De Beemster
Beverwijk
Velsen
Ijmuiden
Ijmuiden
Meer
Weesp
Muiden
Naarden
Eemmeer
Elspeet
Harderwijk
Elburg
Wezep
Hattem
Zwolle
Kampen
Ketteldiep
Blokzijl
Vollenhove
Zwartsluis
Hasselt
Genemuiden
Zwalsche Diep
Meppel
Oldemarkt
Steenwijk
Kuinre
Drentsche Hoofd Vaart
Drentsch Canal
Emmen
Coevorden
Dalen
Echten
Hoogeveen
Zuidwolde
Gramsbergen
Vecht R.
Dedemsvaart
Hardenberg
Ommen
Nieuwleusen
Dedemsvaart
Vaart
Nieuwehaue
Dalfsen
Hasselt
Wezep
Elburg
Heino
Raalte
Hellendoorn
Wierden
Almelo
Oldenzaal
Ootmarsum
OVERIJSSEL
Rijssen
Holten
Markelo
Goor
Delden
Enschede
Gronau
Diepenheim
Boskelo
Haaksbergen
Deventer
Apeldoorn
Hoenderloo
Apeldoorn
Epe
Wolfheze
Wolfheze Berg
Nunspeet
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Overijssel Canal
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Oude Ijssel R.
Berkel R.
Berkel
Lochem
Zutfen
Zutfensche Veer
Barneveld
Nykerk
Hoevelaken
Baarn
Soestdijk
Amersfoort
Utrecht
De Vecht
Vecht R.
Vecht R.

Middelburg
Vlissingen
Westkapelle
Walcheren
Goes
Tholen
Bergen op Zoom
Breda
Tilburg
Eindhoven
Helmond
Deurne
Asten
Venlo
CREFELD
Geldern
Essen
Dusseldorf
M.Gladbach
Roermond
Sittard
Maastricht
Visé
Verviers
Spa
Malmedy
Stavelot
Eupen
Aix la Chapelle
Düren
Jülich
COLOGNE
Euskirchen
Gmünd
Prüm
Wittlich
Trier
Treves
Luxemburg
Arlon
Virton
Longwy
Thionville
Metz
Sedan
Charleville
Mezieres
Rethel
Maubeuge
Valenciennes
Douai
Lille
Roubaix
Tournai
Courtrai
Ypres
Dixmude
Dunkirk
Ostend
Bruges
Ghent
Termonde
Malines
Louvain
Brussels
Tirlemont
Namur
Dinant
Charleroi
Mons
Binche
Soignies
Hal
Waterloo
Wavre
Jodoigne
Hasselt
Tongres
Liege
Huy
Andenne
Ciney
Marche
Bastogne
Neufchateau
Florenville
Carignan
Montmedy
Stenay
Verdun
Rocroi
Hirson
Vervins
Guise
St. Quentin
Peronne
Bapaume
Arras
Cambrai
Douai
Valenciennes
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Tirlemont
Namur
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Avesnes
Maubeuge
Landrecies
Le Cateau
Cambrai
Bapaume
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Compiegne
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Laon
Rheims
Sedan
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Virton
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Bastogne
Wiltz
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Echternach
Grevenmacher
Remich
Luxemburg
Mersch
Ettelbruck
Clervaux
Vianden
Prum
Bitburg
Wittlich
Treves
Saarburg
Merzig
Saarlouis
Saarbrücken
Forbach

being grazed in the fields, are fed at home, in winter on turnips and other roots, and in summer on green crops carefully arranged, so as to come forward in regular succession, and yield a full supply of rich, succulent food. In addition to this, every homestead has a tank, built and generally arched with brick, into which all the liquids of the cattle sheds are conveyed, and have their fertilizing properties increased by the dissolution of large quantities of rape cake. This liquid manure is of singular efficacy in promoting the growth of flax, which enters regularly into the Flemish rotation, and is perhaps the most valuable crop of all, the produce of an acre being not infrequently sold for $250. As this crop is one of the most exhausting which can be grown, and requires the richest manure, while it yields none, the growth of it to any great extent must, without the aid of the tank, have been impossible. At present, in Flanders alone, the value of flax annually raised has been estimated to amount to $7,500,000.

About two thirds of the whole kingdom is under cultivation, and nearly eight ninths profitably occupied, leaving only about one ninth waste. Of this last the far greater part belongs to the comparatively barren districts of the southeast and northeast, already described; and hence, in the more favored provinces, particularly those of South Brabant, the two Flanders, and Hainaut, the quantity of waste is so very small that the whole surface may be regarded as one vast garden. It is an error, however, to assert, as is sometimes done, that Belgium raises more corn than it consumes. For many years the import has considerably exceeded the export. Considerable attention has been paid in Belgium to the raising of stock, and the breeds both of cattle and horses are of a superior description. The horses of Flanders in particular are admirably adapted for draught, and an infusion of their blood has contributed not a little to form the magnificent teams of the London draymen. In general, however, Belgium stock of all kinds is inferior to that of England.

Mines.— The mineral riches of Belgium are great, and, after agriculture, form the most important of her national interests. They are almost entirely confined to the four provinces of Hainaut, Liége, Namur, and Luxemburg, and consist of lead, manganese, calamine or zinc, iron, and coal. The lead is wrought to some extent at Vedrin, in Liége; but the quantity obtained forms only a small part of the actual consumption. Manganese, well known for its important bleaching properties, is obtained both in Liége and Namur. The principal field of calamine is at Liége, where it is worked to an extent which not only supplies the home demand, but leaves a large surplus for export. All these minerals, however, are insignificant compared with those of iron and coal. The former has its seat in the country between the Sambre and the Meuse, and also in the province of Liége. At present the largest quantity of ore is mined in that of Namur. The coal field, already described, has an area of above 500 square miles. The export is about 5,000,000 tons, forming one of the largest and most valuable of all the Belgian exports. Nearly the whole of the coal thus exported is taken by France. There cannot be a doubt that this export adds largely to the national wealth; but a question has been raised as to the policy of thus lavishly disposing of a raw material which is absolutely essential to the existence of a manufacturing community, and the quantity of which, though great, is by no means inexhaustible. One obvious effect of the great foreign demand is to raise the price, and thus place some of the most important manufacturing interests of the country in an unfavorable position for competing successfully with so formidable a rival as Great Britain. Besides minerals, properly so called, Belgium is abundantly supplied with building stone, pavement, limestone, roofing slate, and marble. Of the last, the black marble of Dinant is the most celebrated. In 1899 the products of 1,601 quarries were valued at $11,100,000; of the iron mines, $200,000; of 220 coal mines (22,072,000 tons), $54,900,000.

Manufactures.— The industrial products of Belgium are very numerous, and the superiority of many of them to those of most other countries is confessed. The fine linens of Flanders, and lace of South Brabant, are of European reputation. Scarcely less celebrated are the carpets and porcelain of Tournay, the cloth of Verviers, the extensive foundries, machine works, and other iron and steel establishments of Liége, Seraing, and other places. The cotton and woolen manufactures, confined chiefly to Flanders and the province of Antwerp, have advanced greatly. Other manufactures include silks, glass and glassware, hosiery, paper, beet sugar, beer. There were 17 pig iron works in operation in 1899; 46 iron manufactories; 15 steel works; 123 sugar factories, and 25 refineries; and 240 distilleries.

Trade and Commerce.— The geographical position, the admirable facilities of transport, and the indefatigable industry of the inhabitants, early combined to place Belgium at the very head of the trading countries of Europe. The gradual rise of competitors still more highly favored has deprived her of this pre-eminence, and with the limited extent of her seacoast it is not to be expected that she can ever take high rank as a naval state; but her trade is still of great importance, and within recent years has made a rapid advance. Her coal and iron, and the numerous products of her manufactures, furnish in themselves the materials of extensive traffic; while the possession of one of the best harbors in the world (Antwerp), situated on a magnificent river, which directly, or by canals, stretches its arms into every part of the kingdom, and now made accessible by a system of railways with every kingdom of central Europe, naturally renders Belgium the seat of a transit trade even more important than that which it monopolized during the Middle Ages. This she owes chiefly to the admirable system of railway communication which, in the exercise of an enlightened policy, was early established throughout the kingdom. This system has its centre at Malines, from which a line proceeds north to Antwerp; another west to Ostend; another southwest through Mons, and on to the Northern R.R. of France, which communicates directly with Paris, and another southeast to Liége, and on into Prussia, where it first communicates with the Rhine at Cologne, and thence by that river and by rail gains access both east and south to all the countries of central Europe. In addition to these great trunks, one important branch connects Liége with Namur and Mons; and another from Antwerp,

after crossing the west trunk at Ghent, passes Courtray, and proceeds directly toward Lille. The ramification is thus complete; and there is not a town in Belgium of any importance which may not now, with the utmost facility, convey the products of its industry by the safest and speediest of all means of transport. The railways have a length of about 2,900 miles, three fourths belonging to the state. The value of the general commerce in 1900 was: Imports, $718,885,000, and exports, $659,501,950; imports for home consumption, $443,140,000; exports of Belgian produce and manufactures, $384,580,000; transit trade, $274,920,000.

The articles of import for home consumption include grain and flour, raw cotton, wool, hides, coffee, tobacco, chemicals, oil-seeds, yarn, timber, petroleum, etc. The exports are principally coal, yarn (chiefly linen and woolen), cereals, machinery, flax, woolens and cottons, chemicals, steel and iron, glass and glassware, sugar (raw and refined), zinc, manure, eggs, etc. The trade with Great Britain has grown considerably of late years; for while in 1869 the exports to Great Britain amounted to $46,957,015, and the imports of British produce from Great Britain to $20,017,675, these were in 1898 respectively $107,670,000 and $69,254,500. The chief exports to Great Britain are silks, woolen yarn, cottons, flax, glass, eggs; the chief imports cottons, woolens, raw cotton, metals, and machinery. The trade with France is even greater than with Great Britain. The external trade is chiefly carried on by means of foreign (British) vessels, and the great bulk of the shipping enters and clears from the port of Antwerp. Of the tonnage entered in 1896 only about seven per cent belonged to the Belgian flag. The total burden of the Belgian mercantile marine is over 113,250 tons. Important results are expected from the *Association Belgo-Hollandaise,* an international association of Belgian and Dutch manufacturers and business men founded in 1903 to effect a closer commercial union between the two countries. The trade with the United States is important, Belgium being classed as fifth in the value of its imports from this country and seventh in the exports it sends hither.

People.— The Belgian population is the densest in Europe, and is composed of two distinct races — Flemish, who are of German, and Walloons, who are of French extraction. The former, by far the more numerous, have their principal locality in Flanders; but also prevail throughout Antwerp, Limburg, and part of South Brabant. The latter are found chiefly in Hainaut, Liége, Namur, and part of Luxemburg. The language of each corresponds with their origin — the Flemings speaking a Germanic dialect, and the Walloons a dialect, or rather a corruption, of French, with a considerable infusion of words and phrases from Spanish and other languages. This distinct mixture of races, and the repeated changes of masters to which they have been subjected, have necessarily been very unfavorable to the formation of a national character. Still, in some leading features there is a remarkable uniformity in the population. Though the position of the country between France and Germany has made it the battlefield of Europe, the inhabitants show few warlike tendencies, and are unwearied in pursuing arts of peace. The fact bears strong testimony to the patient endurance of the Belgians, but bespeaks, perhaps, a deficiency of physical and moral courage.

Almost the entire population belong to the Roman Catholic Church. Protestantism is fully tolerated, and even salaried by the state, but cannot count above a mere fraction (some 10,000) of the population among its adherents. An interesting circumstance connected with this state of matters is, that Belgium early embraced, and at one time seemed on the eve of being gained to the Reformation. Persecution did what perhaps it has never done in any other part of the world — not only forced the people back to a religion which they had given up, but induced them to return to it as willing converts. The country is divided into six dioceses, each of which possesses an ecclesiastical seminary. Monks and nuns are numerous, especially the latter (over 25,000). Education is in a very unsatisfactory state. At the census of 1890 nearly 27 per cent of the population above 15 years of age could neither read nor write. By law each commune must have an elementary school, and the expense of primary instruction falls partly upon the communes, partly upon the state. In all the towns colleges and middle-class schools have been established, where a superior education may be obtained; while a complete course for the learned professions is provided by four universities, two of them, at Ghent and Liége respectively, established and supported by the state; one at Brussels, called the Free University, founded by voluntary association; and one at Louvain, called the Catholic University, controlled by the clergy. French is the official language of Belgium and in general use among the educated classes, and there can scarcely be said to be a national literature. Of late, however, patriotic feelings, to which the Belgians were too long strangers, have acquired new strength; and one of its first manifestations has been an eager desire to cultivate the vernacular Flemish, which differs little from Dutch.

The population generally is moral, and apparently in comfortable circumstances. The far larger proportion of it is rural; and though landed property is very much subdivided, the Belgians, instead of exhibiting the wretchedness so common among the small occupiers in Ireland, manage, by a happy combination of agricultural with other industrial employments, to derive from their little holdings all the necessaries and not a few of the comforts of life. It is not to be denied, however, that in some of the provinces, particularly in Flanders, population, in so far at least as it can be maintained by agricultural resources, has reached its limit, and that a deficiency of other employment, particularly spinning and hand-loom weaving, has placed large numbers on, if not within, the verge of pauperism. In Flanders and South Brabant a fourth of the people is dependent on total or occasional relief; and pauper riots have repeatedly occurred. Still the population continues to move on, as if with accelerated pace.

Government.— The Belgian constitution combines monarchical with a strong infusion of the democratic principle. The executive power is vested in a hereditary king; the legislative in the king and two chambers,— the Senate and the Chamber of Representatives,— the former elected for eight years, the latter for four, but one half

of the former renewable every four years, and one half of the latter every two years. The senators are elected partly directly, partly indirectly (by the provincial councils), and must be 40 years of age. Their numbers depend on population. The deputies or representatives are elected directly, one for every 40,000 inhabitants at most. All citizens of 25 years of age are electors, and according to certain qualifications one elector may have three votes. Each deputy is allowed $800 per annum, and a free railway pass between his place of residence and the capital. The army is raised by conscription, to which every able man who has completed his 19th year is liable, and also by voluntary enlistment. The peace strength of the army in 1899 amounted to 51,270 officers and men; in time of war the total strength is about 140,000 men. Besides this standing army there is a *garde civique*, numbering about 43,000 men in time of peace, in addition to which there are 90,000 non-active men belonging to this force. The navy is confined to a few steamers and a small flotilla of gunboats. The estimated revenue for 1902, chiefly from railways, customs, excise, and direct taxation, was $97,808,000; the estimated expenditure, $97,668,880. About one fourth of the expenditure is in payment of the interest of the national debt, the total of which in 1901 was $530,179,630. The coins, weights, and measures are the same, both in name and value, as those of France.

History.— The history of Belgium as a separate kingdom, beginning in 1830, when it was constituted an independent European state, would not truly represent the life of the people, or account even for the events of the period embraced in it. Situated between the two leading states of Europe, and deeply interested in all the political agitations resulting alike from their rivalries and their alliances, the Belgian people often changed masters. Moreover, the Belgian territory contained within itself one leading element of the dissensions which raged around it. The two great races of different origin and habits, the Celtic and Teutonic, or Latin and German-speaking peoples, whose different policies have divided Europe from the time of the Romans, were combined in its population, the Walloon provinces, Hainaut, Namur, Luxemburg, being nearly allied to the French, while Flanders, Brabant, and Limburg approximated more in character and language to the Germans. Thus not only were the great rivalries of Europe represented here in miniature, but their compression within the narrow limits of what is now one of the smallest of European states, has resulted in the formation of a distinct national character. While, therefore, the chief events in which Belgium was interested prior to 1830 are matters of European history, a brief outline of them is needed here to give a distinct conception of the character of the people which they contributed to form.

The territory anciently known as Belgian differed considerably from that which has assumed the name in modern times. According to Cæsar the territory of the Belgæ, who were one of the principal tribes of ancient Gaul, extended from the right bank of the Seine to the left bank of the Rhine, and to the ocean. This district continued under Roman sway till the decline of the empire, and subsequently formed part of the kingdom of Clovis, who subdued nearly the whole of Gaul from the Rhine to the Mediterranean. The Franks at this time did not recognize the law of primogeniture. On the death of a monarch his dominions were divided among his sons, the more ambitious of whom again strove to reunite them under their own sway. Thus the Frankish kingdoms under the descendants of Clovis were subject to continual vicissitudes, in which the Belgian territory shared, forming successively a portion of the kingdoms of Metz, Soissons, and Austrasia, till the whole was reunited under Charlemagne or Charles the Great. This great conqueror and administrator, the first who strove to unite the states of Europe in a civilized commonwealth, was of Belgian extraction. It was at Landen and Herstal, on the confines of the forest of Ardennes, that his predecessors, the great mayors of the palace, held sway, while his own capital was established at Aix. Charlemagne in great measure destroyed his own work by adopting the Frankish custom of dividing his kingdom among his sons at his death. This practice, which had proved so disastrous to the dynasty of Clovis, was continued for some time in his family, but was ultimately abolished in France. It long prevailed among the principalities of Germany, hindering their unity, and contributing to the ascendency of France in Europe. Thus Belgium fell to Lothaire, the grandson of Charlemagne, forming part of the kingdom of Lotharingia, which was dependent on the German empire; but by the treaty of Verdun (843) Artois and Flanders were united to France.

For more than a century this kingdom was contended for by the kings of France and the emperors of Germany. In 953 it was conferred by the Emperor Otto upon Bruno, Archbishop of Cologne, who assumed the title of archduke, and divided it into two duchies: Upper Lorraine, containing modern Lorraine, Luxemburg, and the dioceses of Metz, Toul, Verdun, and the Palatinate; and Lower Lorraine, containing Brabant, Guelders, the bishoprics of Cologne, Liége, and Cambray. These duchies were temporarily reunited under Gonthelan I., Duke of Lower Lorraine, who acquired Upper Lorraine in 1033. Among the dukes of Lower Lorraine may also be mentioned Godfrey of Bouillon, the great Crusade leader, who, in 1099, was crowned king of Jerusalem.

The feudal system, which had established itself over the greater part of Europe, likewise prevailed in the Belgian territory, which in the 11th century was divided into duchies, counties, and marquisates, under the sway of chiefs owing allegiance to the empire, or other of the greater princes, but exercising an almost absolute dominion over their own subjects. Thus were formed the counties of Holland, Brabant, Zealand, Friesland, Namur, Hainaut; the duchies of Limburg, Guelders, Juliers, Luxemburg; the marquisate of Antwerp, and others. In the frequent struggles which took place during this period, Luxemburg, Namur, Hainaut, and Liége were usually found siding with France, while Brabant, Holland, and Flanders commonly took the side of Germany. The princes and the people, however, particularly of Flanders, were not always found on the same side.

The 12th and 13th centuries were distinguished by a general uprising of the industrial communities, which had begun to grow in importance throughout Europe, against the

feudal system. This movement was very strongly manifested throughout the Netherlands, less strongly perhaps in Belgium than in Holland. In both countries prosperous municipalities began to arise and assert their freedom; but the spirit of centralization, more strongly developed among the Latin-speaking races, prevailed more in the southern provinces, while the love of individual liberty, more characteristic of the German races, was more strongly manifested in the north. Many of the towns of Flanders and Brabant, however, became extremely democratic. Ghent in particular distinguished itself for the violence and frequency of its revolts against its rulers.

From this time the popular and civic element began to count for something in political combinations. If one potentate secured the alliance of a count, another might strengthen himself by secretly encouraging insurrection in his towns. The people of Flanders often allied themselves with the English, with whom their commercial intercourse and their love of freedom gave them many common interests and feelings, and both their own counts and the French monarchy often felt the effects of this alliance.

The battle of Courtray in 1302 greatly weakened the feudal authority, but the ascendency of the popular element led to various excesses. The organization of popular power was reserved for a later age, and the battle of Rosebeque, 1382, in which the Ghentese under Philip van Artevelde (who had offered the crown of France to Richard II. of England as the price of his assistance) were totally defeated, restored the authority of the nobles. In 1384, Flanders and Artois fell to the house of Burgundy by the marriage of the Duke, a scion of the French crown, with Margaret, daughter of Louis II., Count of Nevers, the last ruler of these provinces. By a succession of happy marriages, by purchase, or by force, Holland, Zealand, Hainaut, Brabant, Limburg, Antwerp, and Namur had all by 1430 become the inheritance of the same house. In 1442 the duchy of Luxemburg was acquired, and in 1470 Guelders and Friesland. This extraordinary prosperity induced Charles the Bold, who succeeded in 1467, to attempt to unite his territories by the conquest of Alsace, Lorraine, and Liége, and raise his duchy to a kingdom. The details of this enterprise, which forms one of the most exciting episodes in European history, belong more immediately to the history of France. It ended in his defeat and death at the battle of Nancy in 1477. His daughter, Mary, who succeeded him, carried the fortunes of her house still higher, or rather she carried them into a house still more fortunate than her own, by her union with the Archduke Maximilian, son of the Emperor Frederick. Her splendid possessions had been coveted by many potentates, and there were five candidates for her hand, among whom the most important were the dauphin, son of Louis XI., and the archduke.

It now became the part of France to excite troubles in Flanders. The policy of Maximilian, conformably to the traditions of the house of Austria, was directed to the aggrandizement of his house. He was frequently at feud with his Netherlandish subjects, whose manners he took little pains to understand, and for whose liberties he had little respect. Wars and leagues succeeded each other, which belong to the history of the great states of Europe. The Netherlands were by this union again brought under the German empire, and especially under the house of Austria, destined soon to become the most powerful in Europe. In 1512 they were formed into a division of the empire, under the title of the circle of Burgundy. East Friesland was included in the circle of Westphalia. On being called to the empire, Maximilian conferred the government of the Netherlands on his son, Philip the Fair, under whom they began to experience the material advantages of an alliance with the house of Austria. The vast European possessions of this house opened up to its subjects the greatest facilities of the age for commercial intercourse, while the discovery of America gave them in addition the commerce of a new world. The industrial skill and enterprise of the Netherlanders fitted them much more than the Spaniards, whose haughty disposition made them apt to substitute rapacity for industry, to derive permanent benefit from these opportunities. Margaret, the aunt, and Mary, the sister of Charles V., who succeeded to the government of the Low Countries, exercised it in many respects wisely and well. The former, a patroness of arts and letters, kept her court surrounded with poets, artists, and men of learning. A Council of State, consisting of the governors or stadtholders of the 17 provinces, assisted them in the administration of affairs, and such was the prosperity of the country that more than one of the cities of the Netherlands rivaled in extent and opulence the capitals of the greatest European kingdoms. This bright day was too soon clouded. The reign of Charles V. is less distinguished for the political struggles excited by a too prosperous ambition, which shook nearly every nation of Europe, than for the religious dissensions, and the social troubles resulting from them, which attended the dawn of the Reformation. The reformed opinions made great progress in the Netherlands; but here again a remarkable illustration was afforded of the strength of those differences of race, language, and sentiment which divided their populations. In Holland, as in Germany, the Reformation triumphed. On the Belgian territory, especially where the Walloon or French element of the population prevailed, although these opinions spread widely, they yielded at length, as in France, to the force of authority, or the sentiment of unity. In 1535 Mary published at Brussels an edict condemning all heretics to death. An insurrection excited by persecution was suppressed by Charles V. in 1540, and the Netherlands were inseparably united by the law of primogeniture with the crown of Spain. No union could have been more unfortunate. The bigotry of the Spanish branch of the Austrian family has become proverbial, and a country torn with religious dissensions could not have found itself under a worse rule.

Charles V., himself a Netherlander, born in Ghent, and still more his son, Philip II., of Spain, strove to extinguish the reformed opinions among the Netherland subjects in seas of blood. Philip discarded all respect for the liberties of the Netherlands, and subjected them under his governors, particularly the Duke of Alva, to all the horrors of a hostile military rule. Thousands of victims perished by every variety of execution which a barbarous cruelty

could devise, hanging, beheading, burning, drowning, interring alive; to which tortures and imprisonments were added in still greater number. During this period of desolation, great numbers of artisans, abandoning their country, carried elsewhere, especially to England and Germany, which sympathized with their opinions, the arts which had enriched their own country, and which now acquired through them a wider scope, and contributed to the industrial progress of Europe. William of Orange, the Silent, now made himself the champion of the liberties of his country. Supported chiefly by the northern states, thwarted by the jealousy of the Flemish nobles, and opposed by the Walloon provinces, which remained faithful to Spain, and even supplied her with troops, he at length succeeded in freeing the seven northern states, and forming them into the confederation of the United Provinces, whose independence, declared in 1581, was ultimately acknowledged by Spain. These events belonged chiefly to the history of Holland.

Requesens, the successor of Alva, had tried too late a more humane policy. At Antwerp and Ghent the Spanish soldiers broke out into excesses. The confederates assembled in the latter town signed the pacification of Ghent, proclaiming liberty of conscience, and convoking the Estates-General. The Estates called in the aid of France, and offered the crown to Henry III., who declined to accept it, dreading the Roman Catholic league in his own country. It is a special feature of the history of those days, that while the great rulers, particularly those of France and Germany, persecuted their reformed subjects, each was ready to protect the Protestant subjects of the others when opposed to their political policy. The success of the revolutionary party, consummated in the north, was at length checked in the southern provinces by the ability of Alexander Farnes, Duke of Parma, the Spanish commander, and by the reactionary spirit evoked in the provinces themselves, strengthened by the emigration of many influential reformers to the northern states, and the Belgian Netherlands remained attached to Spain. From 1596 to 1633 the Spanish Netherlands were transferred to the Austrian branch of the family by the marriage of Isabella, daughter of Philip II., with the Archduke Albert of Austria. On the death of Isabella they reverted to Spain. By the Treaty of Rastadt in 1714 they were again placed under the dominion of Austria. During this period they were the subject of continual intrigues, and frequently of open warfare among the European states. Twice conquered by Louis XIV., conquered again by Marlborough, coveted by Holland, Spain, Germany, France, and England, they lay continually open to the invasions and the struggles of foreign armies, and it was at this period especially that they were, as they have been called, the battlefield of Europe. Some portions of maritime Flanders, Brabant, and Limburg, which had remained to Spain, were during this period conquered and annexed by Holland, while France acquired Artois and Walloon Flanders, the south of Hainaut, and part of Namur and Luxemburg, including the important towns of Douai, Lille, Valenciennes, Dunkirk, and many others. From 1714 Austria was left in undisturbed possession of the remainder of the southern Netherlands. Joseph II., styled the Philosophical Emperor, excited by his reforms a revolt, headed or stimulated by the monks of Flanders and Brabant, whom he had dispossessed of their convents. The Estates of the two provinces refused to vote the imposts, and were dissolved. The populace took to arms. The Virgin was proclaimed generalissimo of the patriot army. The Austrian army concentrated at Turnhout was totally defeated. After applying in vain for assistance to Holland and France, neither of which could be expected to have much sympathy with their movement, the insurgents were at length subdued, and the Austrians re-entered Brussels, October 1790. Soon after the whole Netherlands were conquered by the revolutionary armies of France, and the country was divided into French departments, a change which, as might be expected, provoked as much resistance as the people were able to offer. When Napoleon ruled France, his brother Louis became king of Holland.

Just before the battle of Waterloo, fought on Belgian territory, had once more changed the fate of Europe, Belgium was united by the Congress of Vienna to Holland, under the title of the kingdom of the Netherlands. This fusion had much to recommend it. The ports and colonies of the north formed a suitable complement to the arts and industry of the south. The Flemings and the Dutch spoke the same language and had the same origin; but there remained outside of this harmony the Walloon provinces, French in language and extraction. A most injudicious measure of the Dutch government, an attempt to assimilate the language of the provinces by prohibiting the use of French in the courts of justice, excited an opposition, which, encouraged, by the success of the French revolution of 1830, broke out into revolt. The electoral system, moreover, gave the preponderance to the northern provinces, though inferior in population, and the interests of the provinces were diametrically opposed in matters of taxation. Belgium was agricultural and manufacturing, Holland commercial; the one wished to tax imports and exports, the other property and industry. In the chambers three different languages were spoken, Dutch, German, and French; and the members frequently did not understand each other. Nothing but the most skilful government could have overcome these difficulties, and no statesman appeared fitted to grapple with them. The revolutionary movement became general in the south, and the Dutch troops, at first successful before Brussels, were finally repulsed, and compelled by the arrival of fresh bands of insurgents from all quarters, to retire. The Flemings saluted the volunteers of Liége, Mons, and Tournay by the ancient title of Belgians, and this name, which properly distinguished only a section of the people of the southern provinces, became henceforth recognized as the patriotic designation of the whole.

A convention of the great powers assembled in London to determine on the affairs of the Netherlands and stop the effusion of blood. It favored the separation of the provinces, and drew up a treaty to regulate it. In the meantime the National Congress of Belgium offered the crown to the Duke of Nemours, second son of Louis Philippe, and, on his declining it, they offered it, on the recommendation of England, to Leopold, Prince of Saxe-Coburg, who acceded

to it under the title of Leopold I., on 21 July 1831. In November of the same year the five powers guaranteed the crown to him by the Treaty of London. Some disputes with Holland in regard to the partition of territories still remained. A convention was concluded between France and England to bring these differences to a close, and in 1839 Holland acceded to a treaty, by which Belgium surrendered to her portions of Limburg and Luxemburg, which she had retained since 1830.

During the reign of Leopold, a prosperous period of 34 years, Belgium became a united and patriotic community. Arts and commerce flourished, and a place was taken in the family of nations upon which the Belgian people could look with complacency. On the outbreak of the French revolution of 1848 Leopold declared his willingness to resign the crown if it was contrary to the wishes of his subjects that he should retain it. This declaration disarmed the Republican party, and confirmed the stability of the monarchy at a critical moment. During his reign Belgium concluded various treaties of commerce, with Great Britain in 1851 and 1862, and with France in 1861. Leopold II. succeeded his father in 1865. In recent years the chief feature of Belgian politics has been a keen struggle between the clerical and the liberal party. At the elections in June 1878, the liberals gained a majority, which they lost in 1884, and failed to regain in 1890. Soon after followed a revision of the constitution, and at the elections in 1894 the clericals were returned with a great majority over liberals and socialists combined. In 1885 Leopold II. became sovereign of the Congo Free State (q.v.).

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Belgorod, byĕl′ gō-rōt, or **Bielgorod,** a town in Russia, government of, and 76 miles south from the town of Kursk, on the Donetz. It is the seat of an archbishop's see, and has important fairs. Pop. (1897) 21,800.

Belgrade, the capital of the kingdom of Servia, situated in the angle formed by the junction of the Save with the Danube, overlooked by a citadel on a rocky eminence about 160 feet high. The town has been almost entirely transformed in recent times, and now contains a number of fine buildings and wide streets, being provided with the electric light, tramways, telephones, waterworks, etc., and having generally the aspect of any modern European town. It contains the royal palace, residences of various ambassadors or ministers, the chief courts and government departments, archiepiscopal cathedral, Protestant church and school, high school or college, gymnasia, military school, national library of 80,000 volumes, national museum, etc. The most numerous places of worship are the Greek-Catholic. There are no industries of any importance, but trade, however, is active, Belgrade being the chief emporium of the kingdom, the place to which most of the imports and exports of Servia are brought, and through which a large transit trade passes between Austria and Turkey. It is now connected by railway with Budapest and with Constantinople and Salonica, and carries on a large shipping trade by the Danube, and also the Save. Under the name of Singidunum, Belgrade was the station of a Roman legion, and in later years was several times destroyed in the contests of the Byzantines, Bulgarians, and Hungarians. Being the key of Hungary, it was long an object of fierce contention between the Austrians and the Turks. It was taken by the latter in 1521 and held by them till 1688, when it was retaken by the imperial army. Two years afterward it was again captured by the Turks, who perpetrated every sort of atrocity in the conquered city, besides killing 1,200 of the garrison. From this period it remained in possession of the Turks till 1717, when it was besieged by Prince Eugene. After a desperate conflict between the contending armies the Turks were defeated. In 1739 the Turks came into possession of it by treaty, retaining it till 1789, when it was taken by the Austrians. It was restored by treaty to the Turks in 1791; since which time it has shared the varying fortunes of Servia. In consequence of a quarrel with the Servians it was bombarded by the Turkish garrison in 1862. In 1867 it was evacuated by the Turks altogether, and since the Treaty of Berlin (July 1878) has been the capital of an independent state. An American consul resides here. See SERVIA. Pop. (1900) 69,097.

Belgrand, bĕl-grăñ, **Marie François Eugene,** French civil engineer: b. Ervy, 23 April 1810; d. 8 April 1878. He designed the gigantic sewerage system and water supply system of Paris, and published 'La Seine'; 'Les Tranvaux Souterrains de Paris'; 'Les eaux Anciennes de Paris'; etc.

Belgravia, the name given to the fashionable quarter of London south and west of Belgrave Square. Till the early part of the 19th century the district was a marshy farm. The district was drained and filled in about 1825.

Belial, bē′lĭ-ăl or bēl′yăl. By the translators of the English Bible, this word is often treated as a proper name, as in the expressions, "son of Belial," "man of Belial." In the Old Testament, however, it ought not to be taken as a proper name, but it should be translated "wickedness," or "worthlessness." To the later Jews Belial seems to have become what Pluto was to the Greeks, the name of the ruler of the infernal regions; and in 2 Cor. vi. 15 it seems to be used as a name of Satan, as the personification of all that is bad.

Belief. In a general sense belief is the assent of the understanding to the truth of a proposition, but in a technical and theological sense, has come to be used as a mental exercise somewhat depending upon the volition of the individual. The word is used to mean the acceptance of a proposition, statement, or fact as true on the ground of evidence, authority, or irresistible mental predisposition; the state of trust in and reliance on a person, thing, or principle; as also for the fact believed, and some-

times specifically for the Apostles' Creed. Belief is by some distinguished from knowledge, inasmuch as the latter rests on evidence, while belief rests on authority. Belief should, some say, not be used of facts occurring in one's own experience, or principles of which the opposite implies absurdity, such as the axioms of geometry. These we know, and, according to this view, the term should be limited to cases where a proposition is accepted without evidence, or where such evidence as is available implies only probability. On the other hand, the psychologists of what is called the intuitive school are accustomed to regard as beliefs the fundamental data on which reasoning rests; and to say that all knowledge rests ultimately on belief. Belief, they say, may admit of all degrees of confidence, from a slight suspicion to full assurance. There are many operations of mind in which it is an ingredient — consciousness, remembrance, perception. Kant defined opinion as a judgment which is insufficiently based, subjectively as well as objectively; belief, as subjectively sufficient but objectively inadequate; knowledge, as both subjectively and objectively sufficient. The strongest beliefs may, of course, be false; beliefs in ghosts, astrological prognostications, etc., are usually treated as superstitions. Beliefs as such rest on grounds regarded as sufficient by the person believing, who is prepared to act on his belief; but their grounds may have absolutely no validity for any other person. Such beliefs are nevertheless very real. On the other hand there are many propositions accepted traditionally, and spoken of as beliefs, which are not real, vital abiding truths for those who nominally accept them; which have no influence on character or mental tone, and on which those who hold them would not be prepared to act. Faith is a word used in very much the same sense as belief, but especially signifies the acceptance of and reliance on the truths of religion.

Bibliography.— Newman, 'Grammar of Assent'; 'Bain, 'The Emotions and the Will' (1800); Spencer, 'Psychology' (1881); Mill, 'Analysis of the Phenomena of the Human Mind' (1869); James, 'Psychology' (1890); Brentano, 'Psychologie' (1874); Verbrot, 'Die Psychologie des Glaubens'; Balfour, 'The Foundations of Belief'; Hume, 'Inquiry' (1894); Ward, 'The Wish to Believe' (1884).

Belinda, a novel by Maria Edgeworth. Belinda Portman goes to spend the winter in London with Lady Delacour, a brilliant and fashionable woman; at her house she meets Clarence Hervey for the first time. Various obstacles keep the lovers apart, but the story ends happily with the marriage of Hervey and Belinda.

Belisa'rius, famous Byzantine general: b. about 505; d. 565. To him the Emperor Justinian chiefly owed the splendor of his reign. Belisarius first served in the bodyguard of the emperor, soon after obtained the chief command of an army of 25,000 men stationed on the Persian frontiers, and in the year 530 gained a complete victory over a Persian army of not less than 40,000 soldiers. The next year, however, he lost a battle against the same enemy, who had forced his way into Syria — the only battle which he lost during his whole career. He was recalled from the army, and soon became at home the support of his master. In the year 532 civil commotions, proceeding from two rival parties, who called themselves the green and the blue, and who caused great disorders in Constantinople, brought the life and reign of Justinian into the utmost peril, and Hypatius was already chosen emperor, when Belisarius with a small body of faithful adherents restored order. Justinian, with a view of conquering the dominions of Gelimer, king of the Vandals, sent Belisarius with an army of 15,000 men to Africa. After two victories he secured the person and treasures of the Vandal king. Gelimer was led in triumph through the streets of Constantinople, and Justinian ordered a medal to be struck with the inscription *Belisarius gloria Romanorum,* which has descended to our times. By the dissensions existing in the royal family of the Ostrogoths in Italy, Justinian was induced to attempt to bring Italy and Rome under his sceptre. Belisarius vanquished Vitiges, king of the Goths, made him prisoner at Ravenna (540), and conducted him, together with many other Goths, to Constantinople. The war in Italy against the Goths continued; but Belisarius, not being sufficiently supplied with money and troops by the emperor, demanded his recall (548). He afterward commanded in the war against the Bulgarians, whom he conquered in the year 559. Upon his return to Constantinople he was accused of having taken part in a conspiracy. But Justinian was convinced of his innocence, and is said to have restored to him his property and dignities, of which he had been deprived. His history has been much colored by the poets, and particularly by Marmontel, in his otherwise admirable politico-philosophical romance. According to his narrative, the emperor caused the eyes of the hero to be struck out, and Belisarius was compelled to beg his bread in the streets of Constantinople. Other writers say that Justinian had him thrown into a prison, which is still shown under the appellation of the Tower of Belisarius. From this tower he is reported to have let down a bag fastened to a rope, and to have addressed the passengers in these words: "Give an obolus to Belisarius, whom virtue exalted, and envy has oppressed." Of this, however, no contemporary writer makes any mention. The blind Belisarius forms the subject of a noted painting by Gérard. Tzetzes, a slightly esteemed writer of the 12th century, was the first who related this fable. Certain it is, that, through too great indulgence toward his wife, Antonina, Belisarius was impelled to many acts of injustice, and that he evinced a servile submissiveness to the detestable Theodora, the wife of Justinian. See Hodgkin, 'Italy and her Invaders' (1880–5); Bury, 'Later Roman Empire' (1893).

Belize, bĕ-lēz' (sometimes written BELICE or BALIZE), the capital of British Honduras. Lat. 17° 29′ N.; lon. 88° 8′ W. It has been suggested that the name is derived from the French *balise,* a beacon, but more probably it is a corruption of Wallace, a Scotch buccaneer named Peter Wallace, with 80 companions, having erected houses enclosed with a rude palisade at this point after the Spaniards abandoned Bacala, leaving a large part of the rugged, uninviting north coast of the Gulf of Honduras unoccupied, save by freebooters, during the latter half of the 17th century. Accordingly the name Walis, Balis, or Belize was applied by the

natives and Spaniards to the settlement, the river on which it was situated, and subsequently to the whole region occupied by the English (see Bancroft's 'History of Central America,' II., 624). Wood-cutting was the chief occupation of this piratical establishment. The value of the forests attracting other settlers, Belize was attacked by the authorities of Yucatan, who sought to expel them as trespassers, in 1733. Various unsuccessful attempts with the same object were made in subsequent years, the most formidable in 1754. Again in 1779, war existing between England and Spain, the governor of Yucatan organized an expedition against Belize; and Spain's last effort to regain possession by force was made in 1798. Before that time the settlers had organized a government. It is an interesting fact that, originating as it did, the town has become, with its population of more than 5,000, its church, schools, and hospital, a centre for the maintenance of good order. It has the characteristic features of a small English colonial capital,—the governor's house, etc. See HONDURAS, BRITISH. MARRION WILCOX,
Authority on Latin-America.

Belknap, George Eugene, American naval officer: b. Newport, N. H., 22 Jan. 1832; d. Key West, Fla., 7 April 1903. He was appointed midshipman in the navy in 1852; became lieutenant-commander in 1862; commander in 1866; captain in 1872; commodore in 1885; and rear-admiral in 1889; and was retired in 1894. He took part in the capture of the Barrier Forts on the Canton River, China, in 1856; and in the Civil War was present at the bombardment of the forts and batteries in Charleston Harbor, and in both of the attacks on Fort Fisher. In 1873, while engaged in deep sea sounding in the north Pacific Ocean, he made discoveries concerning the topography of the bed of the ocean that found high favor among scientists. He was appointed superintendent of the United States Naval Observatory in 1885, and, among other works, published 'Deep Sea Soundings.'

Belknap, Jeremy, American clergyman: b. Boston, Mass., 4 June 1744; d. there, 20 June 1798. He graduated at Harvard in 1762; was pastor of the Congregational Church in Dover, N. H., 1767–86, and of the Federal Street Church, in Boston, 1787–98; and was active for the American cause during the Revolution. The Massachusetts Historical Society, organized in 1790, recognizes him as its founder. In 1792 he became an overseer of Harvard College. He was the author of a 'History of New Hampshire' (1784–92); 'A Discourse Intended to Commemorate the Discovery of America by Columbus, with Four Dissertations' (1792); 'An Historical Account of Those Persons Who Have Been Distinguished in America,' generally known as the 'American Biography,' etc.

Belknap, William Goldsmith, American military officer: b. Newburg, N. Y., 14 Nov. 1794; d. near Fort Washita, 16 Nov. 1852. He distinguished himself in the attack on Fort Erie, in August 1814; was retained in service on the reduction of the army, in 1822, having been, in 1818, one of the assistant professors of tactics in the military academy. He became a captain in 1822, and was brevetted for faithful service, 10 years afterward. In 1842 he was appointed major of the 3d infantry, and, having served in Florida during the war, was made lieutenant-colonel by brevet. He served on the general staff at Buena Vista, and received a sword of honor from the citizens of his own State, for his services in that battle. He also received the brevet of brigadier-general. From December 1843 to May 1851 he was in command of his regiment, and of the troops in the Cherokee nation (Arkansas). In May 1851 he was ordered to upper Texas for the purpose of keeping the Indian tribes within the lines, and while there contracted a fever, of which he died.

Belknap, William Worth, American military officer, son of Gen. W. G. Belknap: b. Newburg, N. Y., 22 Sept. 1829; d. Washington, D. C., 13 Oct. 1890. In 1861 he entered the Union army as major of the 15th Iowa Volunteers and was engaged at Shiloh, Corinth, and Vicksburg; but became most prominent in Sherman's Atlanta campaign. He was promoted to brigadier-general, 30 July 1864, and major-general, 13 March 1865. He was collector of internal revenue in Iowa from 1865 to 13 Oct. 1869, when he was appointed secretary of war, which office he occupied till 7 March 1876. He resigned in consequence of accusations of official corruption. Subsequently he was tried and acquitted.

Bell, A. See BELL, NANCY R. E. M.

Bell, Acton. See BRONTE, ANNE.

Bell, Alexander Graham, American scientist, inventor of the telephone: b. Edinburgh, Scotland, 3 March 1847. He was a son of Alexander M. Bell (q.v.), and was educated at the Edinburgh high school and university, and trained by his father in the latter's system for restoring speech to deaf-mutes. In 1870 he removed with his father to Canada, and in 1872 came to Boston as professor of vocal physiology in Boston University, where he taught his father's system with success. He had long been experimenting on the electrical transmission of sound, had designed and partly constructed a speaking telephone while in Canada, and on 14 Feb. 1876 took out a patent for it. At the Centennial Exposition in Philadelphia that year he exhibited it to multitudes, including foreign scientists, who applauded it warmly; it was still crude, but a company was formed to float it, inventive genius was turned toward perfecting it, and it rapidly assumed a practical commercial form. A number of other telephones were almost immediately brought forward, with claim to priority of invention, and years of protracted and costly law suits followed; but the Bell Company finally established its right before the United States Supreme Court, has held a virtual monopoly of the business in this country, and has made its owners and Prof. Bell very wealthy. In 1880 he invented the photophone, a telephone in which the sound is conveyed by a vibratory beam of light instead of a wire; it has transmitted articulate sounds about 700 feet, but has not been practically used. He has also invented the graphophone, a form of the phonograph for recording and reproducing speech, which is coming largely into use for the teaching of languages. He has never abandoned his first field, however, the instruction and advancement of deaf-mutes, has investigated and written much on this subject, and published his papers through the Volta Bureau, which he founded; and has been president of the American Association to Promote Teaching of Speech

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ALEXANDER GRAHAM BELL.

to the Deaf. He has especially urged that the policy of educating deaf-mutes in asylums is pernicious, as forcing them to intermarry, and increasing the births of children so afflicted. He has been president of the National Geographic Society, and regent of the Smithsonian Institution. The French government in 1881 awarded him the Volta prize. Among his monographs are a 'Memoir on the Formation of a Deaf Variety of the Human Race.'

Bell, Alexander Melville, Scottish-American educator: b. Edinburgh, 1 March 1819; d. Washington, D. C., 7 Aug. 1905. He was a distinguished teacher of elocution in his native city; in 1865 removed to London to act as a lecturer in University College; and in 1870 went to Canada and became connected with Queen's College, Kingston. He invented the system of «visible speech,» in which all the possible articulations of the human voice have corresponding characters designed to represent the respective positions of the vocal organs. This system has been successfully employed in teaching the deaf and dumb to speak. Besides writing on this subject he wrote on elocution, stenography, etc.

Bell, Andrew, Scottish educator, author of the mutual instruction or «Madras» system of education: b. St. Andrews, 27 March 1753; d. Cheltenham, England, 27 Jan. 1832. He was educated at the university of his native town, resided for seven years in Virginia, and on returning took orders in the Church of England. In 1787 he went to India, where he became manager of the institution for the education of the orphan children of European soldiers at Madras established by the East India Company. The superintendence of this asylum was undertaken by Dr. Bell, who, having no object in view but the gratification of his benevolence, refused the salary of 1,200 pagodas (£480) which was attached to it. Failing to retain the services of properly qualified ushers, he resorted to the expedient of conducting his school through the medium of the scholars themselves. It was in the mode of conducting a school by means of mutual instruction that the new method of Dr. Bell consisted; and its value as an abbreviation of the mechanical part of teaching, and where large numbers were to be taught economically, could not be easily overestimated at the time. His system, however, is now abandoned. From the commencement of his experiment he made the scholars, as far as possible, do everything for themselves; they ruled their own paper, made their own pens, etc., while the teacher only directed them. The maxim of the school was that no boy could do anything right the first time, but he must learn when he first set about it, by means of his teacher, so as to be able to do it himself ever afterward. After superintending the school for seven years he found it necessary for his health to return to Europe. On his arrival he published in 1797 a pamphlet, entitled 'An Experiment in Education made at the Male Asylum of Madras, in which he gave an account of his system. The first place in England where the system was adopted was the charity school of St. Botolph's, Aldgate, and gradually, especially through the influence of Joseph Lancaster, it was widely carried out in England, and indeed in almost every other civilized country. Dr. Bell acquired in later life the dignity of a prebendary of Westminster, and was master of Sherborn Hospital, Durham. He employed himself during his latter years in writing several works on education, among which the most valuable were: 'The Elements of Tuition'; 'The English School'; and 'Brief Manual of Mutual Instruction and Discipline.' Before his death he gave over to trustees £120,000 three per cent stock for education, half of it for the purpose of founding an academy in his native city. See 'Life by Southey' (1844); Meiklejohn, 'An Old Educational Reformer' (1881).

Bell, Andrew James, Canadian educator: b. Ottawa, 12 May 1856. He was educated at the University of Toronto, and at Breslau University; became professor of Latin and literature in Victoria University in 1889. He is an active member of the Canadian Institute, and has contributed some important papers to its 'Transactions.'

Bell, Benjamin Taylor A., Scotch-Canadian mining expert: b. Edinburgh, 2 July 1863. He went to Canada in 1882, and became editor of the 'Canada Mining Review.' and of the 'Canada Mining, Iron, and Steel Manual.' In 1890 he was appointed by the Dominion government, with Dr. Selwyn, to conduct the excursions through the mining and industrial centres of Canada of the Iron and Steel Institute of Great Britain, and the Verein Deutscher Eisenhüttenleute. The same year he organized the General Mining Association of the Province, and in 1892 was instrumental in uniting the coal, gold, and other mineral interests of Nova Scotia into a like organization.

Bell, Sir Charles, Scottish anatomist: b. Edinburgh, November 1774; d. near Worcester, England, 28 April 1842. He studied anatomy under his brother, John Bell (q.v.), and had scarcely reached manhood before he had proved himself to be a first-rate anatomist as well as an excellent lecturer. In 1804, being already known by his published works, he went to London, and in 1811 published an essay entitled 'A New Idea of the Anatomy of the Brain,' containing the important discovery of the distinction between sensory and motor nerves, on which his fame chiefly rests. It at once attracted general attention, established his reputation, and was doubtless the main ground on which, on the accession of William IV., he was selected for the honor of knighthood. In 1812 he was appointed surgeon to the Middlesex Hospital, to whose prosperity he afterward greatly contributed. In 1824 he accepted the chair of anatomy and surgery to the London College of Surgeons, and in 1836 that of surgery in the University of Edinburgh. His principal works are 'Anatomy of Expression' (1806); 'System of Operative Surgery'; 'Anatomy and Physiology,' with his brother John; 'Animal Mechanics' (1828); 'Nervous System' (1830); and the Bridgewater Treatise on the Hand' (1833). There is a life in French by Pichot (1859), and in 1870 a selection from Sir Charles Bell's correspondence was published.

Bell, Currer. See BRONTE, CHARLOTTE.

Bell, Ellis. See BRONTE, EMILY JANE.

Bell, George Joseph, Scottish lawyer, brother of Sir Charles and John Bell: b. Edinburgh, 26 March 1770; d. 1843. He passed as advocate in 1791, and became one of the first

authorities on the subject of mercantile jurisprudence and the law of bankruptcy. This distinction he earned for himself by the publication of a work which first appeared in 1804, under the title of a 'Treatise on the Laws of Bankruptcy,' but in subsequent editions was extended and appeared as 'Commentaries on the Laws of Scotland and on the Principles of Mercantile Jurisprudence.' This work, notwithstanding recent changes in the law, is still a standard. Besides the work above mentioned, he published 'Principles of the Law of Scotland,' the 10th edition of which was issued in 1897; and other works.

Bell, Henry, Scottish engineer, the first successful applier of steam to the purposes of navigation in Europe: b. Torphichen, Linlithgowshire, 7 April 1767; d. Helensburgh, 14 Nov. 1830. He practised for several years, at Glasgow, the craft of a house carpenter, but in 1808 removed to Helensburgh, where he continued to prosecute his favorite task of mechanical scheming, without much regard to the ordinary affairs of the world, though he became proprietor of baths there. The application of steam to navigation had already been attempted by Mr. Miller of Dalswinton (among others), who, in 1788, had a vessel constructed, propelled by a small engine and paddle-wheel, the scene of operations being a loch on his own property in Dumfriesshire. Some further experiments were made, yet the scheme had no practical result for several years. Henry Bell seems to have turned his attention to the subject before the end of the century, and in January 1812 produced the Comet, a vessel 40 feet long, which was found in a great measure to answer the purpose contemplated. This vessel could make way against a head tide in the river at the rate of five miles an hour, and continued to ply on the Clyde for a number of years. It may be mentioned, that Mr. Robert Fulton, an American engineer, had launched a boat upon this principle in 1807, and that it performed long voyages upon the Hudson River; but it has been proved that Fulton had derived assistance in the construction of his vessel from Bell, who must therefore be allowed the praise of having done, in his own country, what all other men, notwithstanding the superior advantages of skill and capital, had failed in doing. Bell lived to see the bosom of the Clyde dotted far and wide by innumerable copies of his own invention; to know that steamboats promised to give a new turn to the art of general warfare; yet he reaped for himself little advantage. While mankind at large were enjoying the blessings which he had pointed out to them, he approached the confines of old age with the prospect of hardly the average comforts which attended that stage of existence in the humbler walks of society. Touched by his condition, a number of benevolent individuals instituted a subscription in his behalf, and it is creditable to the good feeling of the citizens of Glasgow and other places that a considerable sum was raised. The trustees on the river Clyde also gave him an annuity of £100, which he enjoyed for several years, the half of which sum was continued to his widow. A monument was erected to his memory at Douglass Point on the Clyde.

Bell, Henry Glassford, Scottish lawyer and author: b. Glasgow, 1803; d. 1874. He founded the Edinburgh 'Literary Journal' 1828, was admitted to the bar in 1832 and became one of the most esteemed Scottish mercantile lawyers of his day. He published a spirited defense of Mary Queen of Scots, (1830), 'Summer and Winter Hours' (1831); 'My Old Portfolio' (1832); 'Romances and Minor Poems' (1866).

Bell, Henry Haywood, American naval officer: b. North Carolina, 1807; d. 11 Jan. 1868. He was appointed a midshipman in 1823, and served on the Grampus when she was engaged in clearing the coast of Cuba of pirates. For many years he served with the East Indian squadron, and commanded one of the vessels of the squadron which, in November 1856 destroyed four forts near Canton, China. Shortly after the outbreak of the Civil War he became fleet captain of the Western Gulf squadron. He commanded one of the three divisions of the fleet which captured New Orleans, and was sent to raise the United States flag over the custom house and the city hall. In 1865 he took command of the East India squadron with the rank of commodore; in 1866 was promoted to rear-admiral; and, in 1867, retired. He was drowned at the mouth of the Osaka River, Japan.

Bell, Henry Thomas Mackenzie, English poet and critic: b. Liverpool, 2 March 1852. His collections of verse include 'The Keeping of the Vow' (1879); 'Verses of Varied Life' (1882); 'Old Year Leaves' (1883); 'Spring's Immortality' (1896); 'Pictures of Travel' (1898). He has also published such critical works as 'Charles Whitehead' (1884); 'Christina Rossetti' (1898).

Bell, Hillary, American dramatic critic: b. Belfast, Ireland, 1857; d. New York, 9 April 1903. After coming to the United States he painted portraits for some years and subsequently engaged in journalism and was the dramatic and musical critic of the New York *Press*. He also edited the 'Insurance Economist,' and was a vice-president of the Mutual Reserve Life Insurance Company. The life-size portrait which he painted of Ada Rehan as Katharine in 'The Taming of the Shrew,' was presented by Augustin Daly to the Shakespeare Memorial at Stratford-on-Avon.

Bell, Isaac, American philanthropist: b New York, 4 Aug. 1814; d. there, 30 Sept. 1897. He began his business life in a banking house when 14 years old, and in 1836 became interested in large financial and other concerns. About this time he began to devote himself to the work of benevolent institutions, and was president of the department of charities and correction 1857–73. It was principally through his efforts that the Bellevue Hospital, and also the Bellevue Hospital Medical College, were founded. In connection with the first institution he established the system of ambulance service. He was also largely instrumental in the establishment of the Normal College, and was responsible for the schoolship Mercury, which came under the control of the department of Charities and Correction, and of the St. Mary's, as well, loaned by the Navy Department to the Department of Education, of which he was also for a long time a member. During the Civil War he was active in raising and disbursing money for the benefit of New York volunteers,

and in aiding soldiers' wives, widows, and orphans.

Bell, James, Scotch geographer: b. Jedburgh, 1769; d. 1833. After receiving a liberal education he served an apprenticeship to the weaving business, and in 1790 commenced the manufacturing of cotton goods upon a large and respectable scale. In the universal depression occasioned by the shock of the French Revolution in 1793, he was reduced to the condition of a common warper; but having relinquished that line of life, he was about the year 1815 engaged to improve the 'Glasgow System of Geography,' a work which had met with considerable encouragement, and was now, chiefly by the labors of Mr. Bell, extended to five volumes. It was well received by the public, and formed the basis of his principal work, 'A System of Popular and Scientific Geography,' published at Glasgow in six volumes. His 'Gazetteer of England and Wales' was in the course of publication at the time of his death.

Bell, James, Canadian physician: b. North Gower, Ont., 10 Oct. 1852. He graduated at McGill University in 1877; became house surgeon of the Montreal General Hospital the same year, and medical superintendent of it in 1881. In 1885 he became a member of the hospital staff as assistant surgeon, and in 1886 full surgeon. In 1894 he was made consulting surgeon to the General Hospital, surgeon of the Royal Victoria Hospital of Montreal, and professor of clinical surgery in McGill University.

Bell, James Franklin, American soldier: b. Shelbyville, Ky., 9 Jan. 1856. He was graduated from the United States Military Academy 1878; served on the plains in the 7th United States Cavalry, 1878–94; and was aid to Gen. J. W. Forsyth in California, Arizona, and Washington. He went to the Philippines with the original expedition in 1898, and his military career there has been of the most daring and brilliant kind. As colonel of the 36th regiment of volunteers, he was not attached to any brigade, but acted as a free lance, reporting only to his division commander. He received a medal of honor for most distinguished gallantry in action 9 Sept. 1899, near Porac, in Luzon. While in advance of his regiment he charged seven insurgents with his pistol and compelled the surrender of the captain and two privates under a close and hot fire from the remaining insurgents, who were concealed in a bamboo thicket. In December 1900 he was made a brigadier-general in the regular army, being promoted over more than 500 captains, 200 majors, 98 lieutenant-colonels, and 77 colonels.

Bell, James Montgomery, American soldier: b. Williamsburg, Pa., 1 Oct. 1837. He entered the 86th Ohio infantry, and served with distinction throughout the Civil War, being twice brevetted for gallant and meritorious services in the battles of the Wilderness and Ream's Station, Va. Entering the regular army as 2nd lieutenant in 7th Cavalry, 1866, he took part in the Cheyenne and Arapahoe war, 1867–9; the Sioux wars, 1876–81, and the Nez Percés war, 1877. He received a brevet-commission of lieutenant-colonel for gallant services in action against the Indians at Cañon Creek, Montana, 13 Sept. 1877. He commanded in southern Luzon, Philippine Islands, 1900–1, and was appointed brigadier-general of volunteers, Jan. 20, 1900.

Bell, John, Scotch traveler: b. Antermony, 1691; d. there, 1 July 1780. Having gone to St. Petersburg in 1714, after the completion of his studies, he happened to be in that city when an embassy was being sent to the Sophy of Persia, and was appointed medical attendant to the ambassador. On his return from Persia to the Russian capital in 1718 he found another embassy preparing to set out for China, and through the influence of the ambassador whom he had attended to Persia he obtained an appointment in it also. The embassy arrived at Pekin «after a tedious journey of exactly 16 months.» The embassy returned in January 1722. The war between Russia and Sweden was now concluded, and the czar had determined to undertake an expedition into Persia, at the request of the sophy, to assist that prince against the Afghans, his subjects, who had seized upon Kandahar and possessed themselves of several provinces on the frontiers toward India. Bell's former journey to Persia gave him peculiar advantages, and he was accordingly engaged to accompany the army to Derbend, from which he returned in December 1722. In 1737 he was sent to Constantinople by the Russian chancellor, and Mr. Rondeau, the British minister at the Russian court. He seems now to have abandoned the public service, and to have settled at Constantinople as a merchant. About 1746 he married a Russian lady and returned to Scotland. The only work written by him is his 'Travels from St. Petersburg in Russia to Various Parts of Asia' (1763).

Bell, John, distinguished Scotch surgeon: b. Edinburgh, 12 May 1763; d. Rome, 15 April 1820. He was a brother of Sir Charles and George Joseph Bell, and after completing his professional education traveled for a short time in Russia and the north of Europe; and on his return began to deliver lectures on surgery and midwifery. These lectures, delivered between 1786 and 1796, were very highly esteemed, and speedily brought him into practice as a consulting and operating surgeon. The increase of his private practice, indeed, rendered it necessary for him, in 1796, to discontinue his lectures, and from that time forward he devoted himself to his patients, and to the preparation of the several publications of which he was the author. Patients came to him from all quarters, both of Scotland and England, and even from the Continent; and during that interval he performed some of the most delicate and difficult operations in surgery. Early in 1816 he was thrown by a spirited horse, and appears never to have entirely recovered from the effects of the accident. He was the author of 'The Anatomy of the Human Body' (1793–1802; 3d edition, with plates by Charles Bell, 1811); 'Engravings of the Bones, Muscles, and Joints,' illustrating the first volume of the 'Anatomy of the Human Body,' drawn and engraved by himself (1794, 3d edition); 'Engravings of the Arteries,' illustrating the second volume of the 'Anatomy of the Human Body' (1801); 'Discourses on the Nature and Cure of Wounds' (1795); 'The Principles of Surgery' (1801–8); 'Letters on Professional Character'; 'Observations on Italy.'

Bell, John, American statesman: b. near Nashville, Tenn., 15 Feb. 1797; d. Cumberland Iron Works, Tenn., 10 Sept. 1869. Graduating at Cumberland College (now University of Nashville) in 1814, he practised law until 1827, when he was elected to Congress. He received successive re-elections until 1841 when he became secretary of war in President Harrison's cabinet, but resigned when President Tyler withdrew from the Whig party. From 1847 to 1859 he was senator from his State. He was chairman of several important committees, and vigorously opposed the Kansas-Nebraska bill and the Lecompton constitution framed for Kansas. In May 1860 he was nominated for President by the Constitutional Union party (q.v.), but was defeated. During the Civil War he took no active part in politics.

Bell, John, English sculptor: b. Hopton, Suffolk, 1811; d. 25 March 1895. His best-known works are the 'Eagle Slayer'; 'Una and the Lion'; 'The Maid of Saragossa'; 'Imogen'; 'Andromeda'; statues of Lord Falkland, Sir Robert Walpole, Newton, Cromwell, etc., and the Wellington Memorial in Guildhall. He was one of the sculptors of the Guards' Monument in Waterloo Place, London, and the Prince Consort Memorial in Hyde Park. He was the author of several professional treatises and of a drama, 'Ivan: a Day and a Night in Russia.'

Bell, Lilian, American novelist: b. Kentucky, 1867. In 1900 she was married to Arthur Hoyt Boyne, but continues to write under her maiden name. Her writings include 'The Love Affairs of an Old Maid' (1893); 'A Little Sister to the Wilderness' (1895); 'The Under Side of Things' (1896); 'From a Girl's Point of View' (1897); 'The Instinct of Stepfatherhood' (1898); 'As Seen By Me' (1900); 'The Expatriates' (1900); 'Yessum' (1901); 'Abroad With the Jimmies'; 'Hope Loring'; 'Sir John and the American Girl.'

Bell, Sir Lowthian, English manufacturer and politician: b. Newcastle-on-Tyne, 1816; d. 20 Dec. 1904. He was mayor of his native city 1854–62, sat in the House of Commons for Hartlepool 1875–80, and was made a baronet in 1885. He founded the Clarence Iron Works on the Tees. His publications include 'The Chemical Phenomena of Iron Smelting' (1872); 'Report on the Iron Manufacture of the United States, and a Comparison of It with That of Great Britain' (1877).

Bell, Nancy R. E. Meugens, English art writer: b. Lambeth, London. Until her marriage to A. G. Bell in 1882 she wrote over the signature N. D. Anvers. She has published 'Elementary History of Art'; 'Masterpieces of the Great Artists'; 'Life of Gainsborough'; 'Representative Painters of the 19th Century'; 'St. Antony of Padua'; 'An Old Educational Reformer: J. M. D. Meiklejohn'; 'Memoirs of Baron Le Jeune'; 'Science Ladders Series' (8 vols.); 'Raphael'; 'Lives and Legends of the Saints'; 'The Saints in Christian Art.'

Bell, Robert, Irish journalist and miscellaneous writer: b. Cork, 16 Jan. 1800; d. London, 12 April 1867. He settled in London in 1828, edited an important weekly paper, the *Atlas,* for several years, and afterward the 'Monthly Chronicle,' 'Mirror,' and 'Home News.' He compiled several volumes of 'Lardner's Cabinet Cyclopædia'; wrote three plays, 'The Ladder of Gold,' a novel (1856); 'Hearts and Altar,' a collection of tales (1852), and did a great deal of miscellaneous literary work; but is best known by his annotated edition of the 'British Poets,' the first volume of which appeared in 1854, and which was carried through 29 volumes.

Bell, Robert, Canadian geologist: b. Toronto, Ont., 3 June 1841. He was educated at McGill and Queen's universities, and in 1867 joined the Canada Geological Survey, and in 1900 was an assistant director of it. In 1861 he was elected a member of the American Institute of Mining Engineers; in 1881 became a Fellow of the Royal Society of Canada; and in 1888–9 was a member of the Ontario Commission, which reported on the mineral resources of that province. During his connection with the geological survey, he made more extensive explorations throughout the Dominion than any other man. He was the author of about 130 reports and papers, a list of which is found in the 'Biblio of the Royal Society.'

Bell, Robert Stanley Warren, English writer, editor of 'The Captain': b. Long-Preston, Yorkshire, 27 June 1871. He has published 'The Cub in Love' (1897); 'The Papa Papers' (1898); 'Bachelorland' (1899); 'Tales of Greyhouse'; 'Love the Laggard' (1901).

Bell, Samuel, American statesman: b. Londonderry, N. H., 9 Feb. 1770; d. Chester, N. H., 23 Dec. 1850. He passed his boyhood upon his father's farm, graduated at Dartmouth College in 1793, and was admitted to practise law in 1796. He rapidly achieved distinction in his profession, and in 1804 was elected a representative to the State legislature, an office to which he was twice re-elected; and during his last two terms held the position of speaker of the house. He declined the attorney-generalship in 1807, after which he was successively a member of the State senate, and of the executive council, a judge of the supreme court, and in 1819 governor of the State. To the latter office he was re-elected four times in succession, till in 1823 he was elected to the senate of the United States, an office to which he was also re-elected. He retired from public life upon the expiration of his second term in 1835.

Bell, Samuel Dana, American jurist: b. Francestown, N. H., 9 Oct. 1798; d. 31 July 1868. He was graduated at Harvard in 1816; studied law in Exeter; and began practice in Meredith. He became a member of the legislature about 1825, and was the clerk of that body for several years. In 1830, 1842, and 1867, he was a member of the commissions appointed to revise the State 'Statutes.' In 1855 he was appointed justice of the supreme court of New Hampshire, and in 1859, became chief justice of the court, which office he held till 1864. He joined the New Hampshire Historical Society soon after its organization, and the Manchester Public Library was founded largely through his efforts.

Bell, Thomas, English zoologist: b. Poole, Dorset, 1792; d. Selborne, Hampshire, 1880. He studied medicine at Guy's and St. Thomas' hospitals, London, became a member of the Royal College of Surgeons in 1815, and soon secured a large practice as a dentist. In 1832 he was appointed professor of zoology in King's

College, London, a post which he held almost to the last. Latterly he lived for a number of years at Selborne in the residence that had belonged to the celebrated Gilbert White. His best-known separate works are his histories of 'British Quadrupeds'; 'British Reptiles'; and 'British Stalk-eyed Crustacea,' published in Van Voorst's series. In 1877 he published an excellent edition of White's 'Natural History of Selborne.'

Bell-Smith, Frederic Marlett, English artist: b. London, 26 Sept. 1846. He went to Canada in 1866, and was for seven years art director at Alma College, St. Thomas, and teacher of drawing in the public schools of London, Ont. About 1888 he became a portrait and figure painter; but he is best known as a painter of landscapes. In 1894 he produced 'Lights of a City Street,' his greatest achievement up to that year, and later, two canvases depicting incidents connected with the death of Sir John Thompson.

Bell, a hollow vessel, which, by its vibrations when struck, gives forth sounds; whence its name, from the old Saxon word *bellan,* to bawl or bellow. It is an instrument of great antiquity, being spoken of by Hebrew writers, as in Ex. xxviii., in which golden bells are prescribed as appendages to the dress of the high priest, that notice may thus be given of his approach to the sanctuary. And at this day the bell is used for a similar purpose before the priest, in Roman Catholic countries, as he proceeds to administer the Holy Viaticum to the soul that is passing away; and so when the bell is tinkled, in administering the sacrament, by the same priest, it is in pursuance of a custom founded on the ancient Hebrew use of the bell. More intimately than any other instrument are bells associated with the religious and imaginative, as also with the most joyous and the saddest feelings of mankind. The metal from which bells are usually made (by founding), is an alloy, called bell-metal, commonly composed of 80 parts of copper and 20 of tin. The proportion of tin varies, however, from one third to one fifth of the weight of the copper, according to the sound required, the size of the bell, and the impulse to be given. The clearness and richness of the tone depend upon the metal used, the perfection of its casting, and also upon its shape; it having been shown by a number of experiments that the well-known shape with a thick lip is the best adapted to give a perfect sound. The depth of the tone of a bell increases in proportion to its size. A bell is divided into the body or barrel, the ear or cannon, and the clapper or tongue. The lip or sound bow is that part where the bell is struck by the clapper.

The sound of a bell is a compound tone, presenting five and in many instances more notes to the ear. There is a great difference between the harmonics of a bell and of a vibrating string. In the case of the former a minor third is not infrequently one of the loudest tones next to the fundamental tone. When a bell is properly struck the first note which attracts the attention of the ear is known as the strike note, tap note, or fundamental, and forms what is called "the" note of the bell. The low sound heard after the strike note has lost its intensity is called the hum note, and the octave above the strike note the nominal. There are also present a minor third and a perfect fifth in the first octave, and a major third and a perfect fifth in the second octave. Very few bells agree with these conditions. Generally the hum note is a sixth or seventh, and in rare cases a ninth below the strike note. The nominal is somewhere about an octave or a ninth above the strike note, and the other notes diverge accordingly. Bells that are swung are more likely to conform to the conditions than those that are struck.

Bells were used very early in the form of cymbals and hand bells in religious services. In Egypt the feast of Osiris was announced through the ringing of bells. Bronze bells have been found in Assyria. Bells of gold were worn by Aaron and the high priests of the Jews on the border of their robes, and in Athens the priests of Cybele used them in their offerings. The Romans also used bells which they called tintinabula, to announce the public assemblies, and, according to Suetonius, Augustus had a bell suspended before the temple of Jupiter. In the Christian churches a similar custom early came into use, though it is not known that in the first Christian churches divine service was announced by any such method. They were used, however, in the early monasteries to announce the hours of prayer. Generally they were made of tubes struck with a hammer. They are said to have been first introduced into Christian churches about 400 A.D., by Paulinus, bishop of Nola in Campania (whence campana and nola as old names of bells); although their adoption on a wide scale does not become apparent until after the year 550, when they were introduced into France. They are rung to summon monks and choir nuns to the office, and the people to mass, to announce the Angelus, to toll during funerals, and peal on occasions of joy. They are blessed with elaborate ceremonies and consecrated or "baptized" in honor of some saint.

Until the 13th century they were of comparatively small size, but after the casting of the Jacqueline of Paris (6½ tons) in 1400, their weight rapidly increased. Among the more famous bells are the bell of Cologne, 11 tons, 1448; of Dantzic, 6 tons, 1453; of Halberstadt, 7½, 1457; of Rouen, 16, 1501; of Breslau, 11, 1507; of Lucerne, 7½, 1636; of Oxford, 7½, 1680; of Paris, 12½, 1680; of Bruges, 10¼, 1680; of Vienna, 17¾, 1711; of Moscow (the monarch of all bells), 193, 1736; three other bells at Moscow, ranging from 16 to 31 tons, and a fourth of 80 tons, cast in 1819; the bell of Lincoln (Great Tom), 5½, 1834; of York Minster (Great Peter), 10¾, 1845; of Montreal, 13½, 1847; of Westminster (Big Ben), 15½, 1856; (St. Stephen), 13½, 1858; the great bell of St. Paul's, 17½, 1882. Others are the bells of Ghent (5), Görlitz (10¾), St. Peter's, Rome (8), Antwerp (7¼), Olmutz (18), Brussels (7), Novgorod (31), Pekin (53½).

Bells, as the term is used on shipboard, are the strokes of the ship's bell that proclaim the hours. Eight bells, the highest number, are rung at noon and every fourth hour afterward, that is, at 4, 8, 12 o'clock, and so on. The intermediary periods are indicated thus: 12:30, 1 bell; 1 o'clock, 2 bells; 1:30, 3 bells, etc., until the eight bells announce 4 o'clock, when the series recommences 4:30, 1 bell; 5 o'clock, 2

bells, etc. The even numbers of strikes thus always announce hours, the odd numbers half hours. See Gatty, 'The Bell: Its Origin and Uses' (1848); Lukis, 'Church Bells and Their Founders' (1857); Andrews, 'History of Church Bells' (1885); Otte, 'Glockenkunde' (1884); Tyack, 'A Book About Bells' (1899).

Bell-bird, the name given to birds in various parts of the world, which utter bell-like notes; especially the "campanero" (*Chasmorhyncus niveus*), one of the chatterers of the South American family, *Cotingidæ*. It resembles, in form and size, the North American wax-wing, but is pure white, and has a remarkable appendage upon its forehead. This consists of a fleshy, tapering caruncle, which is black, thinly covered with star-like tufts of minute feathers. This caruncle ordinarily hangs loosely down at the side of the beak, but in moments of excitement becomes swollen and much extended, reaching a length of even five inches. This seems to be produced by air forced into its elastic tissues from the bird's lungs, and occurs whenever the characteristic notes are uttered. The bird's voice has been described by many travelers as like the sound of a loud, clear bell, which rings out over the forest at mid-day, when most other birds are silent. Waterton said: "You hear his toll and then a pause for a minute, then another toll, and then a pause again, and then another toll, and so on." Others have compared the sound to a blow upon an anvil, and all agree that it can be heard a great distance. Several other species exist in central and southern South America, all of which have caruncles, and utter extraordinary, ringing notes; but the former belief, that the loud voice was aided by these hollow appendages, is now known to be erroneous. These birds go about in small flocks, which flit through the tree-tops, and feed mainly upon forest fruits. They have been particularly studied by J. J. Quelch, a naturalist of British Guiana, an account of whose interesting investigations will be found in 'The Field' of London, for 26 Nov. 1892.

In Australia, the name "bell-bird" is given to one of the honey-suckers (q.v.), whose ching-ching is welcomed by travelers in the forest as an indication that water is near. The "bell-bird" of New Zealand is another honey-sucker (*Anthornis melanura*), whose voice, usually heard in chorus, resembles the tinkling of a silver bell.

Bell, Book, and Candle, a solemn mode of excommunication, used in the Roman Catholic Church. After the sentence is read, the book is closed, a lighted candle thrown to the ground, and a bell tolled as for one dead. See also Excommunication.

Bell-flower. See Campanula.

Bell, Liberty, the bell in Independence Hall, Philadelphia, that was rung to announce the adoption of the Declaration of Independence by the Continental Congress. The bell was cast in London by Robert Charles, and cost about $500. The specifications provided that it was to be made by the best workmen, to be examined carefully before being shipped, and to contain, in well-shaped letters around it, the inscription: "By order of the Province of Pennsylvania, for the State House in the City of Philadelphia, 1752." An order was given to place underneath this the prophetic words from Leviticus xxv. 10: "Proclaim liberty throughout the land and to all the inhabitants thereof." The reason for the selection of this text has been a subject of much conjecture, but the true reason is apparent when the full text is read. It is as follows: "And ye shall hallow the 50th year and proclaim liberty throughout the land and to all the inhabitants thereof." In selecting the text the Quakers had in memory the arrival of William Penn and their forefathers more than half a century before. In August 1752, the bell arrived, but though in apparent good order, it was cracked by a stroke of the clapper while being tested. It could not be sent back as the captain of the vessel who had brought it over could not take it on board. Two skilful men undertook to recast the bell, a bell being provided which pleased very much. But it was found to be defective also. The original bell was considered too high in tone, and in an attempt to correct this fault, too much copper was added. There were a great many witticisms on account of the sound failure, and the ingenious workmen undertook to recast the bell, which they successfully did, and it was placed in condition in June 1753. On Monday, 8 July (not the 4th), at noon, true to its motto, it rang out the memorable message of "Liberty throughout the land and to all the inhabitants thereof." For years the bell continued to be rung on every festival and anniversary, until it eventually cracked 8 July 1835, while being tolled in memory of Chief Justice Marshall. An ineffectual attempt was made to cause it to continue serviceable by enlarging the cause of its dissonance and chipping the edges. It was removed from its position in the tower to a lower story, and only used on occasions of public sorrow. Subsequently, it was placed on the original timbers in the vestibule of Independence Hall, and in 1873 was suspended in a prominent position immediately beneath where a larger bell, presented to the city in 1866, now proclaims the passing hours. In 1893 it was taken to Chicago and placed on exhibition at the World's Columbian Exposition.

Bell Rock, a dangerous reef of sunken rocks on the east coast of Scotland, about 12 miles from Arbroath, and directly in the way of vessels making for the firths of Forth and Tay. The Inchcape or Bell Rock reef was long the terror of seamen, and on it numerous vessels were wrecked. At a very early period the Inchcape Rock was unhappily too well known, and tradition has it that one of the Abbots of Aberbrothock succeeded in placing a bell upon it (hence the name), in such a way as to be rung by the motion of the waves, to warn sailors of its proximity. The legend tells us that a notorious Dutch sea pirate cut the bell from the rock, and on returning with his ship laden with spoils from one of his piratical expeditions, he and his crew perished, as an old historian has it, "by the righteous judgment of God," for want of the signal which he had so wantonly removed. On this legend Southey has founded his well-known ballad of 'Sir Ralph the Rover.' The lighthouse on the rock was designed by Robert Stevenson in 1800.

Bella, Stefano Della, Italian engraver: b. Florence, 1610; d. 1664. In 1642 he went to Paris, where he was employed by Cardinal

Richelieu. Returning to Florence he became the teacher in drawing of Cosmo, the son of the great duke. It is said that he engraved 1,400 plates.

Belladon'na, or **Dwale, Deadly Nightshade,** (*Atropa Belladonna*), a perennial disagreeable-smelling herb of the natural order *Solanaceæ*; is a native of the region from southern Europe to India, but widely naturalized in civilized countries. It is a low, spreading plant which sometimes attains a height of six feet; has entire, ovate leaves; purple, bell-shaped, nodding axillary flowers, single or in pairs; and shining, black, sweetish berries as large as large currants. The plant has long been reputed poisonous but is used in medicine, especially by oculists, because of its property of dilating the pupil of the eye. It is said to derive its name, belladonna ("beautiful lady"), from its use as a cosmetic for distending the pupil and giving the eye a bright glistening appearance and also from the use of the juice for staining the skin. Its names, deadly night shade, and dwale (which latter is believed by some to come from the same source as the French *deuil,* sorrow, and by others from the Anglo-Saxon dull, because of its stupefying effects), refer to popular belief in the plant's poisonous properties. The generic name came from Atropos, the fate who cut the thread of life.

Belladonna Lily. See AMARYLLIDACEÆ.

Bellaire, bĕl-lār', Ohio, a city in Belmont County, on the Ohio River, and several railroads; five miles south of Wheeling, W. Va. The river is here crossed by a costly iron railroad bridge. Bellaire is the centre of a region rich in coal, iron, cement, brick, clay, and limestone, and has manufactories of stoves, glass, carriages, boilers, and foundry and machine shop products. The city has a national bank, high-grade educational institutions, daily and weekly newspapers, and an assessed property valuation of over $3,000,000. Pop. (1900) 9,912.

Bel'lamont, or **Bellomont, Richard Coote** (EARL OF), royal governor of New York and Massachusetts: b. 1636; d. New York, 5 March 1701. To these offices he was appointed in May 1695, but did not arrive in New York until May 1698. He went from New York to Boston in May 1699, and was received by 20 companies of soldiers and a vast concourse of people. His administration was uneventful, his time having been occupied in the pursuit of the pirates who infested the coast, one of whom, the notorious Kidd, he secured and sent to England in 1700. He was disliked by the aristocratic party in New York, but very popular in New Hampshire and Massachusetts. Hutchinson speaks of Bellamont as being a hypocrite in a pretended devotion to religion. It appears, however, that while living at Fort George, in New York, he passed much time in meditation and contrition for his youthful excesses. He was accompanied to America by his countess. See De Reyster, 'Life and Administration of Richard, Earl of Bellamont' (1869).

Bellamy, Edward, American writer: b. in Chicopee Falls, Mass., 29 March 1850; d. there, 22 May 1898. He was educated in Germany; admitted to the bar; was on the staff of the *Evening Post* of New York in 1871–2; and on his return from the Sandwich Islands in 1877, founded the Springfield *News.* He is best known by his novel 'Looking Backward' (1888), a socialistic work, of which an immense number of copies were sold in two years. This led to the formation of Nationalist clubs, in which work Mr. Bellamy took active part. His other books are 'Six to One: a Nantucket Idyl' (1878); 'Dr. Heidenhoff's Process' (1880); 'Miss Ludington's Sister' (1884); 'Equality' (1897); 'The Duke of Stockbridge' (1901), a sequel to 'Looking Backward.'

Bellamy, Elizabeth Whitfield (CROOM), American novelist, writing under the pseudonym KAMBA THORPE: b. Quincy, Fla., 17 April 1838; d. 1900. She published 'Four Oaks' (1867); 'Little Joanna' (1876); 'Old Man Gilbert' (1888); 'The Luck of the Pendennings.'

Bellamy, George Anne, English actress: b. 1727; d. 1788. She was the natural daughter of Lord Tyrawley, by whom she was educated. Having forfeited his favor by going to live with her mother, she secured an engagement at Covent Garden in 1744, and appeared with Quin as Monimia in 'The Orphan.' Mrs. Bellamy's professional career was brilliant; but her extravagance and profligacy were notorious. In 1785, after many alternations of fortune, a free benefit released her from the debtors' prison, and in the same year she published an 'Apology' for her life.

Bellamy, Jacobus, Flemish poet: b. Flushing, 1757; d. 1786. In 1772 the second secular festival in commemoration of the foundation of the republic was celebrated throughout Holland. His genius, suddenly inflamed by the love of his native land, rendered him a poet, and his first productions met with success. He studied Latin, made himself better acquainted with his mother tongue, and composed several pieces of merit sufficient to induce the Society of Arts at The Hague to incorporate them in its collections. In 1785 he published his patriotic songs under the title 'Vaderlandsche Gezangen,' which secured him a place among the first poets of his nation. Bellamy sung likewise the praise of love. A biographical account of him has been written by G. Kniper.

Bellamy, Joseph, American clergyman and educator: b. North Cheshire, Conn., 20 Feb. 1719; d. 6 March 1790. In 1740 he became pastor of the church in Bethlehem, Conn., where he remained until his death. About 1742 he established a divinity school, in which many celebrated clergymen were trained. Among his published works, besides his 'Sermons,' are 'True Religion Delineated' (1750); 'The Nature and Glory of the Gospel' (1762), and 'The Half-Way Covenant' (1769).

Bellamy, Samuel, a notorious pirate, was wrecked in his ship, the Whidah, of 23 guns and 130 men, off Wellfleet, on Cape Cod, in April 1717, after having captured several vessels on the coast. Only one Indian and one Englishman escaped of his crew. Six of the pirates, who had been run ashore when drunk a few days previous, by the captain of the captured vessel, were hung in Boston in November 1717.

Bellangé, bĕl-läṅ-zhā, **Hippolyte,** French painter: b. Paris 1800; d. 1866. Attention was first directed to him by his painting of 'The Return of Napoleon from Elba,' exhibited in 1834. He was director of the museum at Rouen,

1837–53. Among his many noted battle pieces are 'Battle of Wagram' (1837); 'Kellerman's Charge at Marengo' (1847); 'Battle of the Alma' (1855); 'Assault on Malakoff' (1859); 'The Guard Dies' (1866).

Bellarmino, bĕl-lär-mē'nō, or **Bellarmine, Roberto Francesco Romolo,** Italian cardinal and celebrated controversialist: b. Monte Pulciano in Tuscany, 4 Oct. 1542; d. Rome, 17 Sept. 1621. At the age of 18 he entered the College of Jesuits, where he soon distinguished himself; and his reputation caused him to be sent into the low countries to oppose the progress of the reformers. He was ordained in 1569 by Jansenius, Bishop of Ghent, and placed in the theological chair of the University of Louvain. After a residence of seven years he returned to Italy, and was sent by Sixtus V. to France, as companion to the legate. He was made a cardinal on account of his learning, by Clement VIII., and in 1602 created Archbishop of Capua. At the elections of Leo XI. and Paul V. he was thought of for the pontificate, and might have been chosen had he not been a Jesuit. Paul V. recalled him to Rome, on which he resigned his archbishopric without retaining any pension on it as he might have done. Bellarmino had the double merit with the court of Rome of supporting her temporal power and spiritual supremacy to the utmost, and of strenuously opposing the reformers. The talent he displayed in the latter controversy called forth similar ability on the Protestant side; and for a number of years no eminent divine among the reformers failed to make his arguments a particular subject of refutation. The great work which he composed in this warfare is entitled 'A Body of Controversy,' written in Latin, the style of which is perspicuous and precise, without any pretension to purity or elegance. He displays a vast amount of Scriptural learning, and is deeply versed in the doctrine and practice of the Church in all ages. His maxims on the right of pontiffs to depose princes caused his work on the temporal power of the popes to be condemned at Paris. On the other hand, it did not satisfy the court of Rome, because it asserted, not a direct, but an indirect, power in the popes in temporal matters; which reservation so offended Sixtus V., that he placed it among the list of prohibited books. His society thought so highly of his sanctity, that proofs were collected to entitle him to canonization; but the fear of giving offense to the sovereigns whose rights he oppugned has always prevented a compliance with the ardent wishes of the Jesuits. His controversial works were published at Prague in 1721, and again at Mayence in 1842. Of his other works the most important is his 'Christianæ Doctrinæ Applicatio' (1603) — a work originally composed in Italian, but since translated into all European languages. He left an autobiography, which was re-issued and annotated by Döllinger and Reusch (1887).

Bellary, bĕl-lā'rę, or **Ballari,** a town in India, in the presidency of Madras, capital of a district of the same name, 280 miles northwest of Madras. It is the headquarters of the troops belonging to the districts of Bellary and Kadapah, and possesses two forts, one built on the summit, and the other on a lower eminence of a huge granite rock about two miles in circumference, and rising to the height of about 450 feet from the ground. Bellary is the terminus of a branch line of the Madras Ry., and carries on an active trade in cotton. Pop. (1901) 57,700.

Bellay, bĕ-lā, **Joachim du,** distinguished French poet, known as the French Ovid: b. about 1524; d. 1560. He joined Ronsard, Daurat, Jodelle, Belleau, Baif, and De Tisard in forming the «Pleiad,» a society, the object of which was to bring the French language on a level with the classical tongues. Bellay's first contribution was 'La Défense et Illustration de la Langue Française.' His chief publications in verse are 'Recueil de Poésie'; a collection of love-sonnets called 'L'Olive'; 'Les Antiquités de Rome,' a series of sonnets; 'Les Regrets'; and 'Les Jeux Rustiques.' In 1555 he became canon of Notre Dame, and a short time before his death he was nominated archbishop of Bordeaux. A statue of Bellay was unveiled in Ancenis in 1894. Spencer translated some of his Roman sonnets into English; and there are translations of poems by him in Andrew Lang's 'Ballads and Lyrics of Old France.' See 'Life' by Seche' (1880); Pator, 'Studies in the History of the Rennaissance' (1888).

Belle-Alliance, bĕl-ą-lę-äns, a farm 13 miles south of Brussels, famous as the position occupied by the centre of the French army in the battle of Waterloo, 18 June 1815. By the Prussians the battle was called that of Belle Alliance.

Belle Chocolatière, bĕl-shō-kō-lą-tyār, **La,** a noted portrait by the artist Liotard of the Princess Dietrichstien, who, prior to her marriage, was a waitress in a café in Vienna. The painting is now in the Dresden Gallery.

Belle-Isle, bĕl-ęl, or **Belle-Isle-en-Mer** (anciently VINDILIS), an island in the Bay of Biscay, belonging to France, in the department of Morbihan, eight miles south of Quiberon Point, about 11 miles long, and 6 miles across at the widest point. The soil is diverse, consisting of rock, salt marsh, and fertile grounds. Palais is the capital. The island is of much interest historically. In 1747 the French fleet was defeated by Admiral Hauke off the island, and it was captured by the English in 1761. Pilchard and sardine fishing is the important industry. Pop. 10,000.

Belle-Isle, an island, 15 miles north of Newfoundland and northeast of the Gulf of St. Lawrence, about 21 miles in circuit. On the northwest side it has a small harbor, called Lark Harbor, within a little island close to the shore. At the eastern point it has another small harbor or cove that will only admit fishing shallops. A rescue station has been established for persons who may be shipwrecked. Its area is about 15 square miles. At its southern end is a lighthouse whose light is 470 feet above the sea, and visible for 28 miles. The narrow channel between Newfoundland and the coast of Labrador is called the Straits of Bell-Isle. Steamers from Glasgow and Liverpool to Quebec round the north of Ireland commonly go by this channel in summer as being the shortest route.

Belle Isle, Va., an island in the James River, opposite Richmond, where nearly 12,000 Federal prisoners were confined in 1863.

Belle Jardinère, bĕl-zhär-dę-nyăr', **La,** a celebrated painting by Raphael, now in the Louvre. It represents the Madonna with the holy child, and the infant St. John.

Belle Plaine, Iowa, town in Benton County, on the Iowa River and on several railroads; 257 miles west of Chicago. It has flouring mills, furniture factories, creameries, machine shops, broom factories and numerous artesian wells. It was founded in 1862. Pop. (1900) 3,283.

Belle Savage, an old inn, on Ludgate Hill, London, celebrated in coaching days, and frequently mentioned by Dickens and other writers dealing with that period.

Belleau, bĕ-lō', **Rémy,** French poet: b. Nogent-le-Rotrou, 1528; d. Paris, 16 March 1577. He made an elegant and spirited translation of 'The Odes of Anacreon' (1576). His 'Bergerie' (1572), a compound of prose and verse, is of unequal merit; but it contains some passages,— for example, the «April,» — which are of great beauty.

Bellefontaine, Ohio, a city and county-seat of Logan County; on the Cleveland, C., C. & St. L. R.R.; 57 miles northeast of Dayton. It occupies the highest elevation in the State; and is surrounded by an agricultural region. It has extensive car-shops and other railroad works; two national banks; daily and weekly newspapers; an assessed property valuation of $2,250,000; a total debt of about $200,000. Pop. (1900) 6,649.

Bellefonte, Pa., a borough and county-seat of Centre County, 87 miles northwest of Harrisburg. It has important lime quarries, iron furnaces, glass works, manufactories and machine shops, and was incorporated in 1800. It is a summer resort much visited for its scenery and noted for its spring, whose waters have supplied the borough since 1807. Pop. (1900) 4,216.

Bellegarde, bĕl-gärd, **Henri** (Count de), French writer: b. Piriæ, 30 Aug. 1648; d. Paris, 1707. He was a member of the community of priests of St. Francis de Sales, and the recognized author of the 'Universal History of Voyages' (1707).

Belleisle, bĕl-ēl, **Charles Louis Auguste Fouquet** (Comte de), marshal of France: b. Villefranche, 22 Sept. 1684; d. Versailles, 26 Jan. 1761. He distinguished himself during the famous siege of Lille, and became brigadier in the royal forces. After the conclusion of the war of the Spanish Succession he went with Marshal Villars to Rastadt, where he displayed diplomatic talents. The cession of Lorraine to France in 1735 was principally his work. Cardinal Fleury reposed confidence in him; Louis XV. made him governor of Metz and the three bishoprics of Lorraine, which office he held until his death. Before the breaking out of the war in 1741 he visited the principal courts of Germany with the design of disposing them, after the death of Charles VI., to choose the elector of Bavaria emperor of Germany; and he displayed so much address on this occasion as to excite the admiration of Frederick II. After his return he placed himself at the head of the French forces sent to oppose those of Maria Theresa. He took Prague by assault; but, the king of Prussia having made a separate peace, he was compelled to a retreat which he performed with admirable skill. In December 1744, when on a diplomatic journey to Berlin, he was arrested in Germany and sent to England, but he was exchanged in 1746. In the following year he forced Gen. Browne, who had entered the south of France from Italy, to raise the siege of Antibes and to retreat over the Var. In 1748 the king made him a duke and peer of France, and the department of war was committed to his charge. He reformed the army by abolishing many abuses, enlarged the military academy, and caused an order of merit to be established.

Bellenden, William, Scottish writer: b. Lasswade (?) Midlothian, about 1555; d. about 1633. He was educated at Paris, where he was professor of belles-lettres in 1602; and though he was made master of requests by James I. he still continued to reside in the French metropolis. He was distinguished for the elegance of his Latin style, and in 1608 he published a work entitled 'Ciceronis Princeps,' containing a selection from the works of Cicero, consisting of passages relating to the duties of a prince, etc. He afterward published 'Ciceronis Consul,' 'Senator,' etc., with two other treatises, from one of which Conyers Middleton's 'Life of Cicero' was largely compiled — a plagiarism denounced by Dr. Parr in a Latin preface prefixed to a re-issue of Bellenden's writings (1787).

Bellermann, Ferdinand, German painter: b. Erfurt, 14 March 1814; d. Berlin, 11 Aug. 1889. He was educated at the academy at Weimar, and studied later at Berlin under Karl Blechen and Wilhelm Schirmer. He traveled in Norway, the Netherlands, Venezuela, and Italy, and in 1866 became professor of landscape painting at the Berlin Academy. He utilized the results of his travels in the production of many magnificent landscapes, among which may be mentioned 'Evening in the Valley of Caracas'; the 'Guacharo Cave, Venezuela'; 'Sierra Nevada'; etc.

Bellerophon, bĕl-lĕ'rō-fŏn, son of Glaucus, king of Ephyre, by Eurymede, at first called Hipponous. The murder of his brother, whom some call Alcimenus and Bellerus, procured him the name of Bellerophon, or murderer of Bellerus. After this murder Bellerophon fled to the court of Prœtus, king of Argos, whose wife became enamored of him; and because he slighted her passion she sought to destroy him. He escaped her machinations, was introduced to the court of Jobates, king of Lycia, and, after a number of adventures, in one of which he conquered the Chimæra, he married the daughter of Jobates and succeeded to the throne of Lycia. The latter days of Bellerophon were unfortunate. Attempting to soar to heaven on the back of Pegasus, Zeus sent a hornet which so stung his winged steed that he cast his rider to the earth, where lame and blind he wandered lonely in the Aleïan fields, a prey to corroding grief and melancholy, shunning men, and hated by the gods.

Bellerophon, a genus of gasteropodous mollusks, typical of the family *Bellerophontidæ*. The species are all fossil shells found in the limestones of the Silurian, Devonian, and Carboniferous periods. The best-known American species are found in the coal measures of the Mississippi valley and the southwest. The so-

called *B. cilobatus*, a fossil characteristic of the Trenton formation, is now assigned to the genus *Protowarthia*.

Belles-lettres, bĕl-lĕtr, the French term, for which the English equivalent is polite literature. It is impossible to give a satisfactory explanation of what is or has been called belles-lettres; in fact, the vaguest definition would be the best, as almost every branch of knowledge has at one time been included in, at another excluded from, this denomination. The most correct definition, therefore, would be, perhaps, such as embraced all knowledge and every science not merely abstract or simply useful. In the division of the departments at the Lyceum of Arts, established at Paris in 1792, the belles-lettres comprehended general grammar, languages, rhetoric, geography, history, antiquities, and numismatics; while philosophy, mathematics, etc., were called, in contradistinction, sciences.

Belleval, Pierre Richer de, bĕl-văl, pē-ār rē-chā dé, French botanist: b: Chalons-sur-Marne c. 1564; d. 1623. He was the first person in France who taught botany as a science distinct from medicine. Henry IV. established a botanical garden at Montpellier, and created a chair of botany. Belleval obtained the first appointment in 1593, and immediately began a collection of all the plants in Languedoc, in order to the production of an illustrated flora, for which about 500 quarto plates had been engraved, when he died. Through the carelessness of his representatives, almost all of these were lost.

Belleville, bĕl-vĭl, Canada, town, port of entry, and county-seat of Hastings County, Ontario, on the Bay of Quinte, at the mouth of the Moira River. It is on the Grand Trunk Railway and 60 miles west of Kingston. It has an excellent harbor, and the Moira affords abundant water-power for manufacturing. Belleville is in the heart of the finest dairying region of Canada; is in direct steamboat communication with many Canadian and United States points, and enjoys an extensive trade, especially in lumber. It has 13 churches. It is the seat of Albert College, which has an arts course, music, etc., and was established in 1857. The Ontario Business College, Belleville Business College, Saint Agnes Ladies' School, public and high schools, deaf and dumb institute, and public library are some of its institutions. The chief manufactories are lumber, pottery, cigars, sash and blinds, woolens, shirts, mining tools, machinery, lanterns, and tinware. A short distance east of Belleville are large cement works for the utilization of a limestone which exists in great abundance in the vicinity. The city has agencies for the principal banks of Canada, daily and weekly newspapers, and is the seat of a United States consulate. Pop. (1901) 9,117.

Belleville, Ill., a city and county-seat of Saint Clair County; situated on several rail roads; 14 miles east of Saint Louis, Mo. It is in the midst of very productive coal mines; has a large trade in flour, and general produce; and is chiefly engaged in the manufacture of glass, stoves, flour, nails, and machinery, and has one of the largest rolling mills in the West. The city has trolley lines to Saint Louis, a public library, Saint Peter's Cathedral (Roman Catholic), convent, four national banks, and an assessed property valuation of over $2,250,000. Pop. (1900) 17,484.

Bellevue, Ky., a city on the Ohio River opposite Cincinnati, of which it is practically a suburb. It is almost exclusively a city of residences. Pop. (1900) 6,332.

Bellevue, bĕl-view, Ohio, a village on Lake S. & M. S., Wheeling & L. E., and Nickel P. R.R.'s; situated in Huron and Sandusky counties; about 16 miles south of Sandusky. It has manufactures of agricultural implements, and a large farming trade. Pop. (1900) 4,100.

Bellevue, bĕl-vü (French, "fine prospect"), a name given to various villas and palaces, but particularly to a beautiful country palace in the neighborhood of Paris, situated on a ridge of hills stretching from St. Cloud toward Meudon. It was built by Mme. de Pompadour, commenced in July 1748, and finished in November 1750. The first French artists of the time had exerted all their talents in embellishing it; so that at the period when it was built, it was considered the most charming in all Europe. After the Revolution the Convention decreed that Bellevue should be kept in repair at the expense of the nation, and devoted to public amusements. Nevertheless it was publicly sold during the highest pitch of revolutionary excitement, and the purchaser had it demolished. There is a pretty village on its site, which, during the siege of Paris (1870–1) was an important strategic point.

Bellevue Hospital, New York, a hospital situated on the East River, between 26th and 27th streets. It is the seat of a medical school of high rank, and has accommodations for about 1,300 patients.

Belley, bĕl-lā, France (ancient BELLICA), a town in the department Ain, 39 miles southeast of Bourg, and 38 miles southwest of Geneva; situated in a fertile valley watered by the Furan. It is very ancient, having been a place of note in the time of Julius Cæsar, and is the seat of a bishopric founded in 412. It contains a communal college, has an agricultural society, and a court of primary resort. The episcopal palace, the belfry of the cathedral, the college, and the rich cabinet of medals and antiquities, are worth notice. Silk worms are reared; and lithographic stones, reckoned the best in France, are obtained from quarries in the neighborhood. Pop. (1896) 6,070.

Belli, Giuseppe Gioachino, bĕl'lē, joo-sĕp'pĭ jō-kē'nō, Roman humorist and satirical poet: b. 1791; d. 1863. He wrote in the popular dialect of the Trastevere; and in early life scourged the papacy and the clergy with stinging, irreverent, and often vulgar satire. Becoming afterward a zealous convert to the Roman faith, he endeavored to call in and destroy the indiscretions of his youth. In his last years he published a beautiful translation of the Roman Breviary. His published sonnets amount to more than 2,000; his other published Italian verses fill four considerable volumes; while two thirds of his vast remains have never been gathered and edited. Of this last, much is clothed in language too coarse to bear the light of modern culture.

Belliard, Augustin Daniel, bĕl-yär, ō-goos-tăn dän-vĕl (COUNT DE), French soldier and diplomatist: b. Fontenay-le-Comte, La Vendée, 1769; d. 27 Jan. 1832. He entered the military service very early, and Dumouriez soon made

him an officer of his staff. Under Napoleon, serving in Egypt, Germany, Spain, and Russia, he rose to great military distinction. After the emperor's abdication he received the order of Saint Louis from Louis XVIII. and was made a peer and major-general of the French army.

Bellig'erent, a nation or a large section of a nation engaged in carrying on war. When a revolted party of great numerical strength are able to form a regular government and rule over the whole or part of the territory which they claim, humanity dictates that they should not be treated as rebels guilty of treason, but should, if captured, be regarded as prisoners of war. To attain this result it is needful for those who have risen in arms against the government to make every effort to obtain for their party the position of belligerents. In the contest between the Federals and Confederates in the War of 1861–5, the latter section of the American people, at the very commencement of the struggle, claimed the privileges of belligerents. Their demand was promptly acceded to by the British government, at which the Federal authorities took umbrage, contending that the recognition had been premature, while the British maintained that it could not have been refused or delayed.

Bellingham, Richard, royal governor of Massachusetts: b. 1592; d. 7 Dec. 1672. He emigrated to the colony in 1634; in 1635 was made deputy-governor; and in 1641 was elected governor in opposition to Winthrop by a majority of six votes. He was re-elected in 1654, and after the death of Endicott was chosen again in May 1665, and continued in the executive chair of the colony as long as he lived, having been deputy-governor 13 and governor 10 years. He was chosen major-general in 1664, in which year the king sent Nichols, Cortright, Coon, and Moresick as commissioners to inquire into the state of the colony, when, according to Hutchinson, Bellingham and others obnoxious to James II. were required to go to England to account for their conduct. The general court, however, refused obedience and maintained the authority of the charter. His wife having died, in 1641 he married a second time, of which a contemporary speaks thus: "A young gentleman was about to be contracted to a friend of his, when on a sudden the governor treated with her, and obtained her for himself." The banns were not properly published, and he performed the marriage ceremony himself. He was prosecuted for a violation of the law, but at the trial he refused to leave the bench, sat and tried himself, and thus escaped all punishment. In his last will he provided that after the decease of his wife and of his son by a former wife, and his granddaughter, the bulk of his estate should be spent for the yearly maintenance "of goodly ministers and preachers" of the true Church, which he considered to be that of the Congregationalists. This will the general court set aside on the ground that it interfered with the rights of his family. A sister of his, Anne Hibbens, was executed at Salem in June 1656, during the witchcraft persecution.

Bellingham, Wash., city, county of Whatcom; on the eastern shore of Bellingham Bay, and on the Great Northern, Northern Pacific, Canadian Pacific, and Bellingham Bay & British Columbia R.R.'s.

History.— The first settlement was made in October 1852 by Capt. Henry Roeder, who built a saw-mill on what is now Whatcom Creek. The Lummi tribe of Indians maintained their chief camp on the beach near the mouth and falls of Whatcom Creek, and called the camp or rather the locality "*Whrap-cop,*" meaning "the noisy water" or "the place of the noisy water." The white men retained the Indian name for their town, modified as indicated by the spelling to Whatcom. This remained the name of the town until the consolidation of Whatcom and New Whatcom in 1891 under the name of New Whatcom, from which the prefix "New" was dropped by action of the state legislature 19 Feb. 1901. Fairhaven is the English interpretation of an Indian word or phrase, "*See-see-leechel,*" meaning "a safe harbor" or "the sheltered beach." The town was platted and named in 1883 by Daniel J. Harris, the original donation claimant. In 1890 Fairhaven and the adjoining town of Bellingham were incorporated as one city under the name of Fairhaven. On 27 Oct. 1903, the electors of Fairhaven and Whatcom voted to consolidate the two cities under the name of Bellingham and the consolidation was duly consummated. The new name went into effect 28 Dec. 1903, and the post-office became Bellingham 1 April 1904. Bellingham Bay was named by Vancouver in 1792, and the consolidated city takes its name from that bay.

Industries.— The city is the commercial centre of a large lumber and agricultural region; salmon fishing is also an industry of great importance, and mining and quarrying are carried on in the vicinity. The principal manufacturing establishments include lumber and shingle mills, salmon canneries, wood working and iron working plants, and brick kilns. There are four banks with a combined capital of $405,000.

Churches and Educational Institutions.— There are (in 1904) 27 established churches in Bellingham, representing practically all denominations. There are 11 city schools, including a high school, and two libraries, the Bellingham Bay Library, and the Carnegie Library. The city also contains the State Normal School, and three business colleges.

Government and Population.— The government is vested in a mayor, elected biennially, and a council of seven members, elected alternately every two years. Pop. (Official census 1904), 22,632.

FRANK C. TECK,
Bellingham Chamber of Commerce.

Bellini, Gentile, jĕn-tē'lā, the elder son of Jacopo (q.v.): b. 1421; d. 1501. He became much more distinguished than his father, but did not rival his younger brother, Giovanni. His fame attracted the notice of Mohammed II., conqueror of Constantinople, and Bellini visited the grand seignor, being sent by the Senate. He painted a number of pictures for Mohammed, and also struck a medal for him, with all of which he was greatly pleased, and rewarded the painter by presenting him with a gold chain and 3,000 ducats. A story is told of his exhibiting to Mohammed a picture he had painted of the head of John the Baptist in a charger, and the emperor, who had certainly great experience in decapitation, observing that the muscles of the neck were not correctly drawn, sent for a slave and had his head cut off in the presence of the artist, to convince him

of his mistake. Voltaire ridicules this tale, and Gibbon altogether rejects it. There is a very fine pen-and-ink drawing by Bellini in the British Museum, representing Mohammed and the sultana mother, in whole-length figures in a sitting position. After Gentile's return to Venice, he continued to paint, honored by the patronage of the state and of private individuals, until his death.

Bellini, Giovanni, bĕl-lē′nē, jo-vä-ni, Italian painter: b. 1426; d. Venice, 29 Nov. 1516. He was the second son of Jacopo Bellini (q.v.) and generally regarded as the founder of the Venetian school, though he himself was his father's pupil. Some of his earliest works were portraits, among them that of the doge, Leonardo Loredano, now, with another of his masterpieces, 'Peter Martyr,' in the London National Gallery. Having attracted the notice of the government, he was employed by the republic to decorate the great hall of the council with a series of magnificent paintings, covering the entire walls, and designed to represent the proudest historic glories of Venice. These were worthily accomplished, but were destroyed by a fire. Among his scholars were Giorgione and Titian, and it was from him that these masters acquired their magnificent coloring.

Bellini, Jacopo, yä′cō-pō, Italian painter: b. Venice about 1405; d. 1470. He was a pupil of Gentile da Fabriano, and is said to have been taught oil-painting, which was then a secret, by Andrea dal Castagno, and in turn taught it to his sons Gentile and Giovanni (qq.v.). The first works by which he acquired fame were portraits of Catharine Cornaro, the beautiful queen of Cyprus, and one of her brothers; a picture representing the passion of Christ, in which many figures were introduced, himself among the number; and a historical picture representing a Venetian legend of the miracle of the cross. This cross, containing a piece of the true one on which the Saviour died, was by some accident thrown into the Grand Canal at Venice, and although many persons plunged in after it, it was the will of God that only the guardian of the brotherhood to whom the cross belonged, Andrea Vindramino, could take it out again. This event was represented in the painting. Almost all of Jacopo's works have perished; one supposed to be authentic is in the Manfrini palace at Venice and represents the portraits of Petrarch and Laura.

Bellini, Vincenzo, vĭn-chĕn′zō, Italian composer: b. Catania, Sicily, 1802; d. near Paris, 1835. He was educated at Naples under Zingarelli, commenced writing operas before he was 20, and composed for the principal musical establishments in Europe. His most celebrated works are 'Norma,' 'I Puritani,' and 'La Sonnambula.' He is remarkable chiefly for sweetness of melody, suitableness of harmony, and an adaptation of sound to sense, and stood honorably distinguished from many of his profession by the excellence of his moral character.

Bellinzona, bĕl-ĭn-zō′nä, or **Belleny,** bēl-ā′nē, Switzerland, the capital of the canton of Ticino on the left bank of the Ticino, about five miles from its embouchure in the northern end of Lago Maggiore. It occupies a position of great military importance.

Bellis. See DAISY.

Bellman, Karl Mickel, Swedish poet: b. Stockholm, 1740; d. 1795. He grew up in the quietude of domestic life, and the first proofs he gave of his poetical talents were religious and pious effusions. The dissipated life of young men at Stockholm devoted to pleasure was afterward the subject of his poems. By these his name was spread over all Sweden. Even the attention of Gustavus III. was attracted to him, and he received from the king an appointment which enabled him to devote himself almost entirely to poetical pursuits, in an easy independence, until his death. His songs are truly national, and love and liquor their most common themes.

Bello, Andres, Spanish-American diplomatist and author: b. Caracas, Venezuela, 30 Nov. 1780; d. Santiago, Chile, 15 Oct. 1865. He represented Venezuela in London, 1810–28; in 1829 became an official of the bureau of finance; in 1834 was minister of foreign affairs for Chile; in 1842, the first rector of Santiago University. He was the author of 'Principles of International Law' (1832), and after his death his entire works were printed at the expense of the state.

Belloc′, Hilaire, English litterateur: b. 27 July 1870. He is the son of M. Louis Belloc, a French barrister; was educated at Balliol College, Oxford, after serving for a time in the French artillery at Toul, and in 1906 was elected to Parliament as a Liberal. He has published 'The Bad Child's Book of Beasts' (1896); 'More Beasts for Worse Children' (1897); 'The Modern Traveler' (1898); 'The Moral Alphabet' (1899); 'Danton,' a much-admired biography (1899); 'Lambkins Remains' (1900); 'Paris' (1900); 'Robespierre' (1901); 'The Path to Rome' (1902); 'The Old Road' (1905); etc.

Belloc, Marie Adelaide. See LOWNDES, M.A.

Bellomont, Earl of. See BELLAMONT, RICHARD, EARL OF.

Bel'lomont, Earl of. See COOTE, RICHARD.

Bello'na, the goddess of war, daughter of Phorcys and Ceto. She was called by the Greeks *Enyo,* and is often confounded with Minerva. She was anciently called *Duellona,* and was the sister of Mars, or, according to some, his daughter or his wife. She prepared his chariot when he was going to war, and drove his steeds through the tumult of the battle with a bloody scourge, her hair dishevelled and a torch in her hand. The Romans paid great adoration to her; but she was held in the highest veneration by the Cappadocians, chiefly at Comana, where she had above 3,000 priests. Her temple at Rome was near the Porta Carmentalis. In it the senators gave audience to foreign ambassadors and to generals returned from war. At the gate was a small column, called the "column of war," against which they threw a spear whenever war was declared. The priests of this goddess consecrated themselves by making great incisions in their bodies, and particularly in the thigh, from which they received the blood in their hands to offer as a sacrifice to the goddess. In their wild enthusiasm they often predicted bloodshed and wars, the defeat of enemies, or the besieging of towns.

Bellot, Joseph René, bĕl-lō, zhō-sef rẹ-nā, French naval officer: b. Paris, 1826; d. 1853. At the age of 16 he entered the naval academy at

Brest, and two years afterward received a commission as *élève de marine* on board the Berceau. He was promoted for bravery to the rank of *élève* of the first class, and also created a chevalier of the Legion of Honor, though not yet 20 years old. On his return to France in 1847 he was made a sub-lieutenant, and shortly after a two-years' voyage to South America in the Triomphante he volunteered his services on the Royal Albert schooner, fitted out by Lady Franklin, in June 1851, to search for her husband, Sir John Franklin. The expedition failed in its main object, but an interesting journal of it, kept by Bellot, was published after his death. In June 1853, he sailed again on board the Phœnix, under command of Capt. Inglefield, on a new Arctic expedition, the principal object of which was to convey dispatches to Sir Edward Belcher, then commanding H.M.S. Assistance in the Polar seas. Arrived in Erebus and Terror Bay, where lay the North Star, whose commander, Capt. Pullen, was absent on a journey of discovery, Capt. Inglefield set out in search of him; but in his absence it became desirable to get the despatches conveyed to Sir Edward Belcher — a duty which Lieut. Bellot undertook to perform by crossing the ice. Having set out with four sailors, a canoe, and a sledge, the party got separated in a gale of wind on 18 August, and Bellot, with two others, drifted away on a piece of ice. With the view of ascertaining the direction the ice was taking, he crossed over to the opposite side of the hummock and was never seen more. A handsome granite obelisk was erected to his memory in front of Greenwich Hospital, and a provision was made for his sisters.

Bellot Strait, the passage on the north coast of North America which separates North Somerset from Boothia Felix and connects Prince Regent Inlet with Franklin Channel. Its eastern entrance was discovered in 1852 by Lieut. Bellot (q.v.). After four unsuccessful attempts it was explored for the first time by McClintock on his crowning voyage. It is about 20 miles long, and, at its narrowest part, about one mile wide, running nearly on the parallel of 72°, between granite shores which, everywhere high, rise here and there to 1,500 or 1,600 feet. Through this funnel both the winds and the waters have full play; the latter, permanent currents and flood tides alike, coming from the west. A point on the southern shore, 71° 55′ N., 95° W., is the most northerly point of the North American continent.

Bellotto Bernardo, Italian painter and engraver: b. Venice, 1724; d. Warsaw, 1780. He studied under his uncle, Antonio Canal, and painted perspective and architectural views. He passed much time in Germany and was a member of the Academy of Dresden, where many of his pictures are exhibited. He etched, from his own designs, views of Vienna, Dresden, and Warsaw. His pictures are called by the name of Canaletto, which he assumed.

Bellows, Albert F., American painter: b. Milford, Mass., 20 Nov. 1829; d. 24 Nov. 1883. He was one of the first to succeed with water-colors. He studied in Antwerp, Paris, and England, becoming a National Academician (1861), and an honorary member of the Royal Belgian Water Color Society (1868).

Bellows, Henry Whitney, American Unitarian clergyman and writer: b. Walpole, N. H., 11 June 1814; d. 30 Jan. 1882. He became pastor of All Souls Church, New York, 1839; was chief founder and long editor of the 'Christian Inquirer' (1846); chief originator of the United States Sanitary Commission, and its president during the Civil War (1861–5). He wrote 'Public Life of Washington' (1866); 'Relation of Public Amusements to Public Morality'; 'The Old World in Its New Face' (2 vols. 1868–9), a record of travel in Europe. He was an effective preacher and public speaker.

Bellows, a machine for blowing fire, so formed as, by being dilated and contracted, to inhale air by an orifice which is opened and closed by a valve, and to propel it through a tube upon the fire. The invention of bellows is ascribed to Anacharsis the Scythian, though probably it took place in different countries. The forms of bellows at present are very various, as many attempts have been made for the improvement of this highly important machine, which becomes necessary wherever a powerful flame is required in the arts. As mining was carried on at an early date in Germany, and great heat is required in smelting the ores and working the metals, various new kinds of bellows were invented in that country, one of which consists of an empty box, which moves up and down in another, partially filled with water. Between the bottom of the empty box and the surface of the water is a space filled with air, which is driven out by the descent of the enclosed box. Bellows of very great power are generally called blowing-machines (q.v.). The common Chinese bellows consist of a box of wood about two feet long and one foot square, in which a thick, square piece of board, which exactly fits the internal cavity of the box, is pushed backward and forward. In the bottom of the box, at each end, there is a small conical or plug valve to admit the air, and valves above to discharge it.

Bellows Falls, Vt., a town in Windham County, on the Connecticut River, so called from several rapids and cataracts occurring there. The whole descent is about 44 feet. It was formerly a famous place for spearing salmon. A canal with locks has been cut around the falls, through the solid rock. The scenery is romantic, and various interesting minerals are found in the vicinity. The town contains several mills and manufactories, and is remarkable for its handsome dwellings. Pop. (1900) 4,337.

Bellows-fish. See Globe-fish.

Belloy, Pierre Laurent Buirette de, bĕl-lwä, pē-ār lôr-ŏn bwē-rĕt dė, French dramatist: b. St. Flour, Auvergne, 17 Nov. 1727; d. 5 March 1775. The first French dramatist who successfully introduced native heroes upon the French stage. He was designed by his uncle, a distinguished advocate in the parliament of Paris, who reared him after his father's death, for his own profession, but while he applied himself to the law with reluctance, he showed much genius for the drama. His uncle opposed this taste, and the young man secretly left his house. He next made his appearance as an actor under the name of «Dormont de Belloy.» Belloy had hoped to reconcile his family to him by the success of his first tragedy, 'Titus,' but this hope was disappointed by the failure of the

piece; and the author went to St. Petersburg. He returned to France, where he brought out his tragedy 'Zelmire,' which met with complete success. In 1765 followed his 'Siege of Calais,' a tragedy which produced a great sensation, and is still esteemed, though it owes the applause bestowed on it rather to its subject than to its poetical merit. He received the medal promised by the king to those poets who should produce three successful pieces, and which was awarded on this occasion only, the 'Siege of Calais' being counted as two, it being, in fact, only the second successful piece of Belloy. The city of Calais sent him the freedom of the city in a gold box. Belloy wrote sundry other dramatic pieces, of which 'Gaston and Bayard' procured his reception into the Academy.

Bell's Palsy, named after Sir Charles Bell (q.v.), a palsy of the muscles of the face supplied by the seventh or facial nerve, and due to some peripheral lesion, in distinction to facial palsy of a central, or of a nuclear origin. It may occur on both sides of the face. The causes are many, but exposure to cold, such as sleeping in the open with the wind blowing over the face, or sitting by an open window in a railway train or steamboat, is one of the most frequent causes. It may also occur in a multiple neuritis that is due to poisoning by alcohol, lead, arsenic, or the poison of diphtheria, etc., and in rare instances from fractures of the skull. It comes on suddenly, the patient often waking in the morning to find one side of his face stiff, and in two or three days the palsy has developed. There is a sense of discomfort on the paralyzed side. The patient cannot close one eye completely and cannot manage his food on the affected side. He cannot whistle, and his speech is peculiar. The wrinkles of the paralyzed side are smoothed out and every motion of the facial muscles seems to be an exaggerated one, so that many patients say their face is drawn to one side. The reality being that it is the opposite side that is affected and immovable. The paralysis usually gets well in from three to five months, especially if the treatment is begun early and perseveringly followed out. Some patients never entirely recover, although much improvement takes place in practically all. The treatment is electrical, massage, and general tonics. Particular attention should be paid to the care of the paralyzed eyelid. See also FACIAL PARALYSIS.

Consult: Starr, 'Text-book of Organic Nerve Diseases' (1903).

Belluno, Italy, a northern city, capital of a province of the same name, on the Piave, 48 miles north of Venice. It has a cathedral, a handsome theatre, etc.; and manufactures of silk, straw-plait, leather, etc. Pop. (1897) 18,348.

Bel'mont, August, American banker: b. Alzey, Germany, 1816; d. 24 Nov. 1890. He was educated at Frankfort, and was apprenticed to the Rothschild's banking house in that city when 14 years old. In 1837 he went to Havana to take charge of the firm's interests, and soon afterward was sent to New York, where he established himself in the banking business and as the representative of the Rothschilds. He was consul-general of Austria 1844–50; became charge d' affaires at The Hague in 1853; and was minister-resident there in 1854–8. He was a delegate to the Democratic National Convention in 1860, and when a portion of the delegates withdrew and organized the convention in Baltimore he was active in that body, and through it became chairman of the National Democratic Committee, an office he held till 1872. He was an active worker in the party till 1876, when he closed his political career.

Belmont, August, American banker: b. New York, 18 Feb. 1853; son of the preceding. He was graduated at Harvard University in 1875; at once entered his father's banking house, and on the death of his father became head of the firm of August Belmont & Company, also representing the European banking firm of the Rothschilds. In February 1900 he organized the Rapid Transit Subway Construction Company to back John B. McDonald, who had been awarded the $35,000,000 contract for the construction of a rapid-transit system in New York. The house, under the management of the son, has continued to exert the large influence in the financial and railroad affairs of the city and country that it gained under its founder.

Belmont, Perry, American lawyer: b. New York, 28 Dec. 1851 (son of August Belmont 1816–90). He was graduated at Harvard University in 1872, and at Columbia College Law School in 1876; was admitted to the bar and practised in New York till 1881, when he was elected as a Democrat to Congress and served till 1887, being a member of the Committee on Foreign Affairs, and in that capacity, in his first term in Congress, came into notice by his cross-examination of J. G. Blaine, then ex-secretary of state, as to his relations with a syndicate of American capitalists interested in Peruvian guano. In 1885 he was appointed chairman of the Committee on Foreign Affairs, and in 1888 United States minister to Spain. In 1889 he was commissioner to the Universal Exposition in Paris, and for his services received from the President of France, in 1890, the decoration of commander of the Legion of Honor. He was one of the principals in the rapid-transit contract in New York, in which his brother August (q.v.) was interested

Belmont, Cape Colony, a town midway between Orange River Junction and Kimberley. It was the scene of one of the earliest engagements in the war of 1899–1900, between the Boers and the British under Gen. Lord Methuen. The town was attacked by the British on 23 Nov. 1899, while on the march to the relief of Kimberley, and the battle resulted in a victory for them. Two days later Lord Methuen took Graas Pan, 10 miles north of Belmont, after again defeating the Boers.

Belmont Park, N. Y., a racing field on Long Island, 15 miles from New York city, probably the most magnificent establishment devoted to horse-racing in the world. The park covers an area of 666 acres, laid out in groves and gardens, among which are placed the palatial club buildings and stables.

Belmontet, bĕl-mŏn-tā, **Louis,** French poet and publicist: b. Montauban, 26 March 1799; d. Paris, 14 Oct. 1879. He studied and practised law in Toulouse until involved in difficulties with the magistracy on account of some satirical poems, when he went to Paris and there produced his principal works: 'The Sad Ones'

(1824), a cycle of elegies; 'The Supper of Augustus' (1828); and with Soumet, 'A Festival of Nero' (1829), a tragedy which exceeded 100 performances. In 1830 he edited the *Tribune* newspaper, opposed the accession of Louis Philippe, and predicted his downfall and a second revolution in a bold pamphlet addressed to Chateaubriand, for which he was arrested. In 1839 he established, together with Messrs. Laffitte and Mauguin, a manufactory, in which the men were to share the benefits with the employers. In 1852 he became a member of the legislative assembly. Subsequently he became an ardent partisan of Bonapartism, pleading its cause as a journalist and poetically extolling the Napoleonic dynasty in many enthusiastic odes.

Belodon, an extinct reptile of the Triassic Period, partly intermediate between dinosaurs and crocodiles, but with many archaic characters. The body was protected by bony plates, those on the back interlocking by a peg-and-socket joint. The snout was long and narrow, the external nares behind in contrast to their position in modern crocodiles, where they are at the tip of the snout. The limbs were longer than those of modern crocodiles, but the proportions were otherwise similar. Its remains have been found in the Triassic coal-beds of North Carolina and Pennsylvania, and the red beds (estuarine sediments) of New Mexico, as well as in European strata of corresponding age.

Beloe, William, English clergyman and writer: b. 1756; d. 1817. He was educated at Cambridge, and was presented to the rectory of All-hallows, London Wall, and subsequently to stalls in Lincoln Cathedral and St. Paul's. In 1803 he became keeper of the printed books in the British Museum. His chief publications are, 'Anecdotes of Literature and Scarce Books' (6 vols. 1806–12); a translation of Herodotus with a commentary; and 'The Sexagenarian' (1817).

Beloit', Wis., a city in Rock County, on the Rock River, and the Chicago & N. W. and Chicago, M. & St. P. R.R.'s, 85 miles southwest of Milwaukee and 91 miles west of Chicago. The city derives fine power for manufacturing from the river; and has the second largest wood-working machinery plant in the world, beside manufactories of gas-engines, windmills, iron, paper-mill machinery, plows, paper, rye flour (the oldest mill of its kind in the country), and bicycles. The city is widely known as the seat of Beloit College (q.v.). It was first settled in 1836. Pop. (1905) 12,855.

Beloit College, a co-educational (non-sectarian) institution in Beloit, Wis.; organized in 1847 by the Congregational and Presbyterian Churches; reported at the end of 1905: Professors and instructors, 30; students, 506; volumes in the library, 32,000; grounds and buildings valued at $335,000; productive funds, $420,000; income, $28,000; number of graduates, 869; president, Edward D. Eaton, LL.D.

Bel'omancy, divination by arrows, practised by the ancient Scythians and other nations. One of the numerous modes was as follows: A number of arrows, being marked, were put into a bag or quiver, and drawn out at random; and the marks or words on the arrow drawn determined what was to happen. See Ezek. xxi. 21.

Beloochistan. See Baluchistan.

Belot, bĕ-lō, **Adolphe,** French novelist and dramatist: b. Pointe-à-Patre, 6 Nov. 1829; d. Paris, 17 Dec. 1890. He traveled extensively and settled at Nancy as a lawyer. He won reputation with a witty comedy, 'The Testament of César Girodot' (1859, with Villetard); and, being less successful with his following dramatic efforts, devoted himself to fiction. Of his novels may be mentioned: 'The Venus of Gordes' (1867, with Ernest Daudet); 'The Drama of the Rue de la Paix' (1868); 'Article 47' (1870); all of which were dramatized.

Belper, England, a market town of Derbyshire, on the left bank of the Derwent, over which there is a handsome stone bridge of three arches; seven miles north of Derby, on the Midland Railway. It has three churches, besides other places of worship, a public hall, with reading-rooms, library, etc. There are large cotton-mills, hosiery works, engineering works, and foundries. It is a thriving town and has been very much improved since about 1890. Pop. (1901) 10,920.

Bel'phegor. 1. An arch-demon appointed by Pluto and his council to undertake an earthly marriage, who fled unable to endure female companionship. He has been made the subject of one of La Fontaine's 'Contes,' and also of an English play by Wilson, published in 1691.

2. An English play by Charles Webb, translated and adapted from the French 'Paliasse,' in which the chief character is Belphegor, a mountebank.

3. One of the deities of the Moabites.

Belsham, Thomas, English Unitarian clergyman: b. 1750; d. 1829. He became theological tutor of an academy at Daventry in 1781. At this time he was a Calvinist, but a change of views unfitted him for this situation, and he became tutor of an academy which had been recently established at Hackney. This institution soon failed for want of funds, and Belsham removed first to the Gravel Pit Chapel, which had been occupied by Dr. Priestly, and afterward to Essex Street Chapel, where he officiated for some time as the colleague of Lindsey, and latterly as sole pastor till his death in 1829. His works are chiefly of a controversial nature, and probably attracted attention as much from the celebrity of the works which they attacked as from their own merits. His first appearance in the polemical field was as an opponent of Wilberforce, of whose celebrated 'Practical View of the Prevailing Religious Systems' he published a review. He also published 'Memoirs of Mr. Lindsey,' which was reviewed by the celebrated Robert Hall.

Belsham, William, English writer: d. 1827, aged 75. He published in 1789 'Historical, Political, and Literary Essays' (2 vols. 8vo.); and he subsequently wrote on the test law, the French Revolution, parliamentary reform, and other subjects; but his principal work is a 'History of Great Britain, from the Revolution to the Treaty of Amiens' (1793–1806), 12 vols. 8vo.).

Belshazz'ar, the last of the Chaldæan dynasty who reigned at Babylon. He is supposed to have been the son of the Nabonnedus of Berosus, Labynetus of Herodotus, and Naboandelus of Josephus, and to have been adopted by

his father as joint king some time before the fall of Babylon. He perished 538 B.C. during the successful storming of Babylon by Cyrus. The interesting circumstances which immediately preceded this event, and are recorded at length in the book of Daniel, have repeatedly furnished subjects to painters and poets.

Belt, The Great and **Little,** two straits of Denmark, connecting the Baltic with the Cattegat. The former runs between the islands of Zealand and Funen, and is about 15 miles wide, where it is crossed from Nyborg, in Funen, to Corsoer, in Zealand. The greatest breadth of the strait is 20 miles. The navigation is very dangerous, on account of the many small islands and sandbanks by which the channel is impeded. The Little Belt is between the island of Funen and the coast of Jutland, and the narrowest part of the strait is not more than a mile wide. At this place stands the fortress Fredericia, where tolls were formerly paid. The fortress completely commands the entrance from the Cattegat. The Sound, between Zealand and the Swedish coast, is preferred for all large vessels entering or leaving the Baltic.

Belt, in astronomy, a varying number of dusky, belt-like bands or zones encircling the planet Jupiter parallel to his equator, as if the clouds of his atmosphere had been forced into a series of parallels through the rapidity of his rotation, and the dark body of the planet was seen through the comparatively clear spaces between.

Beltane. See BAAL.

Belton, Texas, a city and county-seat of Bell County, situated on the Leon River, northeast of Austin City, and on the Gulf C. & S. F., and the Missouri, K. & T. R.R.'s. Baylor Female College is located here. It is in a cotton-growing district, near some good building-stone quarries, and has a considerable export trade; its chief manufactories are cotton-mills, a cotton-seed oil-mill, flour-mills, and foundries. Pop. (1900) 3,700.

Beltraffio, bĕl-trăf'yō, or **Boltraffio,** Italian painter: b. Milan, 1467; d. 1516. He was a pupil of Leonardo da Vinci and imitated him in the treatment of his subject and in the use of color. Among his works are several portraits and a 'Madonna of the Casio Family.'

Beltrame, Giovanni, bĕl-tra'mā, jō-vän'nē, Italian philologist and missionary: b. 11 Nov. 1824. In 1854 he was sent in a missionary party to Khartum up the Blue Nile to Fazogl; in 1858 he went with Knoblecher and other missionaries up the White Nile to Gondokoro, whence he made several journeys into a country at that time wholly unknown. He returned to Italy in 1862 and occupied himself principally with researches in the languages of the Nile country. Among other philological works he published a grammar and a dictionary of the Denka speech. He was author also of 'Di un Viaggio sul Fiume Bianco nell' Africa Centrale'; 'Il Sennaar e lo Sciangallah'; 'Il Fiume Bianco e i Denka,' and 'In Palestina.'

Beltrami, Eugenio, bĕl-trä'mē, yoo-jān'yo, Italian mathematician: b. 16 Nov. 1835; d. 18 Feb. 1900. He studied at Pavia. In 1862 he was professor at Bologna, then professor at Pisa, Rome, and Pavia, and in 1891 again at Rome. He was president of the Academy of the Lincei. His work has been chiefly in non-Euclidian geometry; also in electricity, and magnetism. His 'Mathematical Works' (1902), and 'Bibliography of Mathematics' (1901), were published by the University of Rome after his death.

Beltrami, Giovanni, jō-vän-nē, Italian lapidary: b. Cremona, 1779; d. 1854. He was self-educated and at the time of French rule in Italy found a patron in Eugene Beauhamais for whom he made a chain of 16 cameos, illustrating the story of Psyche. Among his other notable works is a reproduction of the 'Last Supper' of Leonardo da Vinci on a topaz.

Beluga, bĕ-loo'gą, an old name, adopted as the name of its genus, of the white whale (q.v.).

Beluga, or **Bielaga,** bē-lä'gą. See STURGEON.

Be'lus, the Roman name of the Assyrian and Babylonian divinity called Bel in Isaiah xlvi. 1.

Belus, a Phœnician river at the base of Mount Carmel. Its fine sand, according to tradition, first led the Phœnicians to the invention of glass.

Belus, Temple of, an enormous temple in ancient Babylon, rebuilt by Nebuchadnezzar about 604 B.C. Its site is thought by some authorities to be the modern Bers-Nimrud, and by others, Babil, both situated near Hillah.

Belvedere, bĕl-vĕ-dēr', or It. bāl-vā-dā'rĕ (It. "*fine sight.*" See BELLEVUE). A name given in Italy to buildings destined for the enjoyment of prospects. The name is also given to small cupolas on houses built for the advantage of fresh air, or of the view which they afford. Many of the buildings in Rome are furnished with such cupolas; yet the term "belvedere" is generally applied only to those on the palaces of the rich. This is the name also of a part of the Vatican where the famous statue of Apollo is placed, which, on this account, is called Apollo Belvedere.

Belvidere, bĕl-vĭ-dēr', Ill., a city and county-seat of Boone County; on the Kishwaukee River, and the Chicago & N. W. R.R.; 78 miles northwest of Chicago. An important farming and dairying trade centre, and contains railroad shops, one of the largest sewing-machine and bicycle works in the country, manufactory of sewing-machine supplies, flour-mills, creamery, and other industries; and has two national banks, several daily and weekly periodicals, and a property valuation of about $2,000,000. Pop. (1900) 6,937.

Belzoni, Giovanni Battista, (JOHN BAPTIST), bĕl-zō'nē, jō-vän' nē bä-tēs'ta, Italian traveler: b. Padua, 1778; d. 3 Dec. 1823. Destined for a monastic life he was educated at Rome, but left the city when it was occupied by the French, and in 1803 went to England, where he acted in Astley's amphitheatre. Here he acquired, besides an acquaintance with the English language, much knowledge of the science of hydraulics, the study of which had been his chief occupation in Rome, and which afterward carried him to Egypt. He left England after a residence of nine years, and took his way through Portugal, Spain, and Malta, to Egypt. There he lived from 1815 to 1819, at first as a dancer, till he won the favor of the pasha.

Belzoni kept the rude inhabitants of the country in awe by his extraordinary stature and strength. He opened the second of the pyramids of Ghizeh, known by the name of Cephrenes. In the year 1816 he succeeded in transporting the bust of Memnon from Thebes to Alexandria, whence it was taken to the British Museum. In 1817 he entered several catacombs near Thebes, especially one in a fine state of preservation in the valley of Biban el Molook, which is considered to be the mausoleum of Psammetichus, and from which he took the splendid alabaster sarcophagus which is now in the British Museum. On 1 August in the same year he opened the temple of Ipsambul, near the second cataract of the Nile, which two Frenchmen, Cailliaud and Drovetti, had discovered the year before, but had not succeeded in opening. Belzoni discovered a subterranean temple in its ruins, which until that time had been unknown. He then visited the coasts of the Red Sea and the city of Berenice, discovering the emerald mines of Zubara and made an expedition into the Oasis of Jupiter Ammon. Belzoni refuted Cailliaud's assertion, that he had found the famous Berenice, the great emporium of Europe and India, by subsequent investigations on the spot, and by the actual discovery of the ruins of that great city four days' journey from the place which Cailliaud had taken for Berenice. Belzoni's 'Narrative of the Operations and Recent Discoveries within the Pryamids, Temples, Tombs, and Excavations in Egypt and Nubia; and of a Journey to the Coast of the Red Sea in Search of Berenice; also of another to the Oasis of Jupiter Ammon' (Lond. 1820); accompanied by a folio volume of 44 copper-plate engravings, was received with general approbation. Padua, his native city, requited his present of two Egyptian statues from Thebes with a medal by Manfredini. In the year 1823 this enterprising traveler had made preparations for passing from Benin to Houssa and Timbuctoo, when he died at Gato, on his way to Benin, 3 Dec. 1823. He believed the Nile and Niger to be different streams, and that the Niger emptied its waters into the Atlantic Ocean; opinions which have long been proved to be correct.

Bel'zu, Manuel Isodoro, mä'noo-el ē-sō-dôr'o, Bolivian revolutionist: b. LaPaz, 1808; d. March 1866. He led the revolutions of 1847 and 1848, and was killed in a street battle there while leading a revolt againt Melgarijo.

Bem, Jozef, a distinguished military commander b. Tarnow, in Galicia, 1795; d. Aleppo, Syria, 1850. He was educated at the University of Cracow, and in 1810 was admitted into the corps of cadets founded at Warsaw by Napoleon, afterward entered the horse artillery, and took part as lieutenant in the expedition of the French army to Russia. For the bravery here displayed by him he received the decoration of the cross of the Legion of Honor. On hearing of the outbreak of the Polish revolution, he at once hurried to Warsaw, and during the whole of the Polish struggle he displayed great gallantry and military skill. On the night of 7 Sept. 1831, he held the bridge of Praga with his artillery, but the following morning, on hearing of the agreement concluded with the Russians, withdrew to Modlin. After the fall of Warsaw he went to Prussia, and in 1832 to Paris, where he was occupied partly with political schemes, partly with scientific pursuits. Upon the commencement of the Austrian insurrection in 1848, Bem proceeded there, and took a prominent part in conducting the defense of Vienna against the imperial troops. Toward the end of the year he received a commission from the new Hungarian government to undertake the conquest of Transylvania, and crossed over into that territory at the head of a large army, raised by his own exertions in an incredibly short space of time. His progress here was marked by great successes, with occasional checks; and in March 1849 he succeeded in driving the Austrians, with their Russian auxiliaries, into Wallachia. He subsequently made an incursion into the Banat, which he compelled Puchner to evacuate. Returning to Transylvania, he found himself opposed by overwhelming numbers, and, after several reverses, returned to Hungary, where he took part in the disastrous battle of Temesvar. Shortly after he went to Turkey, became a convert to Mohammedanism, and received an appointment in the Sultan's army under the name of Amurath Pasha.

Bema (Gr. *bēma,* a stem), the name applied in the Greek Church to the sanctuary because of its position above the rest of the church. The iconostasis or choir screen divides it from the main portion of the church.

Bembato'ka, Bay of, a safe and commodious bay on the northwest coast of Madagascar, lying in lat. 16° S. and lon. 46° E. The river Betsiboka, with the Ikiopa, drain into the bay; the former, about 300 miles long, is navigable for small steamers for about 90 miles. Mojanga, on the north side of the bay, is the second town in the island, with about 14,000 inhabitants, Bembatoka being but a village.

Bemberg, bäṅ-bār, **Henri,** French composer: b. Paris, 1861. Besides songs and pianoforte numbers his principal works are 'Le Baiser de Luzon,' a one-act opera (1888); and 'Elaine,' a four-act opera successfully produced in London 1892, and in New York 1894.

Bembecidæ, bĕm-bĭs'ĭ-dē, a family of wasp-like hymenopterous insects with stings, mostly natives of warm countries, and known also as sand-wasps. The female excavates cells in the sand, in which she deposits, together with her eggs, various larvæ or perfect insects stung into insensibility, as support for her progeny when hatched. The insects are very active, fond of the nectar of flowers, and delight in sunshine. *Bembex* is the typical genus of the family.

Bembo, Pietro, a celebrated Italian scholar: b. Venice, 29 May 1470; d. 18 Jan. 1547. At Ferrara he completed his philosophical studies, and after visiting Rome went, in 1506, to the court of Urbino, at that time one of those Italian courts where the sciences stood highest in esteem. In 1512 he went to Rome, where Pope Leo X. made him his secretary. His many labors arising from his office, as well as his literary pursuits, and perhaps too great an indulgence in pleasure, having impaired his health, he was using the baths of Padua when he was apprised of the death of Leo X. Being by this time possessed of several church benefices, he resolved on withdrawing entirely from business, and on passing his days at Padua occupied only with literature and science, and enjoying the society of his friends. Bembo

collected a considerable library: had a cabinet of medals and antiquities, which at that time passed for one of the richest in Italy, and a fine botanical garden. In the year 1529 the office of historiographer of the republic of Venice was offered to him, which he accepted, declining the salary connected with it. At the same time he was nominated librarian of the library of St. Mark. Pope Paul III., having resolved upon a new promotion of cardinals, from the most distinguished men of his time, conferred on him, in 1539, the hat of a cardinal. From that time Bembo renounced the belles-lettres, and made the Fathers and the Holy Scriptures his chief study. Of his former labors he continued only the 'History of Venice.' Two years later Paul III. bestowed the bishopric of Gubbio on him, and soon after the rich bishopric of Bergamo. A collection of all his works appeared in 1729, at Venice, in four folio volumes.

Bembridge Beds, in geology, a fossiliferous division of the upper Eocene strata, principally developed at Bembridge, in the Isle of Wight, consisting of marls and clays resting on a compact, pale-yellow or cream-colored limestone, called Bembridge limestone. Their most distinctive feature is the mammalian remains of the Palæotherium and the Anoplotherium. The Anita group of Colorado and Wyoming, and the gypsum deposits near Paris, are supposed to belong to the same epoch as the Bembridge beds.

Bementite, a mineral occurring at Franklin Furnace, New Jersey, in radiated-stellate masses. It has a grayish-yellow color and pearly lustre, is soft and has a specific gravity of about 3.0. It is a hydrous silicate of manganese, having the approximate formula of $2MnSiO_3.H_2O$. It was named in honor of C. S. Bement, whose unrivaled private collection of minerals is now in the American Museum of Natural History in New York city.

Bemis, Edward Webster, American economist: b. Springfield, Mass., 7 April 1860. He graduated at Amherst College in 1880; was a pioneer lecturer in the University Extension System, 1887–8; professor of economics and history, Vanderbilt University, 1889–92; and associate professor of economics, University of Chicago, 1892–5. In 1897 he became professor of economical science in the Kansas State Agricultural College. He published 'History of Co-operation in the United States' (1888); 'Municipal Ownership of Gas' (1891); 'Local Government for the South and Southwest' (1893).

Bemis Heights, N. Y., a village in Saratoga County, on the Hudson River, famous as the scene of the first battle of Stillwater, 19 Sept. 1777. See also SARATOGA, BATTLE OF.

Bemmel, Peter von, German painter: b. Nuremberg, 1685; d. 1754. He was educated by his father, also an artist, and was employed by the Prince Bamberg, Franz Konrad von Stadion in adorning the walls of his palaces. Many of his paintings are preserved at Bamberg and Brunswick. Of the Bemmel family 14 were prominent as artists.

Ben (Hebrew, son), a prepositive syllable found in many Jewish names, as Bendavid, Benasser, etc., which, with the Jews in Germany, has been changed into the German sohn (son), for example, Mendelssohn, Jacobssohn, etc. In Arabic the plural form Beni occurs in the names of many tribes, as Beni Omayyah and in those of places, as Beni-Hassan.

Ben, Beinn, or **Bhein,** a Gaelic word signifying mountain, and prefixed to the names of many mountains in Scotland north of the Firths of Clyde and Forth, as Ben Nevis and Ben MacDhui. Pen, which occurs in Welsh and Cornish nomenclature is a corresponding term.

Ben Bolt, a noted poem by Thomas Dunn English (1843) set to an old German air. It had been partially forgotten when it was revived by its effective employment in Du Maurier's 'Trilby.'

Ben Hur: A Tale of the Christ, a popular novel, by Lew Wallace, published 1880. The scene of the story is laid in the East, principally in Jerusalem, just after the Christian era. The first part is introductory, and details the coming of the three wise men, Melchior, Kaspar, and Balthasar, to worship the babe born in the manger at Bethlehem. In the course of the narrative, which involves many exciting adventures of Ben Hur, hero, John the Baptist and Jesus of Nazareth are introduced, and Ben Hur is converted to the Christian faith through the miracles of our Lord. The tale has been successfully dramatized.

Ben-Lawers, a huge pyramidal mountain of Scotland, Perthshire, on the north bank of Loch Tay, 3,984 feet above the level of the sea, or 4,004 with the cairn at the top. Many rare Alpine mosses and other plants are found on it.

Ben-Ledi, a Scottish mountain, lying northwest of Callander, Perthshire, reaching the height of 2,875 feet above sea-level. It is somewhat difficult of ascent, but gives a splendid view. High up on it there is a small loch. It is mentioned in Scott's 'Lady of the Lake.'

Ben-Lomond, a Scottish mountain at the western extremity of Stirlingshire, on the east shore of Loch Lomond. The ascent is divided into three great stages, and the top has an elevation of 3,192 feet above sea-level. On the southeastern side it presents a sheer precipice of about 2,000 feet. From the hotel at Rowardennan, on the east shore of the loch, to the summit, the distance is four miles. The lower part is well wooded, and the upper affords excellent healthy pasture. It commands a most extensive prospect of the vale of Stirlingshire, the Lothians, the Clyde, Ayrshire, Isle of Man, Hills of Antrim, and all the surrounding highland territory. Like Ben-Lawers this is one of the botanical gardens of the highlands.

Ben-More (the great mountain), a conical hill between Loch Dochart and Loch Voil, western part of Perthshire, among the Braes of Balquhidder. It rises to an elevation of 3,843 feet above the level of the sea. Several other hills also bear this name.

Ben-Muich-Dhui, bĕn-măk-doo'e, or **Ben-Mac-Dhui,** the second highest mountain in Scotland, situated in the southwest corner of Aberdeenshire, on the borders of Banffshire. It is a granitic mass, rising to the height of 4,296 feet, and forms one of a cluster of lofty mountains, among which are Brae-riach, Cairntoul, Cairngorm, Ben-a-bourd, and Ben-A'an. Its upper parts are bare of vegetation. The view from the top includes the Moray Firth, the

BENARES, INDIA.

hills of Caithness and Sutherland, Ben Nevis, Benmore, etc.

Ben Nevis, a Scottish mountain now ascertained to be the most lofty height in Great Britain, is situated in the southwestern extremity of Inverness-shire, immediately east of Fort William and the opening of the Caledonian Canal into Loch Eil. It rises from the brink of the latter piece of water to the height of 4,406 feet. In clear weather a view can be obtained from its summit across nearly the whole of the north of Scotland from sea to sea. It consists principally of a fine brown porphyry, and contains red granite of a beautiful grain. It has some very lofty precipices, and in its fissures the snow remains unmelted, even in the warmest weather. An observatory occupied by a resident staff was established on the top of the mountain by the Scottish Meteorological Society in 1883.

Ben Nut. See BEN, OIL OF.

Ben, Oil of, the expressed oil of the ben-nut, the seed of *Moringa aptera,* the ben or horse-radish tree of India. The oil is inodorous, does not become rancid for many years, and is used by perfumers and watchmakers.

Benaiah, bĕ-nā'yą, the name of 12 different persons mentioned in the Bible, the most important being a son of Jehoida, a chief priest. He figures as a mighty and valiant warrior who overcame two Moabite champions, slew an Egyptian giant with the giant's own spear, went down into a dry cistern and slew a lion that had fallen in while it was covered with snow, and killed the rebels Adonijah and Joab. He was made commander-in-chief in Joab's place by Solomon.

Benalcazar, bā-nąl-kä'thär, **Sebastian de,** Spanish leader, the first conqueror of Popayan, New Granada: b. about the end of the 15th century, at Benalcaz, in Estremadura, Spain; d. 1550. He set out as a common sailor in the train of Pedrarias, the newly appointed governor of Darien, 1514. The ability and daring of young Sebastian gained for him the confidence of Pizarro, who sent him against the Indian leader, Ruminahui. Sebastian was favored at the moment of engagement by a happy accident; the volcano of Cochabamba suffered an eruption. The frightened Peruvian army fled to Quito and Sebastian then possessed himself of the smoking ruins of this city. From here he passed northward and conquered the territory possessed by a chief named Popayan, whose name he preserved to designate the territory over which the former had held sway. Inflamed by the speeches of an Indian captive, who spake strange words about a chief farther north, anointed with gold powder, Benalcazar and his band determined to visit and conquer this *El Dorado,* or chief of gold. After traversing vast forests, in 1534, he arrived at the country which afterward received the name of New Granada. Arrived there, he found himself forestalled by two other Spanish adventurers, or conquistadores. He returned to Popayan, and was made governor of this province by a decree dated 1538. When La Gasca succeeded in supplanting Diego Pizarro, he deprived Sebastian of his governorship.

Benares, bĕ-nä'rĕz, a division in the northwestern provinces of India, with an area of 10,414 square miles, largely made up of rich cultivated flats on each side of the Ganges. The heat in summer is excessive, but in winter fires are requisite. Garden stuffs, grain of different kinds, flax for oil, and sugar, are the principal objects of cultivation. Rice, for which many parts of the soil seem well adapted, is seldom grown. Muslins, silks, and gauzes, salt, indigo, and opium, are made very extensively. The principal town is Benares. Pop. (1901) 5,368,600, and the Hindus greatly outnumbering the Mussulmans.

Benares (in Sanskrit, *Vārānasī*), a town in Hindustan, northwest provinces, in the division of the same name, on the left bank of the Ganges, from which it rises like an amphitheatre, presenting a splendid panorama of temples, mosques, palaces, and other buildings, with their domes, minarets, etc. Fine ghauts lead down to the river. It is built of freestone, and contains many handsome and highly decorated houses, but the height of the houses and narrowness of the streets give it all the usual inconveniences of an Asiatic town. Kasi, the Splendid, as the Hindus commonly call it, is one of the most sacred places of pilgrimage in all India, being the headquarters of the Hindu religion. To die at Benares is the greatest happiness for a Hindu, because he is then sure of immediate admission into heaven. The number of pious foundations and temples is exceedingly great. There is a continual influx of wealthy pilgrims into the city, and many of the Hindu princes have a town residence here. The principal temple, called Bisheswar, is dedicated to Siva. Aurungzebe built a splendid mosque on the highest ground in the city, and it is the most prominent object from the river side. At the end of the 17th century an observatory was erected in this city by one of the rajahs, which still exists. One of the temples has a great number of sacred monkeys attached to it. Altogether there are about 1,500 Hindu temples. Among the municipal structures are the government college, hospitals, town-hall, asylums, swimming baths, and waterworks. Benares carries on a large trade in the produce of the district and in English goods, and manufactures silks, shawls, embroidered cloth, jewelry, etc. The merchants and bankers are numerous and wealthy. There are few English inhabitants, except the government officers, and the members of the various missions. Kasi was ceded to the East India Company by the Nabob of Oude in 1775. During the mutiny of 1857 a serious outbreak occurred here. Pop. (1901) 203,100. See Sherring, 'Sacred City of the Hindus' (1869).

Benaventé, bā-nä-vĕn'tā, a town of Spain, in the province of Zamora, on the western bank of the Esla, 34 miles north from Zamora. It is overlooked by a huge, half-ruined castle, and is now a dull and poverty-stricken place, built chiefly of mud cottages. It was here that Moore's retreat commenced, 28 Dec. 1808.

Benbow, John, famous English admiral: b. Shrewsbury, England, 1653; d. Jamaica, 4 Nov. 1702. After serving for some time in the navy he entered the merchant service, and fought so desperately against a pirate from Sallee, in one of his trips to the Mediterranean, about the year 1686, as to beat her off, though greatly his superior in men and metal. He re-entered the navy after the Revolution, and was employed in protecting the English trade in the channel, which he did with great effect. His valor and

activity secured him the confidence of the nation, and he was soon promoted to the rank of rear-admiral, and charged with operations against Dunkirk and the French coasts. In 1698 he was sent to put down the pirates in the West Indies, and not long after returning, he again sailed to the West Indies with a small fleet, having accepted a command previously declined by several of his seniors, from the supposed superiority of the enemy's force in that quarter. In August 1702, he fell in with the French fleet under Du Casse, and for five days maintained a running fight with them, when he at length succeeded in bringing the enemy's sternmost ship to close quarters. In the heat of the action a chain-shot carried away one of his legs, and he was taken below; but the moment the dressing had been applied to the wound he caused himself to be brought again on deck, and continued the action. At this critical instant, being most disgracefully abandoned by several of the captains under his command, who signed a paper expressing their opinion that "nothing more was to be done," the whole fleet effected its escape. Benbow, on his return to Jamaica, brought the delinquents to a court-martial, by which two of them were convicted of cowardice and disobedience of orders, and condemned to be shot; which sentence, on their arrival in England, was carried into execution at Plymouth.

Bench, in law, the seat which judges or magistrates occupy officially in a court of justice; also the judges or magistrates sitting together to try cases. The court of common pleas in England was formerly called *Bancus,* the Bench, as distinguished from *Bancus Regis,* the King's Bench. It was also called *Communis Bancus,* the Common Bench, and this title is still retained by the reporters of the decisions in the court of common pleas. Mention is made in the Magna Charta "*de justiciariis nostris de Banco,*" which all men know to be the justices of the court of common pleas, commonly called the Common Bench, or the Bench. Viner, Abr. Courts (n. 2).

Bench-mark, a mark placed upon some permanent object, as a stone or wall, for use in tidal observations and leveling surveys. Its position above the zero of the tide-gauge or other datum level is made a matter of record and any level once established may be readily ascertained at a future period. See also Leveling.

Bench Warrant, a warrant issued by the court before which an indictment has been found to arrest the accused, that he may appear and find bail for his appearance at the trial. Where a bench warrant is directed to the sheriff it cannot be executed by one having only verbal authority from the sheriff, and such arrest does not discharge the recognizance. A bench warrant is defective which does not direct that the party shall be brought before some judge or justice.

Benchers, in England, senior members of the Inns of Court, who have the entire management of their respective inns, the power of punishing barristers guilty of misconduct, and the right to admit or reject candidates to the bar. See also Inns of Court.

Bencoolen, bĕn-koo'lĕn (Dutch, *Benkoelen*), a seaport of Sumatra, on the southwest coast; lon. 102° 19′ E.; lat. 3° 47′ 36″ S. The English settled here in 1685, and in 1690 the East India Company built a fort here, calling it Fort York. In 1825 Bencoolen was yielded up to the Dutch in exchange for the settlements on the Malay Peninsula. A convenient river on its northwest side conveys pepper out of the inland country; but there is great inconvenience in shipping it, by reason of a dangerous bar at the river's mouth. The place, which is almost two miles in compass, is known at sea by a high, slender mountain, which rises in the country 20 miles beyond it, called the Sugar Loaf. It is inhabited by a mixed population. The medium heat throughout the year is from 81° to 82°. Pepper is the chief produce of the adjacent country, which is mountainous and woody. The place is unhealthy and subject to earthquakes; storms are frequent. Pop. 6,000.

Benczur, bĕn'tsoor, **Gyula (Julius),** Hungarian artist: b. Nyiregyhaza, 1844. He was made professor at the Academy of Munich in 1880 and was subsequently director of the Academy of Budapest. His paintings, which are of the School of Piloty, are noted for their splendid coloring. Among the most celebrated are 'Farewell of Ladislas Hunyady' (1867); 'Arrest of Rákóczy' (1701); 'Louis XV. in the Boudoir of Dubarry'; 'Family of Louis XVI. during the Assault on Versailles' (1872), owned by D. O. Mills, New York; 'Baptism of St. Stephen' (1875); 'Bacchanti' (1881); 'The Reconquest' of Buda by Charles of Lorraine' (1888).

Bend, in heraldry, one of the nine honorable ordinaries, containing a third part of the field when charged, and a fifth when plain, made by two lines drawn diagonally across the shield from the dexter chief to the sinister base point. The bend sinister differs only by crossing in the opposite direction, diagonally from the sinister chief to the dexter base. It indicates illegitimacy.

Ben'da, Franz, German violinist: b. Jungbunzlau, Bohemia, 1709; d. Potsdam, 1786. He exhibited, while a boy, a great desire to learn the violin, which he could gratify in no other way than by joining a band of strolling musicians. He found means, however, to acquire an extraordinary mastery of the instrument, and in 1732 entered the service of Frederick the Great, then prince-royal, with whom he remained the rest of his long life. He founded a school of violinists, whose method of playing was entirely original and quite effective. He also published some excellent solos for the violin.

Benda, Georg, German musician, the most distinguished of a notable musical family: b. Jungbunzlau, Bohemia, 1721; d. Köstriz, 1795. He was bandmaster to the Duke of Gotha (1748–87), and in this period produced several operas and cantatas, such as 'Ariadne auf Naxos' and 'Medea.'

Bendalou, Paul, a soldier of the American Revolutionary army: b. Montauban, France, 15 Aug. 1755; d. Baltimore, Maryland, 10 Dec. 1826. In October 1776 he embarked at Bordeaux for the United States, as a volunteer in the cause of liberty, and, on reaching the headquarters of Washington, received a lieutenant's commission. Transferred to the command of

Pulaski, he was captain of the first company in his famous legion at the siege of Savannah. There he carried off the field the body of the generous Pole, and preserved, also, the standard of the legion, which had been wrought and presented by the wives and daughters of Maryland. He was quartermaster-general, with the rank of colonel, in the Maryland militia during the War of 1812, and for many years United States marshal for the circuit and district courts of Maryland, his official conduct, from first to last, being marked with exactness and integrity.

Bendemann, bĕn'dĕ-man, **Eduard,** German painter: b. Berlin, 3 Dec. 1811; d. Düsseldorf, 27 Dec. 1889. As early as 1832 his great picture of the 'Captive Jews' was exhibited at Berlin, and in 1837 he gained the gold medal at Paris. In 1838 he was appointed professor of the Academy of Art at Dresden. Here he was intrusted with the execution of the larger frescoes in the palace, and on these his fame chiefly depends. In 1858 he succeeded his father-in-law as director of the Düsseldorf Academy, a post which he held until 1867. He afterward produced several large canvases and frescoes, some of which are among his best works. Tytler, 'Modern Painters and their Paintings' (1899).

Bender, Louis Prosper, Canadian-American physician and author: b. Quebec, 30 July 1844. He graduated at McGill University in 1865, after having interrupted his studies by a service in the medical department of the Union army during a portion of the American Civil War. In 1884 he settled in Boston, Mass., where he established himself in homœopathic practice. His writings include 'Literary Sheaves,' or 'La Litterature au Canada-Français' (1881); 'Old and New Canada, 1753–1844,' 'Historic Scenes and Social Pictures, or the Life of Joseph François Perrault' (1882), etc. He has frequently contributed to American magazines.

Bender, a city of Russia, in the government of Bessarabia. It is situated on the Dniester, and is a straggling place, chiefly consisting of low houses and mere huts. It formerly possessed a strong fortress, but this was dismantled in 1897. Its commerce is important. After being several times taken from the Turks by the Russians, it has belonged to Russia since the Peace of Bucharest, in 1812. Pop. (1897) 32,934.

Bendigo, formerly SANDHURST, Australia, a city in Bendigo County, Victoria, on Bendigo Creek, fully 100 miles north-northwest of Melbourne, with which it has direct railway communication. It is one of the chief cities in the colony and an important railway centre. Along one side of its main street (Pall Mall) there are fine buildings of brick and stone, and facing these, in Rosalind Park, are the elegant government buildings and the law courts, which together cost nearly £80,000. Other buildings worthy of mention are the handsome town-hall, mechanics' institute, with library and school of mines; free library; temperance, masonic, and other halls; hospital, benevolent asylum; some fine banks; Anglican, Wesleyan, Presbyterian, and other churches; Roman Catholic Cathedral, in course of erection; art gallery, jail, state and other schools, etc. The public parks comprise, besides the Rosalind Park, the fine Botanic Gardens and two others largely used for sports. The streets are lighted by gas and electricity, and there is an excellent water-supply from large reservoirs near the town. The chief industry of the district is gold-mining, which gives employment to 5,000 miners. Other important industries are brewing, iron-founding, stone-cutting, granite-polishing, tanning, and the manufacture of pottery, bricks, tiles, cordials, etc. Agriculture and viti-culture are carried on in the district, and there is a trade in wine and fruits. Bendigo was founded at the time of the gold discovery in 1851. Nearly £70,000,000 worth of gold has been obtained here, much of it from quartz reefs. Pop. (1901) 31,020. See Mackay, 'History of Bendigo' (1901).

Bendire, bĕn-dē'rę, **Charles Emil,** German-American military officer and ornithologist: b. Darmstadt, Germany, 27 April 1836; d. 1897. He came to the United States in 1852, and entering the army in 1854, served through the Civil War, becoming a captain in the 1st Cavalry. After the war he was transferred to the West, and was retired 24 April 1886. During his stay in the West he applied himself to the study of ornithology, and collected a vast amount of material in various branches of natural history. In 1870 he began to collect the eggs of North American birds, which finally numbered more than 8,000 specimens, and this collection he presented to the United States National Museum. He is the author of 'The Life Histories of North American Birds, with Special Reference to their Breeding Habits and Eggs.'

Bendzin, bĕnd'zen, the capital of a district in Russian Poland, in the government of Piotrkow, situated on the Black Przemsza, on a branch of the Warsaw & Vienna R.R. Its chief industry is the zinc works, under government control; there are also coal mines in the vicinity. Pop. 21,200.

Bene, bĕn'e, the plant that furnishes oil of sesamum.

Ben'edek, Ludwig von, Austrian military officer: b. Odenburg, Hungary, 14 July 1804; d. Gratz, 27 April 1881. He fought against the Italians in 1848, and afterward against the Hungarian patriots. He distinguished himself at Solferino in the campaign of 1859; and in the war with Prussia in 1866 commanded the Austrian army till after his defeat at Sadowa, when he was superseded.

Benedetti, bā-nĕ-dĕt'te, **Vincent** (COUNT DE), French diplomatist of Italian extraction: b. Bastia, Corsica, 29 April 1817; d. Paris, 28 March 1900. He was educated for public service, held consulates in Cairo, Palermo, Malta, and Tunis; and as secretary of the Congress of Paris in 1856, drew up the protocols of the treaty then agreed upon. In 1861 he was appointed ambassador to Italy, and in 1864 to Prussia. In 1870 great excitement was aroused throughout Europe by the publication in the London *Times* of the alleged draft of a secret treaty between France and Prussia. The authenticity of the document was not denied. The French government declared that although Benedetti had written the document, he had done so at the dictation of Bismarck. At the same time Benedetti was under orders to protest against the candidature of Prince Leopold of the house of Hohenzollern for the crown of Spain. He became so importunate in trying to carry out these orders that he was forbidden to seek further interviews with King William. The refusal of

the king to again receive Benedetti gave great offense in France, and was made a pretext for declaring war within a few days. After the fall of the empire, Benedetti withdrew from public life. In 1871 he published a pamphlet charging Bismarck with the whole responsibility of the secret treaty, to which the latter made a vigorous reply. Benedetti was author of 'Ma Mission en Prusse' (1871); and 'Studies in Diplomacy,' an English translation of which appeared in 1895.

Benedetto, da Majano, Italian architect and sculptor: b. Florence in 1442; d. there, 1498. He began his career as a worker in wooden mosaic, and with his brothers, Giovanni and Giuliana, he executed the 'Madonna dell Ulivo.' His own work, represented in the 'Madonna,' far excels the work of his brothers. His most celebrated work as an architect was the Palazzo Strozzi, began in 1489. In 1490, he carved the busts of Giotto and Squarcilupo, in the Duomo at Florence. In 1491, the monument to Filippo Strozzi was erected in Santa Maria Novella, a work which Strozzi had commissioned Benedetto to make before his death. It is the *chef-d'œuvre* of the sculptor, and one of the most notable sculptures of the 15th century.

Benedicite, bĕn-ę-dĭs'ĭ-tę, the song of the 'Three Children' in the fiery furnace, as given in the Apocrypha and the Septuagint version of Daniel, which is a part of the Roman Breviary in the office of lauds; it is also a part of the Anglican morning prayer, to be used when the Te Deum is not sung, usually from Septuagesima to Easter and during Advent.

Benedick, sometimes spelled **Benedict,** a married man; from the Latin *benedictus* (a happy man), and a skit on the order of St. Benedict, famous for their ascetic habits, and, of course, rigidly bound to celibacy. Shakespeare, in 'Much Ado About Nothing,' avails himself of this joke in making Benedick, the young lord of Padua, "rail against marriage," but afterward marry Beatrice, with whom he falls in love.

Benedict, Saint, the founder of the first religious order in the West: b. Norcia, Italy, 480; d. 21 March 543. In the 14th year of his age he retired to a cavern situated in the desert of Subiaco, 40 miles from Rome, and in 515 drew up a rule for his monks, which was first introduced into the monastery on Monte Cassino, in the neighborhood of Naples, founded by him (529) in a grove of Apollo after the temple had been demolished. This gradually became the rule of all the western monks. The abbots of Monte Cassino afterward acquired episcopal jurisdiction, and a certain patriarchal authority over the whole order. Benedict, with the intention of banishing idleness, prescribed, in addition to the work of God (as he called prayer and the reading of religious writings), the instruction of youth in reading, writing, and ciphering, in the doctrines of Christianity, in manual labors (including mechanic arts of every kind), and in the management of the monastery. With regard to dress and food, the rule was severe but not extravagant. Benedict caused a library to be founded, for which the aged and infirm brethren (*ordo scriptorius*) were obliged to copy manuscripts. By this means he contributed to preserve the literary remains of antiquity from ruin; for though he had in view only the copying of religious writings, yet the practice was afterward extended to classical works of every kind; and the learned world is indebted for the preservation of great literary treasures to the order of St. Benedict.

Bibliography.— Wölfflr, 'B. von Nursia und seine Mönchsregel' (1895); Henderson, 'Historical Documents of the Middle Ages,' pp. 274–314 (1892); 'Die historische Voraussetzungen der Regel des heiliges Benedict von Nursia' (1895); Doyle, 'Teachings of Saint Benedict' (1887). See BENEDICTINES.

Benedict, the name of fourteen Popes.

Benedict I., succeeded John III. 575; d. 578, and was himself succeeded by Pelagius II.

Benedict II., succeeded Leo II. 684: d. 685, and was succeeded by John V.

Benedict III., succeeded Leo IV. 855. During his pontificate, the Saracens were ravaging Apulia and Campania. D. 858, and was succeeded by Nicholas I.

Benedict IV., succeeded John IX. about 900. He crowned Louis, son of Boson, king of Italy. D. 903, and was succeeded by Leo. V.

Benedict V., succeeded John XII. 964, and was appointed by the Romans in opposition to Leo VIII. The Emperor Otho, supporter of Leo, appeared before Rome with an army, reduced the city to famine, and a new assembly of the clergy declared to be null the election of Benedict, who was exiled. D. 965.

Benedict VI., succeeded John XIII. 972. After the death of the Emperor Otho I., the Romans imprisoned Benedict, who was strangled in the castle of St. Angelo, in 974. Owing to the mistake of later chroniclers in confusing Dominus Papa with a supposed proper name, Donus II. appears in many lists of the Popes between Benedict VI. and Benedict VII. Geisebrecht, in his 'Year-Book of the German Kingdom under Otho II.,' has clearly shown that no such Pope as Donus II. ever existed.

Benedict VII., of the family of Conti, elected in 975. During his pontificate, the Emperor Otho II. came repeatedly to Rome, where he died in 984. Benedict died about the same time, and was succeeded by John XIV.

Benedict VIII., of the same family, succeeded Sergius IV., in 1012. In 1016, the Saracens from Sardinia having landed on the coast of Tuscany, Benedict attacked and defeated them. He crowned the Emperor Henry II., and his wife, in the Church of St. Peter. D. 1024, and was succeeded by his brother, John XIX.

Benedict IX., a relative of the two preceding Popes, succeeded John XIX. in 1034. He was then very young, some say only 18 years old. He was deposed in 1048, and died in a convent in 1054, being succeeded by Leo IX.

Benedict X. was elected by a faction after the death of Stephen IX., in 1058; but the Council of Siena nominated Nicholas II. Benedict did not submit till the following year, when Nicholas came into Rome. D. 1059.

Benedict XI., a Dominican, succeeded Boniface VIII., in 1303. Contemporary historians speak highly of his character and virtues. He died 1304, and was succeeded by Clement V.

Benedict XII., Jacques Fournier, a native of France, succeeded John XXII., in 1334, the Popes residing then at Avignon. He put a stop to many abuses in the distribution of ecclesiastical patronage, enforced discipline among the monastic orders, and insisted that temporal rulers should observe their compacts with the Holy See. D. 1342, and was succeeded by Clement VI.

Benedict XIII., Cardinal Orsini, succeeded Innocent XIII., in 1724, but it was with difficulty that he coud be made to accept the pontificate. Benedict lived with the greatest frugality, and has been called more a monk than a Pope. He managed, however, to transact an extraordinary number of affairs. His great fault was his implicit confidence in Cardinal Coscia, who much abused it. D. February 1731. His works were published in 1728, in three volumes folio. He was succeeded by Clement XII.

Benedict XIV., Prospero Lambertini: b. Bologna, 1675; d. 3 May 1758. He applied himself with success to the canon and civil law, and became advocate to the consistory at Rome. Afterward he was appointed *promotor fidei,* and wrote a valuable work on the 'Ceremonies used in Beatifications' (1734). He was passionately fond of learning, of historical researches, and monuments of art, and also associated with the distinguished men of his time; among others with Father Montfaucon, who said of him, "Benedict has two souls; one for science and the other for society." He also made himself familiar with the best poetical works, whereby his mind became elevated and his style animated. Benedict XIII. made him, in 1727, bishop of Ancona; in 1728 cardinal, and in 1732 archbishop of Bologna. In every station he displayed great talents, and fulfilled his duties with the most conscientious zeal. He opposed fanaticism even at the risk of his own safety, defended the oppressed, and expressed himself with the greatest frankness to Clement XII. without losing his favor. When, after the death of Clement XII. in 1740, the election of a new Pope in the conclave was retarded by the intrigues of Cardinal Tencin, and the cardinals could not agree, Lambertini, with his usual good nature, said to them, "If you want a saint, take Gotti; if a politician, Aldobrandi; if a good old man, myself." These words, thrown out in a humorous manner, operated on the conclave like inspiration, and Lambertini, under the name of Benedict XIV., ascended the papal throne. His choice of the ministers and friends whom he assembled around him does the greatest honor to his judgment. The condition of the Church and of the Roman court had not escaped his penetration. Since the Reformation princes no longer trembled at the thunders of the Vatican. The power of the Popes in temporal affairs had notably declined, and Lambertini knew that respect for the papal authority could be maintained only by a wise moderation. He constantly regulated his measures by this principle, and thus succeeded, even in difficult circumstances, in satisfying not only the Catholic but even the Protestant princes. The sciences were a special object of his care. He established academies at Rome; promoted the prosperity of the academy at Bologna; caused a degree of the meridian to be measured; the obelisk to be erected in the Campus Martius; the Church of St. Marcellino to be built after a plan projected by himself; the beautiful pictures in St. Peter's to be executed in mosaic; the best English and French works to be translated into Italian; and commanded a catalogue of the manuscripts contained in the Vatican library (the number of which he had enlarged to 3,300) to be printed. His government of the papal states did equal honor to his wisdom. He enacted severe laws against usury, favored commercial liberty, and diminished the number of holidays. His piety was sincere, yet enlightened and forbearing. He strove to maintain purity of doctrine and of morals, giving in his own character the most praiseworthy example. The sole reproach brought against him by the Romans was that he wrote too much and governed too little. His works compose, in the Venice edition, 16 volumes folio. The most important of his works is that on the Synods, in which we recognize the great canonist.

Benedict Biscop, Anglo-Saxon ecclesiastic: b. of a noble Northumbrian family in 628 or 629; d. Wearmouth, 12 Jan. 690. He spent the first years of his life at court, but at the age of 25 he relinquished this manner of life and accompanied Wilfrid on a pilgrimage to Rome in 653. Here he lived for more than 10 years, when he returned to England; but not very long after again went to Rome, on a mission intrusted to him by Alchfrid, king of Northumbria. On his way back he stopped at Lerins in Provence, where he remained for the next two years, making himself acquainted with the rules of monastic life in the monastery of Lerins, of which he had become a member. In 668 he made a third journey to Rome, where he arrived just at the time when the Pope was about to appoint some one to fill the see of Canterbury, which was then vacant. Having fixed upon Theodore, a Cilician monk, he requested Benedict to accompany him to England to assist him in securing the favor of the Anglo-Saxons, which as a foreigner he might have difficulty in doing. Benedict agreed to do this, and was presented with the abbacy of St. Peter's in Canterbury; but at the end of two years he resigned the abbacy and again went to Rome. On this occasion he returned to England with a valuable collection of books and a large number of relics, which he had accumulated during his previous visits to Rome. With these he proceded first to Wessex with the intention of remaining there, but finding that the king of Wessex was dead he turned northward to his native Northumbria, and there he was fortunate enough to secure the favor of King Egfrid. From him he received a donation of land at the mouth of the Wear, on which he founded the monastery of Wearmouth. In 678 he made his fourth journey to Rome, and brought back additional stores of books for his library, as well as pictures, images, glass for windows, etc., with which he decorated the monastery he had founded. He was now presented by Egfrid with a further grant of land on the other side of the Wear, where he founded another monastery, that of Jarrow, dependent on the monastery at Wearmouth. During the remainder of his life he continued to live in the latter monastery, except on the occasion of a fifth voyage to Rome, made in 685, and from which he derived as before valuable additions to his various collections. It is chiefly by these collections that his services to learning are to be

estimated, and there can be no doubt that his great pupil, the "Venerable Bede," who was a monk in the monastery of Jarrow, was immensely indebted to them for the learning he acquired.

Benedict, David, American Baptist clergyman and historian: b. Norwalk, Conn., 10 Oct. 1779; d. 1874. He was pastor at Pawtucket, R. I., for 25 years, and preached till over 90 years of age. Among his chief works were 'History of All Religions'; 'Fifty Years Among the Baptists,' 'History of the Donatists.'

Benedict, Frank Lee, American novelist: b. Alexander, N. Y., 6 July 1834. Among his numerous novels are 'John Worthington's Name'; 'Miss Van Kortland' (1870); 'Her Friend Lawrence' (1879); 'The Price She Paid' (1883). A collection of his verses 'The Shadow Worshipper and Other Poems' appeared in 1857.

Benedict, Sir Julius, German-English pianist and composer: b. Stuttgart, 1804; d. London, 1885. In 1821 he went to Dresden to study under Weber, and two years later became conductor at a Vienna theatre. His first opera, 'Giacinta ed Ernesto,' was produced in Naples in 1829 without success. He took up his residence in England in 1835, and was knighted in 1871. He was for many years conductor at the Norwich festival, and during a number of seasons acted as operatic conductor in London, both for English and Italian opera. His principal works are the operas, 'The Gipsy's Warning' (1838); 'The Bride of Venice' (1843), 'The Crusaders' (1846); 'The Lily of Killarney' (1862), founded on Boucicault's 'Colleen Bawn,' and 'The Bride of Song' (1864); the cantatas, 'Undine' (1860) and 'St. Cecilia' (1866); the fine oratorio 'St. Peter' (1870); and the cantata 'Graziella' (1882).

Benedict-Beuern, bĕ'nĕ-dĭkt-boi'ĕrn, formerly an abbey situated in the Bavarian circle of the Iser, about 40 miles distant from the city of Munich, on the descent of the mountains toward the Tyrol. The convent was founded as early as 740, and was abolished in 1803. The fine abbey church still remains. The Bavarian government has here a depot for army horses, and a veterinary establishment; and there is also a residence for invalids.

Benedic'tine, a liqueur originally prepared by the Benedictine monks of the abbey of Fécamp, in Normandy, consisting of spirit (fine brandy) containing an infusion of the juices of plants, and said to possess digestive, antispasmodic, and other virtues, and to have prophylactic efficacy in epidemics. It somewhat resembles chartreuse and has been made in the same way since 1510. See LIQUEUR.

Benedictines. From the 6th to the 10th century almost all the monks in the West might be so called, because they followed the rule of St. Benedict of Norcia. The rules which at that time the monasteries in Spain and France received from their bishops, as well as the rule of the Irish St. Columba, were essentially the same as those of St. Benedict; and in the progress of his order the monasteries in Spain and France, as well as those of the order of Columba, united themselves with it. Monte Cassino, the magnificent primitive monastery of the Benedictines, became the model of all others. At that time the monasteries, having no common superiors, were under the immediate control of the bishops in their respective dioceses, and differed from one another in many qualifications of the primitive rule. Not even the color of their dress was the same. The disciples of Columba wore white garments like the first Benedictine nuns, who originated in France in the 6th century. After the unions which took place at a later period, all the members of this order wore black, as the founder is said to have done. The decline of monastic discipline after the 8th century occasioned the reforms of Benedict of Aniana in France, the renewed inculcation of the old rule, and the adoption of new ordinances suited to the times, by the Council of Aix-la-Chapelle (817), as well as the particular rules and fraternities of the celebrated monasteries in France, Germany, and England, which in those barbarous times became seats of civilization and finally the institution of the Cluniacs, a new branch of the Benedictines, which proceeded from the convent of Clugny in Burgundy, founded in the year 910. The Benedictine monasteries, in the Middle Ages, were often asylums in which science took refuge and found protection. In place of the discordant and uncertain rules which had hitherto existed, the Cluniacs made fixed regulations concerning the hours of worship, the obedience, discipline, and common government of all the monasteries belonging to their order, which were soon imitated in all Europe. In the 12th century their order contained 2,000 monasteries, whose luxury frequently called for reforms, and finally became the chief cause of their decline. The remains of the Cluniacs united themselves in the 17th century, under the patronage of Richelieu, with the Benedictine fraternities of St. Vannes and St. Maurus, the latter of which, founded in 1618, had in the beginning of the 18th century 180 abbevs and priories in France, and acquired by means of its learned members, such as Mabillon, Montfaucon, and Martène, merited distinction. To this family belong those new orders established on the foundation and observing the rule of St. Benedict, which have originated since the 11th century, and are distinguished from the proper Benedictines by their dress, names, and particular regulations; for example, the Camaldulians, the monks of Vallombrosa, the Sylvestrians, the Grandimontenses, the Carthusians, the Cœlestines, the Cistercians, and Bernardines, the Trappists, and the monks of Fontevraud. The Benedictine monasteries never constituted one society, constitutionally regulated and governed under an aristocratical or monarchical form; on the contrary, a great many monasteries which descended from the old Benedictines were compelled by the Council of Trent to unite themselves gradually into particular fraternities. Among these the Benedictines of Monte Cassino, of Monte Vergine, and Monte Oliveto (who called themselves *Olivetans*) in Italy and Sicily; those of Valladolid and Montserrat in Spain; those of Hirschau and Fulda in Germany, and that of Mölk in Austria, deserve particular notice on account of the extent of their possessions, the magnificence of their churches, and the mildness of their rules. To the fraternity of Mölk (or Melk), which still exists, but accommodated to the spirit of the times, the rest of the Benedictine convents in Austria are joined. Many of the nunneries of this order are reserved for the

nobility, because the places in them are equal to the most lucrative benefices. During the first French revolution the monasteries of the Benedictines along with all other monastic orders were abolished; but the Benedictines have since partially re-established themselves in France. In England the Benedictines were an important body at the dissolution of the monasteries, having then 186 abbeys, priories, and nunneries, besides many smaller houses. At present there are eight Benedictine abbeys in England, besides an extensive establishment at Fort Augustus in Scotland, comprising an abbey and college. In the United States there are 13 abbots, 545 priests, 133 clerics, and 345 lay brothers in the order. The Benedictines have charge of 16 colleges in the United States.

Bibliography.—Chateaubriand, 'Monks of the West'; Taunton, 'English Black Monks of Saint Benedict'; Digby, 'Ages of Faith.'

Benediction, the act of blessing, of wishing to a person or thing the grace of God. It has always existed as a custom among Jews and Christians. The Jewish priests bestowed benedictions upon the people when they remained obedient to the law, and maledictions when they neglected it. In the Catholic Church the term is generally applied to the religious public service at which the priest makes the sign of the cross over the congregation with the ostensorium containing the consecrated Host. The Anglo-Saxon term "blessing" is now commonly used to express the benediction invoked with prayer, sign of the cross, and holy water upon religious articles such as prayer-books, holy pictures, rosary-beads, etc. In Protestant churches the benediction is usually given in words similar to those prescribed by Moses to Aaron. It is often accompanied with laying on of hands, especially in the celebration of marriages, the ordination of pastors, the confirmation of converts, and the baptism of children.

Benedic'tus, the song of Zacharias used in the Roman breviary at lauds and also in the Anglican morning service.

Benedix, bā'nĕ-dĭks, **Roderich,** German playwright and actor: b. Leipsic, 21 Jan. 1811; d. 26 Sept. 1873. In 1831, he became an actor, and in 1838 staged his first play 'Das Bemuste Haupt.' He was connected with the management of several theatres at Cologne and Frankfort-on-the-Main. Among his plays are 'Dr. Wespe'; 'Die Hochzeitreise'; 'Die Männerfeinde'; 'Der Liebesbrief'; 'Der Prozess'; and 'Die Sonntagsjäger.' His dramatic works were collected and published at Leipsic in 27 volumes. He has written also concerning German folklore.

Benefice (Lat. *beneficium*), an ecclesiastical living, originally including every species of preferment, as well as those to which dignities and offices were attached, namely, bishoprics, deaconries, and prebends, as the lesser sort, namely, rectories, vicarages, perpetual curacies, and endowed chaplainries; but in its popular acceptation it includes only the latter class, and the distinction is recognized in recent acts of Parliament. The name is derived from the *beneficium* of the Romans, a grant of any kind to a subject by the sovereign. It was afterward the designation of a grant of land by any large proprietor to a retainer or follower as a reward of services, being the same that later was denominated a fief or fee, the essential incident of which was perpetuity, that is to say, it was a permanent stipendiary estate held of a superior, and usually subject to some condition indicating vassalage. The principle of the feudal tenure was applied, in the Middle Ages, to ecclesiastical benefices to this extent, that they were held of the Pope, as a superior lord, though these benefices had not the hereditary character of a fee, so far as respected the office or dignity connected therewith, and the lands or emolument conferred by a grant were usually attached to such office or dignity, and on the death of the incumbent, reverted to the ecclesiastical superior who was entitled to appoint a successor. This, at all events, was the claim of the Popes, though it was the subject of contest between them and the principal European sovereigns.

Benefit of Clergy, in English criminal law, the *privilegium clericale,* exemption of the clergy from penalties imposed by law for certain crimes. This privilege no longer exists, but it was for many centuries an important element in the administration of criminal law, and still is a curious and instructive part of the history of England. The origin of this privilege was a claim made by the ecclesiastics at an early period for the entire exemption of their order from the jurisdiction of the common law courts. In scattered instances the right was recognized in the colonies of Carolina and Virginia. An Act of Congress passed 30 April 1790 provided that benefit of clergy shall not be allowed for any offenses punishable by death. See Pollock and Maitland, 'History of English Law' (2d ed., 1899).

Beneke, bā'nĕ-kĕ, **Friedrich Eduard,** German philosopher: b. Berlin, 17 Feb. 1798; disappeared 1 March 1854; found drowned in a canal at Charlottenburg, 4 June 1856. After serving as a volunteer in the campaign of 1815, he studied theology and philosophy at Halle and Berlin, giving special attention to the English philosophers. In 1820 he lectured in the University of Berlin as a private teacher, but the continuance of his lectures was forbidden in 1822, on account of his departure from the philosophical principles of Hegel. He then taught for a few years in Göttingen, but, returning to Berlin in 1827, received permission to lecture in the university, in which he was elected extraordinary professor of philosophy after Hegel's death, in 1832. The starting point of his system is, that philosophy must be founded upon a strict and careful examination of the phenomena of consciousness. He thus adopts, in mental philosophy, the method observed by Bacon in the natural sciences, and his system is described as an empirical psychology. He was a voluminous writer and among his chief works 'Erfahrungsseelenlehre, als Grundlage alles Wissens, in ihren Hauptzügen dargelegt' (1820); 'Neue Grundlegungen zur Metaphysik' (1822); 'Pragmatische Psychologie, oder Seelenlehre in der Anwendung auf das Leben' (1850).

Benet, Stephen Vincent, American military officer: b. St. Augustine, Fla., 22 Jan. 1827; d. 22 Jan. 1895. He was graduated at the United States Military Academy in 1849, and assigned to the Ordnance Department; was assistant professor of ethics and law at the Military Academy in 1859–61; instructor of ordnance in 1861–4; became brigadier-general and chief of

ordnance in 1874; and was retired in 1891. He was author of 'Military Law and the Practice of Courts Martial' (1862); 'Electro-Ballistic Machines and the Schultze Chronoscope' (1866); and a translation from the French of Jomini's 'The Campaign of Waterloo.'

Beneven'to, a province of Italy, with an area of 680 square miles, and an archiepiscopal city. The surface of the province is hilly but the soil fertile in corn, fruit, and pasture. Game is very abundant, and cattle, grain, wine, oranges, and dead game are exported. Benevento was originally called Maleventum; but this was changed to Beneventum by the Romans when they founded a colony here after the defeat of Pyrrhus. Before it came into the hands of the Romans it belonged to the country of the Samnites. The Lombards in 571 made it a dukedom, which, long after the extinction of the Lombard kingdom, remained independent. At a later period it fell into the hands of the Saracens and Normans. The city, however, was not conquered by the latter, because Henry III. had given it to the Pope, Leo IX. In 1418 Benevento became part of Naples, but was given back to the Pope by Ferdinand I. In 1798 it was conquered by the French, and handed over to Naples; and then in 1806 Napoleon made a present of it to his minister Talleyrand, who received thence the title of Prince of Benevento. In 1815 it was restored to the Pope, and finally with Naples was annexed to the kingdom of Italy. The city of Benevento is situated on a hill between the rivers Sabato and Calore, is surrounded with a wall, has narrow dirty streets and some interesting buildings. Since 969 it has been the see of an archbishop. Few cities in Italy deserve so much attention on account of the antiquities which they contain as Benevento. Almost every wall consists of fragments of altars, sepulchres, columns, and entablatures. Among other things the well-preserved, magnificent triumphal arch of Trajan, built in 114, deserves particular mention. It is now called *Porta Aurea* (the golden gate), and is a gate of the city. The cathedral is a beautiful building in the Lombard-Saracenic style. Pop. (1901) 24,647.

Benevolence, a forced loan or contribution, by which the kings of England were wont, without any sanction from Parliament, to levy money from their subjects. Such benevolences had been denounced by Magna Charta; and even Richard III. had allowed the only Parliament of his reign to enact a statute declaring them illegal; but they still continued under some shape or other till finally abolished by the Bill of Rights in 1689.

Benezet', Anthony, American Quaker philanthropist; b. St. Quentin, France, 31 Jan. 1713; d. Philadelphia, 3 May 1784. His family came to Philadelphia from London in 1731. He earnestly opposed the slave trade, advocated the emancipation and education of the colored population of the colonies, and himself opened an evening school for negroes. Of his numerous tracts, distributed gratuitously, the most important are: 'A Caution to Great Britain and Her Colonies, in a Short Representation of the Calamitous State of the Enslaved Negroes in the British Dominion' (1767); 'Historical Account of Guinea' (1772); 'A Short Account of the Society of Friends' (1780); 'Dissertation on the Christian Religion' (1782); 'Observations on the Indian Natives of this Continent' (1784).

Benfey, bĕn'fi, **Theodor,** German Orientalist and comparative philologist: b. of Jewish parents, Nörlen, Hanover, 28 Jan. 1809; d. 26 June 1881. He studied in Göttingen, Munich, Frankfort, and Heidelberg, devoting himself especially to classical and comparative philology. In 1862 he was appointed to the chair of Sanskrit and comparative philology in the University of Göttingen, which he held till his death. One of his earliest literary efforts was a translation of 'Terence' (Stuttgart 1837); after this, however, he turned his attention almost exclusively to comparative philology, Oriental languages, especially Sanskrit, and mythology. In his 50 years devoted, with rare enthusiasm and persistency, to linguistic studies, he did more than any other scholar to enlarge the boundaries of Sanskrit philology. In comparative philology, though an adherent of Bopp, he deviated from his master in deriving all Indo-European words from mono-syllabic primitive verbs. This conception depends on his theory of the origin of stem suffixes. These, he holds, are almost all derived from a fundamental form, *ant,* which appears in the present participle of verbs. To support this view he assumes the most violent permutations of sounds, which set all phonetic laws at defiance. For his theory, see his 'Lexicon of Greek Roots' (1839); 'Short Sanskrit Grammar' (1868), and numerous essays. In Sanskrit he laid a foundation for the true study of the Veda by editing the 'Sâma Veda' (1848), with glossary and translation; and this work he continued by a scholarly translation of the first *mandala* of the Rig Veda in his magazine, 'Orient und Occident' (1863–4). His Vedic grammar, for which he had been collecting materials for many years, was left unfinished. He also published a 'Complete Sanskrit Grammar, Crestomathy and Glossary' (1854), and a 'Sanskrit-English Dictionary' (1866). In comparative folklore his principal work is a translation of the 'Panchatantra,' (1859). It is accompanied with elaborate notes, and the first volume consists entirely of an introduction in which he traces the course of these Indian stories in their wanderings and transformations both in eastern and western literatures.

Benga, an African tribe, living on the Spanish island, Corisco, off the western coast, having moved from the interior within a few generations. The American Presbyterian Board of Missions have Christianized many of the Bengas and translated books into their language, which closely resembles the Kamerun and Dualla.

Bengal (Hind. *Bangālā,* Skt. *Vangalam,* from *Vanga*). In the widest application the name presidency of Bengal is extended to the whole of British India, except what is under the governors of Madras and Bombay; so that it includes the provinces of Ajmir and Meirwara, Coorg, and Berar, which are under the direct administration of the governor-general; the lieutenant-governorships of Bengal, the Northwest Provinces and the Panjab; the chief commissionerships of Assam, Central Provinces, and Oudh, besides various native states, etc. But the name is now usually restricted to that portion which is under the lieutenant-governor of Ben-

gal, and which occupies the northeast of India, comprising the following divisions:

Divisions	No. of dists.	Area in sq. m.	Population in 1891
Burdwan	6	13,855	.....
Presidency	5	12,029	16,145,310
Rajshahi	7	17,428	8,003,740
Dacca	4	15,000	.....
Chittagong	4	12,118	13,965,230
Patna	7	23,647	.....
Bhagalpur	5	20,492	24,284,370
Orissa	5	9,053	3,865,020
Chota Nagpur	4	26,966	4,645,590
Total	47	150,588	70,909,260

The total population in 1901 amounted to 74,713,020.

The district composed of the first five of the above divisions forms the province of Bengal proper; Patna and Bhagalpur form the province of Behar. Besides these the lieutenant-generalship includes four native states under British protection, namely, Cooch Behar, Hill Tipperah, Chota Nagpur (part of), and Orissa (part of), having a total area of 37,515 square miles, and a population in 1891 of 3,428,390.

The general physical character of Bengal is that of a practically level country, though it is surrounded with lofty chains of mountains; the northern part rests on the terraces of the Himalaya Mountains, the east is bounded by the Garos or Garrows chain, and the west is ribbed with offsets of the Vindhya Mountains. It is intersected in all directions by rivers, the principal of which are the Ganges and Brahmaputra, whose annual inundations render the soil which they reach extremely fertile. In those tracts where this advantage is not enjoyed the soil is thin, seldom exceeding a few inches in depth. The most inhospitable part of Bengal is what is called the Sunderbunds (from being covered with the soondru or sunder tree), that portion of the country through which the numerous branches of the Ganges seek the sea, or the space lying between the Hoogly River and Chittagong, about 150 miles from east to west, and about 160 from north to south. This district is infested with tigers, is traversed in all directions by water-courses or nullahs, and interspersed with numerous sheets of stagnant water called jheels, which abound with fish and waterfowl, and are much resorted to by crocodiles.

Geology and Minerals.—In the northern part of Bengal, at the foot of the Himalayas, is a band of Tertiary formation; south from which, and along the course of the Ganges, more especially east from that river, and including the greater part of its delta and that of the Brahmaputra, the country is wholly composed of alluvium or modern detritus. Calcutta stands upon strata of the transition series, which stretch west into Bahar, and are flanked north and south by tracts of crystalline formation. In the Garo Hills coal, iron, and limestone are found; and nitre effloresces on the surface around Calcutta and elsewhere. Mineral springs are not numerous.

Rivers.— The principal rivers, besides the Ganges and Brahmaputra, the latter of which enters the province at its northeast extremity, and falls into the Bay of Bengal near the principal embouchure of the Ganges, are the Soobunreka, which falls into the Bay of Bengal, in lat. 21° 35′ north, south-southwest of the Hoogly; the Cosi or Coosee, which rises near Khatamandoo in Nepal, and falls into the Ganges near Bhagalpur, in lat. 25° 20′ N.; and the Dumooda, which, rising in Bahar, falls into the Hoogly about 22 miles below Calcutta. There are numerous other streams of less note, mostly tributaries of the Ganges and Brahmaputra, or their larger affluents.

Climate.— There is more regularity in the changes of the seasons in Bengal than perhaps in any other part of India; but it is subject to great extremes of heat, which, added to the humidity of its surface and the heavy dews that fall, render it generally unhealthy to Europeans. The prevalence of hot winds, which are sometimes loaded with sandy particles, is another source of disease. The seasons are distinguished by the terms hot, cold, and rainy. The hot season continues from the beginning of March to the end of May, within which period the thermometer frequently rises to 100°, sometimes to 110°. The month of September is also often intensely hot, and when so is the most unhealthy period of the year to natives as well as Europeans, owing to the profuse exhalations from stagnant waters left by the inundations, and from a rank decaying vegetation. The rainy season commences in June, and lasts till October. During the first two months of this period the rain is frequently so heavy that five inches of water have fallen in one day, the annual average being from 70 to 80 inches. It is in this season that the inundations take place, and that the Ganges overflows its delta, covering the land with its waters for more than 100 miles. The cold season, the most grateful and healthy of any to Europeans, continues from November to February, during which period north winds prevail, with a clear sky.

Forests.— In Bengal, as in India generally, great attention has been paid of late to the management of forests. Great destruction is caused among forests by fires, which are sometimes the result of accident, but more frequently made purposely by the natives in pursuance of a system of jungle cultivation that appears to prevail throughout India. This consists in cutting down and burning a patch of forest, and raising a crop in the open space, no plowing or digging being necessary. The next year this patch is abandoned, and another treated in the same way. Another cause of destruction is the wastefulness of those who use the timber. The sunder-trees, for example, which furnish the best wood for the boats which are built in great numbers throughout Eastern Bengal, have been cut down in so reckless a manner that the western parts of the Sunderbunds have already been to a large extent exhausted. In order to limit the destruction that goes on by such proceedings certain portions of the Indian forests are reserved and placed under the entire control of the government, and additions are made to these reserves every year. Of the total 11,669 square miles of forest in Bengal, in 1896 5,877 were reserved and 3,437 protected.

Animals.— Among the wild animals are tigers, elephants, boars, bears, wolves, foxes, jackals, hyenas, leopards, panthers, lynxes, hares, deer, buffaloes, antelopes, and monkeys. The most formidable of all these animals (and more so even than the lion) is the tiger, which here attains its utmost size, and perhaps also its greatest ferocity. The domestic animals include native horses, thin, ill-shaped animals, and not

well adapted for any kind of labor; cattle, of a very inferior breed, being extremely small and miserable looking; sheep likewise of diminutive size, with very coarse hairy wool, but when well fed their flesh is excellent. Hogs and goats are also plentiful, and buffaloes are domesticated for the sake of their milk. Reptiles are numerous and formidable, including gavials, a kind of crocodile, with which the larger rivers are infested; and among the serpent tribe, many of which are highly poisonous, the deadly cobra-de-capello. Turtles, frogs, and lizards also abound, with swarms of mosquitoes. The turtles are chiefly procured from the island of Cheduba, in the Bay of Bengal. Fish are so exceedingly plentiful as to be within the reach of almost every class of inhabitants. Game, poultry, and water-fowl of all descriptions abound in Bengal, particularly ducks, of which there is a great variety, and most of them of a superior kind. The gigantic crane, commonly called the adjutant, from the stately air with which he struts about, frequents the towns in considerable numbers, performing the office of scavenger by clearing the streets of garbage, in consideration of which duty he enjoys an entire immunity from all disturbance; his principal food is offal, toads, lizards, serpents, and insects. Crows, kites, sparrows, and other small birds are numerous.

Agriculture.— The staple crop of Bengal is rice, which is cultivated so as to produce three harvests in the year — spring rice, autumn rice, and winter rice. The last of these harvests is by far the most important. Besides sufficing for the wants of the population the rice crop leaves a large surplus for exportation. Oil seeds are also largely cultivated, chiefly mustard, sesamum, and linseed. The jute plant (*pât*) has long been cultivated, and in recent times the cultivation of it has greatly extended. It will grow on almost any description of land. Part of this crop is cultivated by those who use or manufacture it, almost all the Hindu farmers weaving cloth from it. It is now manufactured also in large mills under European management, and jute goods are now an export of some importance, though not nearly so much so as jute in the raw state for manufacture in Europe. The sunn plant, somewhat resembling the Spanish broom, is now quite extensively cultivated and exported to Great Britain, affording excellent material for both sails and cordage, and being made into fishing nets by the natives. Cotton is grown over all India, but the best of the herbaceous kind is raised in Bengal and on the Coromandel coast; the finest grows on light rocky soil. The cotton of India is generally inferior to that of the United States; but this is believed to be wholly owing to careless cultivation, and to the slovenly manner in which it is prepared for the market. The cultivation of the date palm and the manufacture of date sugar are carried on to a considerable extent, forming a profitable business for the cultivator. This kind of sugar forms an article of export. The sugar cane is cultivated, but not nearly to such an extent as might be expected. There are two kinds of sugar cane, a yellow hard cane, about the thickness of a finger; the other much thicker and deeply stained with purple. The latter is the most productive, but the most troublesome to cultivate, and therefore avoided by the more indolent farmers. Tobacco, which requires a light soil, is grown in three different situations,— in rich spots of land contiguous to the farmer's house,— in high land suitable for the growth of sugar cane,— and on the banks of rivers. The betel leaf, famous for its intoxicating quality and largely used over all India on that account, is cultivated in what is called a *voroj* or fort, and is carefully protected from the sun and wind. Indigo being one of the principal articles of foreign commerce with Bengal, is extensively cultivated in that province. The opium production of Bengal was a government monopoly under Mohammedan rule, and has been retained as such by the British. All the juice of the opium poppy must be sold to the government at a fixed price. This cultivation is carried on in the west of Bengal in the divisions of Chota Nagpur and Patna. Orchards of mango trees are to be found in every part of Bengal, the fruit being in general demand during the hot months. The cinchona tree and the tea plant have both in recent times been added to the agricultural products of Bengal; the former in the native state of Sikkim, the latter especially in Cooch Behar (Darjiling), Chittagong, and Chota Nagpur.

The luxuriance of vegetation in Bengal is perhaps unequaled in any other part of the world. The cultivation of the land requires little effort, and large crops are obtained without the application of any other manure than the sediment or mud deposited by the inundations. It is doubtful, however, how far this facility is good, since it seems to have had the effect of preventing all attempts at improvement either in the science of agriculture itself or in the implements used in its practice. The Indian plow is of wretched construction, having neither colter nor mold-board, and in some districts it wants even the share, while the animals by which it is dragged, two oxen or cows, are miserable half-starved creatures. The reaping hook (*kastya*) is a most inefficient implement,— the curved or cutting part of the blade is six inches long by one and a half broad, with teeth like a saw — the handle is about four and a half inches long. The *dengki*, by which the husks are separated from the grain, is another wretched implement, and so ill adapted to its purposes that one fifth part of the whole grain is sacrificed in the operation. Nearly all the other implements in use are of an equally rude and imperfect description. Rotation of crops and the use of fallows are unknown to the farmers of India; the land is generally in an exhausted condition, and the enclosures everywhere bad. Grain is trodden out by oxen, and stacking corn is unusual, the corn being often left exposed to the weather. Irrigation, however, is well understood,— necessity giving rise to invention,— and is accomplished by the most ingenious and efficient means.

Manufactures.—The principal manufacture of Bengal is that of cotton goods, including cotton piece goods of various descriptions, calicoes, thread, and sail-cloth. Muslins of the most beautiful and delicate texture were formerly made at Dacca, a city in this province, but the manufacture is almost extinct. «Some of these fabrics,» says Tavernier, «were so fine that they could hardly be felt in the hand, and the thread when spun was scarce discernible.» In Ward's 'History' of the Hindus this character in the muslin of Dacca is confirmed; though perhaps in both cases it is a little exaggerated. «When

this muslin is laid on the grass," says the latter, "and the dew has fallen on it, it is no longer discernible." The extraordinary fineness and beauty of India muslins, manufactured under the disadvantages of rude machinery and ill prepared material, is attributed to the exquisitely fine sense of touch possessed by the Hindus, and to the hereditary continuance of a particular species of manufacture in families through many generations.

The modern decay of the muslin manufacture of India has been owing in a great measure to the successful competition of Great Britain, and to the circumstance of British fabrics being subject to no duty in Bengal, while high duties were levied on the fabrics of Bengal in Great Britain. These duties are now abolished. Large quantities of a coarse cloth, manufactured from jute, are made in various districts of Bengal. Sericulture is carried on more largely in Bengal than in any other part of India, and silk-weaving is still a leading industry in many of the districts; but of late years there has been a serious decline. One branch of this industry, however, seems more flourishing than some others, namely, the cultivation of *tasar* or wild silk, the worm that produces it feeding upon the leaves of the sal and other forest trees. On the other hand, various new manufactures, carried on by machinery, are rising up. The most important of these are the industries connected with jute, cotton, and sugar. These are already affording employment to many thousands, and the natives are said to show great aptitude for factory work. The jute mills alone employ nearly 40,000 hands.

Commerce.— The commerce of Bengal, both internal and external, is very large. Multitudes of native boats and other craft navigate the rivers. The imports to Calcutta from the interior have been valued at over $13,000,000, consisting of rice, tea, jute, indigo, linseed, mustard seed, wheat, etc. The foreign trade is large and increasing. Almost the whole of it passes through Calcutta, and the value of it annually is over $275,000,000, over $170,000,000 being exports. The most important exports are opium, jute, indigo, oil seeds, tea, hides and skins, and rice; the chief import is cotton piece goods. The foreign trade is chiefly with Great Britain, China, the Straits Settlements, France, the United States, and Ceylon.

Finance.— The total revenue of the lieutenant-governorship of Bengal in the year ending 31 March 1898, was (calling the rupee 25 cents), $101,442,465, and the total expenditure $51,620,525. The surplus goes to meet the expenses of the general government of India. The principal sources of revenue are land, salt, opium, excise, stamps, and customs, assessed taxes, etc.

Education, Social, and Domestic Conditions, etc.— It is one of the consequences of the extreme povery of the bulk of the population of Bengal, that education should be there at a very low ebb. The proportion of boys of school-going age attending school is only about 28.6 per cent; of girls 2 per cent. The first rudiments of education are often given in small schools called *páthsálás*, in which the fees are extremely low, and in which only reading, writing, and arithmetic are taught. The greater number of these, although private establishments, receive aid from government. In the primary schools the principle of keeping the standard of instruction as low as possible is adhered to; and this is intended to be done till the whole of the poorer classes shall have been brought under some kind of instruction. In the meanwhile, all who have time or means for learning more are encouraged to resort to schools of a better class. With this view a system of intermediate schools was established in 1875 between the primary and what are called the middle schools, and this step has been rewarded with a satisfactory measure of success.

In addition to the schools already mentioned there are various educational institutions of a higher kind connected with government. The highest of these institutions is the Calcutta University, with the four faculties of arts, law, medicine, and engineering. Affiliated to the university are a number of general and professional colleges, in one of which all who have passed the university entrance examination and wish to proceed to a degree must enroll themselves. The majority of educated Bengal youths, according to official information, resort to two professions, the public service and the law, in consequence of which many cannot obtain employment. With a view to open out other lines of employment the government is endeavoring to establish technical and industrial schools of a superior kind in many places. A healthy ambition is said to exist among the natives of Bengal to raise themselves by education. Almost every Bengalee youth who can afford the means aspires to an English education as one of the main objects of his life. One result of the Prince of Wales' visit to Bengal at the end of 1875 was that the wealthier natives raised subscriptions to commemorate the event by founding educational institutions. The secondary schools are generally divided into "English" and vernacular. Those in which English forms part of the regular course of study of all the scholars, or at least of all in the higher classes, are reckoned as English; if English is optional only, they are reckoned as vernacular. In the common languages of the country there were till lately almost no books to be had; but the Bible, or parts of it, has now been printed in the various languages and widely circulated, as well as a number of other works.

The private houses of Bengal are huts, with pentroofs constructed of two sloping sides which meet in a ridge. One hut of this kind serves the poor man for himself, family, and cattle; wealthy men increase the number of houses without altering the plan, and without having any communication between the different apartments. The walls are generally made of mud, and the floor is raised a foot or two above the level of the plain, to prevent it being flooded in the rainy season, which, however, is not always accomplished. The frames of the houses consist of bamboos tied together — wooden posts and beams being used in the construction of the houses of the wealthy only. The huts collectively sufficient for the accommodation of a family are usually surrounded by a common fence. Farmers have in general larger and better houses than people living in towns. A rich farmer will sometimes have as many as 12 or 14 huts within his enclosure. The food of the class just above the rank of common laborers consists chiefly of rice, wheaten flour, fish, vegetables, and butter, with various condiments and seasonings.

In the case of the laborer there is neither flour, fish, vegetables, nor butter, the chief food of that class being a coarse description of rice.

History.— The English first got a firm footing in Bengal about 1644, when, through the influence of an English medical man named Boughton, a favorite of the emperor of Delhi, the East India Company obtained permission to locate themselves at Hugli or Hoogly, some 28 miles above Calcutta. In 1686 the company's factors, having had a rupture with the Moslem commander at the place where they were located, removed to Calcutta, then the village of Chuttanutty, where they continued to carry on their trade. In 1700 the viceroy of Bengal, being in want of money to dispute the succession to the Mogul throne, obtained a large sum from the company for the township on which their factory stood at Calcutta, and some adjacent lands. Seven years afterward, namely in 1707, Calcutta was erected into a presidency, and the foundation of British power in India laid — presenting a striking proof of the energy of the British character, there having been settlements in India by the Portuguese, Dutch, French, and Danes, previous to, and contemporary with, the location of the English in that quarter of the world; but the mighty achievement of obtaining the supremacy in that vast empire could, it appears, be accomplished only by the British. For nearly half a century the company pursued a peaceful and profitable commerce; but at the expiration of that period, 1756, Calcutta was attacked and taken by the Soubahdar of Bengal, who threw the Englishmen he found there, 147 in number, into a dungeon, the well-known "black-hole" of Calcutta, where 123 of them perished in 11 hours. In the ensuing year Calcutta was retaken by Lord Clive — an event which was followed by a series of victories on the part of the British, that terminated in the entire conquest of India. In consequence of unprecedented drought great scarcity of food prevailed in 1873 and 1874, but the prompt measures of the government were sufficient to prevent any widespread mortality. A bill conferring upon agricultural tenants a transferable interest in their holdings and protecting them against eviction was passed in 1885.

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Bengal, Bay of, that portion of the Indian Ocean between Hindustan and Farther India, or Burma, Siam, and Malacca, and extending south to Ceylon and Sumatra. It receives the Ganges, Brahmaputra, and Irrawadi. Calcutta, Rangoon, and Madras are the most important towns on or near its coasts. On the west coast there are no good harbors, but the east coast has a considerable number, among them being Aracan, Cheduba, Negrais, Mataban, and Syriam. On account of the extreme heat the rate of evaporation is very high, sometimes amounting to an inch per day. The tide sometimes rises to the height of 70 feet. In summer the northeast monsoon prevails, and in winter the southwest monsoon.

Bengal, or **Bengola, Light,** a firework, giving a vivid and sustained blue light. It is used for signals at sea. It is composed of six parts of nitre, two of sulphur, and one of antimony tersulphide. These are finely pulverized and incorporated together, and the composition pressed into earthen bowls or similar shallow vessels.

Bengali, bĕn-gä'lę, the dealer's name, originating in a mistake as to their origin, for any of several of the beautiful little African waxbills (q.v.), bred and sold as cage-birds; especially the "blue-bellied finch" (*Estrilda bengala*), which is ashy-brown above, with the wing quills brown, and the sides of the head, the throat and whole lower surface azure blue, spotted under and near the wings. They add to this charming dress lively manners and an agreeable song. Their requirements in the cage are like those of a canary.

Bengali Era, The, one of the chronological eras of the Hindus, supposed to have been derived from the Hegira. The Hindus, however, use the sidereal year, and the Mohammedans the lunar, hence the Mohammedan epoch is at present some nine years in advance of the Bengali.

Bengali, or **Gaura, Language,** one of the five modern languages of Hindustan, which are derived from the ancient Sanskrit. Its name is derived from Banga, the Sanskrit name of the country, with the Arabic article *al* suffixed; the whole being corrupted into the present form. Gaura is derived from Gaur, the name of the ancient metropolis. It is spoken by 42,000,000 of British subjects, of whom about one fourth speak also some other dialect. It extends over the regions on the lower Ganges, from Patna down to its delta, being purest in the province of Bengal and in the eastern regions. This language consists of an aboriginal basis, with which a much greater portion of Sanskrit and Pracrit has been admixed than with any one of its cognates; with a considerable addition of Afghan, Persian, Arabic, Portuguese, Malay, and English words. Although the Sanskrit element predominates as regards the words, the grammatical forms of the language differ more from the Sanskrit than the forms of the Greek, Latin, Gothic, and Persian; most of the flexions of nouns and verbs having been lost, and their places being supplied by auxiliary words and by circumlocution. Notwithstanding this, it admits in the higher style, many of those forms which are intelligible only to more cultivated persons. There are no forms of gender, and only few feminine words are formed by the suffixes *i* and *ini*. There are seven cases made by suffixes — nominative, accusative, instrumental, dative, ablative, genitive, and vocative. The plural of nouns is made by suffixing *dig* to the genitive singular. It delights in compound words, formed especially by means of a sort of past participle; elegant Sanskrit compounds being unidiomatic. There is but one conjugation, whose radical is the imperative. Compound tenses are made by the auxiliaries, meaning to do, to be, to become. The singular and plural of verbs are often confounded; the plural with a singular noun denoting respect, the singular with the plural noun being used in speaking to inferiors. There are three simple moods, infinitive, indicative, imperative; four others being periphrastic, the potential, optative, inchoative, and frequentative. Any verb is conjugable negatively by the suffix *nā*. The system

of writing is that of the *dêvanāgari* of the Sanskrit language, but the forms of letters are more broken and twisted. B and v, however, are written by one character, and the characters of the sounds, s, z, sh, are interchangeable.

No book written in Bengali appeared before 1500 A.D. After the settlement of Moslems in Gaur, the Voisyas and Soodras (agricultural and servile castes) began to study Persian, to gain a livelihood, and were well rewarded by the conquerors. Except the stories of Krishna's study, the rules of arithmetic in verse, and a few other elementary books, the vernacular literature was very poor, until Rajah Krishnachandra Roy Bahadoor restored Hindoo literature in India, by bringing in pundits and endowing schools. Owing to the abundance of Sanskrit books, and the prejudice of most Brahmins against the Bengali, this was neglected until 1800, when the college of Fort William was founded, and the study of Bengali was made imperative and collateral to the Sanskrit. Many Bengali works have since been printed at Calcutta and Serampore. The first native newspaper was published at Serampore in 1818. Considerable change has been made since in the diction and composition of this language, which continues to be enlarged and ennobled, by being capable of borrowing indefinitely from the venerable Sanskrit mother. Gilchrist, H. P. Forster, Carey, W. Morton, Hunter, Mohun Persaud, Tahur, Tarachand Chukruburti, Sir G. C. Haughton, have published Bengali English dictionaries and vocabularies, and Ram Comul Sen has translated Todd's edition of Johnson's English dictionary into Bengali.

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Bengazi, bĕn-gä'zę, or **Benghazi,** a town in North Africa, capital of the vilayet Barca, on the east coast of the Gulf of Sidrah. Next to Tripoli it is the most important seaport on this coast. The harbor is fast silting up, and admits only small vessels; but there is still a considerable trade, cattle, corn, etc., being exported, especially to Malta. It is sometimes identified as the ancient Hesperides and in the time of Ptolemy III. was called Berenice. Pop. about 15,000.

Bengel, bĕng'ĕl, **Johann Albrecht,** German theologian and philologist: b. Winnenden, Würtemberg, 24 June 1687; d. Alpirsbach, 2 Nov. 1752. He studied at Stuttgart and Tübingen, and became pastor and head of a school at Denkendorf. He especially applied himself to the critical study of the Greek Testament, of which he published an edition in 1723. Among his other works are 'Apparatus Criticus Novi Testamenti,' a work of great value for its suggestive condensed comments, which first appeared in 1742, and has been several times reprinted, etc. An attempt has been made to adapt his 'Gnomen' to English readers in the 'Critical English Testament,' by Blackley and Hawes (1866).

Benger, bĕng'gĕr, **Elizabeth Ogilvy,** English historical writer: b. Wells, Somersetshire, 1778; d. London, 9 Jan. 1827. She early displayed a turn for literature, but her straitened means preventing her from gratifying this taste by the purchase of books, she was in the habit of perusing the opened books in a bookseller's window, and would return day after day to see if the page had been turned over. In 1802 she removed with her mother to London. Her first literary attempts, including a poem on the abolition of the slave trade, and two novels, attracted little attention; but she was more successful with her 'Memoirs of Mary Queen of Scots,' and of 'Elizabeth Queen of Bohemia.' She also wrote the Lives of Anne Boleyn, Mrs. Elizabeth Hamilton, and John Tobin, the dramatist. Her chief merits are a clear style and industry in the collection and arrangements of facts.

Bengough, John Wilson, Canadian poet: b. Toronto, 5 April 1851. In 1873 he established the *Grip,* a humorous weekly in Toronto. His political cartoons in this paper were highly artistic. He is also widely known as a lecturer and a poet. His publications include: 'Ontario, Ontario' (a famous election song); 'Grip's Cartoons' (1875); 'Popular Readings, Original and Selected' (1882); 'Caricature History of Canadian Politics' (1886); 'Motley: Verses Grave and Gay' (1895); 'The Up to Date Primer: A First Book of Lessons for Little Political Economists' (1896); etc.

Benguela, bĕn-gā'lą, or **Benguella,** a district belonging to the Portuguese on the western coast of South Africa, forming one of the three provinces of Angola; bounded north by the province of Loanda, south by that of Mossamedes, and west by the Atlantic Ocean. The interior of the country is mountainous, the direction of the elevated lands being from northeast to southwest. It is well watered, being intersected by numerous rivers and streams. Its vegetation is luxuriant, and it possesses extensive forests. Its products are those of tropical Africa generally. Coffee grows wild. The soil in parts is well adapted for the production of grain; but little is grown. The larger animals of Africa are numerous, such as lions, elephants, and hippopotami. The minerals include copper, sulphur, lead, gold, and silver. The only town worth mention is the seaport, Benguela, founded in 1617 as San Felipe de Benguela, which is pleasantly situated and fairly healthy. It exports rubber, coffee, skins, ivory, etc. A short railway starts from the town, the population of which is about 3,000. The population of the province may amount to several millions.

Benha'dad, the name of three kings of Syria, all mentioned in Scripture. The most conspicuous is the second, who was equally remarkable for his arrogance in prosperity and his craven spirit in adversity. He first sent an insolent message to Ahab, claiming himself and all his subjects as his slaves; and after Ahab encountered and defeated him, Benhadad sent a message abjectly begging his life. Ahab was impolitic enough to grant it, and Benhadad, disregarding all his promises, proved a bitter enemy to his successor. He was murdered about 890 B.C.

Benham, Andrew Ellicott Kennedy, American naval officer: b. New York, 10 April 1832; d. at Lake Mahopac, N. Y., 11 Aug. 1905. He entered the navy in 1847; served in the East India and the Home squadrons in 1847–52;

attended the United States Naval Academy, 1852–3; was commissioned lieutenant in 1855; lieutenant-commander in 1862; commander, 1866; captain, 1875; commodore, 1885; and rear-admiral in 1890, and retired in 1894. During the Civil War he served in the South Atlantic and West Gulf Blockading squadrons. In April 1893 he commanded one of the divisions in the great naval display at New York; in 1894, as commander of a squadron at Rio de Janeiro, Brazil, he forced the commander of the insurgents' squadron to raise the blockade of the city and to discontinue firing on American merchant vessels; and in 1898 was naval prize commissioner in Savannah, Ga.

Benham, Henry W., American military engineer: b. Cheshire, Conn., 1816; d. 1 June 1884. He was graduated at the United States Military Academy in 1837; and became brevet major-general, United States army. He commanded the engineer brigade and laid several pontoon bridges under fire during the Chancellorsville battles; constructed and commanded the defenses at City Point; devised the picket shovel; and made many improvements in the construction of pontoon bridges, in which he was a recognized expert. After the war he was in charge of the Boston harbor sea wall and later of the New York harbor defenses; retired from active service, 1882.

Benham, William, English clergyman and author: b. West Meon, Hampshire, 15 Jan. 1831. He was vicar of Addington, 1867–73; of Margate, 1873–80; of Marden, 1880–2; and rector of St. Edmund's, Lombard Street, London, from the year last named. He was appointed canon of Canterbury in 1885. He has published among other works: 'The Church of the Patriarchs' (1867); 'Catharine and Crawfurd Tait'; 'How to Teach the Old Testament' (1881); 'Annals of the Diocese of Winchester' (1884); 'A Short History of the Episcopal Church in America' (1884); 'The Dictionary of Religion' (1887); 'Life of Archbishop Tait,' with Davidson (1891). He has edited the 'Ancient and Modern Library of Theological Literature.'

Beni, bā'nẹ, one of the nine departments of Bolivia, South America. It is in the northeastern part, with an area of 100,580 square miles. It is a level, fertile region, growing cocoa, coffee, sugar-cane, and tobacco, and containing vast forests of rubber-trees, and rich deposits of gold. Pop. 26,750; chief town, Trinidad.

Beni, a river of South America, formed by the junction of several streams flowing eastward from the Andes in about 18° south. Its course is north and northeast through Bolivia; and on the border of Brazil it unites with the Mamoré to form the Madeira, by which its waters are carried to the Amazon. It receives several tributaries of importance, the chief being the Madre de Dios from Peru, and it is navigable throughout a great part of its course. Its length is about 850 miles.

Beni-Hassan, bā'nẹ-häs'san, a village of middle Egypt, on the east bank of the Nile, remarkable for the rock-hewn tombs in the neighborhood, supposed to have formed a necropolis for the chief families of a city, Hermopolis, on the opposite bank, and exhibiting interesting paintings, and hieroglyphics. The paintings portray incidents in the ancient life of Egypt, and the inscriptions are of great value for the light they throw upon the history of the 12th dynasty.

Beni-Israel, bā'nẹ-ĭz-rā-ĕl, a race in the west of India (the Konkan sea board, Bombay, etc.), who keep a tradition of Jewish origin, and whose religion is a modified Judaism. By some persons they are supposed to be a remnant of the 10 tribes. Their number is estimated at 5,000, and in feature they resemble the Jews of Arabia.

Beni Israel, a small antelope. See MADOQUA.

Beni-Khaibir (sons of Keber), an Arabic tribe supposed to be a remnant of the ascetic tribe of Rechabites.

Beni-Mzâb, a race or tribe of Berbers that dwell in the Sahara, near its northern border, and recognize the supremacy of the French. They number some 60,000, of whom about 15,000 are in the town of Ghardaya. They are peacefully disposed, and numbers of them are employed in Algiers in various occupations.

Beni-Suef, bā'nẹ-swāf, the capital of a province of the same name in Egypt; is pleasantly situated on the left bank of the Nile, 70 miles south from Cairo, with which it is connected by railway. It is the entrepôt for the produce of the Fayoum, and contains cotton mills, controlled by the state, and alabaster quarries. Pop. 10,085.

Benicarlo, bā-nẹ-kär-lō', a seaport of Spain, in Valencia, in the province of Castellon, surrounded with walls, having an old castle, a fine church, with an octagonal tower, and some manufactures, etc. It is chiefly noted as being the place of export of the red wines called by its name which are produced in the surrounding country. These are chiefly sent to Bordeaux to be mixed with clarets, or to England to be manufactured into port. Pop. (1897) 7,900.

Benic'ia, Cal., a city in Solano County, at the mouth of the Sacramento and San Joaquin rivers, and on the Southern P. R.R.; 30 miles northeast of San Francisco. It contains a United States arsenal and barracks; St. Augustine College (Roman Catholic); St. Catherine's Convent (Roman Catholic); extensive shipyards, and large agricultural, tanning, cement, and meat-packing plants. The city was once the capital of the State. Pop. (1900) 2,751.

Benicia Boy, a popular name for a once noted pugilist, John C. Heenan, whose home was in California. His fight with Sayers attracted wide-spread attention.

Benin, bĕ-nĭn', Africa, a negro country or kingdom, on the Bight of Benin, Gulf of Guinea, extending along the coast on both sides of the Benin River, and to some distance inland, but the limits are not accurately known. The capital is Benin, a town which at one time had some 15,000 inhabitants, but is now said to have greatly decreased in population. It is situated about 50 miles from the coast, and consists of clay-built houses neatly thatched with reeds, straw, or leaves. The coast, which now belongs to the British, is thickly indented with estuaries, some of them of considerable breadth and studded with islands. The country is flat for some distance inland, when it begins gradually to rise till it attains a height of over 2,000 feet. It is very well wooded, and being likewise well watered, it is rich in all the vegetable produc-

tions of the tropics. Cotton is indigenous, and is woven into cloth by the women. Sugar-cane of good quality is grown; and yams, plantains, maize, rice, etc., are cultivated. The religion is Fetishism. The climate, especially at the mouths of the rivers, is very unhealthy. There is a considerable trade in palm oil and other products.

Benin, Bight of, Africa, a large bay on the west coast, forming a portion of the Gulf of Guinea, and extending from the Niger delta westward to about the river Volta.

Beniowsky, Moritz August von, bā-nē-ŏff'-skĭ, mō'rĭtz ow'goost fŏn, Hungarian adventurer: b. Verbova, Hungary, 1741; d. 23 May 1786. The son of án Austrian general, he served as lieutenant in the Seven Years' war and in the Polish war against Russia. In 1769 he fell into the hands of the Russians, who exiled him to Kamchatka. Availing himself of a knowledge of navigation, he succeeded in saving from wreck the vessel which was to convey him to Siberia. This feat won for him the sympathy of the governor of Kamchatka, which was still more strengthened by his proficiency in chess, and he appointed him tutor of his children. One of his pupils fell in love with him, and with her father's consent they were married. In 1771 he effected his escape from Kamchatka with the assistance of his wife, who, although she had since learned that he had another wife in Hungary, followed him to Formosa and Moscow, at which latter place she died. On his return to Paris he undertook to found a French colony at Madagascar, where he arrived in June 1774, founded his colony, and in 1775 was proclaimed king by some of the native tribes, while his wife was proclaimed queen. The governor of the Isle of France refusing to supply him with men to support his state, Beniowsky applied directly to the French government, but without success. Disgusted with the French and their colonies, he now entered the Austrian service, and was commander in the battle of Habelschwerdt, in 1778, against the Prussians. His subsequent efforts to interest the English government for Madagascar were fruitless, but with the support of a wealthy firm of Baltimore, U. S. A., he effected a landing in Madagascar, but was killed soon after in a conflict with troops from the Isle of France. He wrote his autobiography in French; it was translated into German by George Forster, into English by William Nicolson, and into various other languages. Kotzebue dramatized his character and career in his play entitled 'The Conspiracy in Kamchatka.'

Benish' Days, days (Mondays, Wednesdays, and Saturdays) on which the modern Egyptians don the *benish* (whence the name), or ordinary garment, relax their religious duties, and engage in pleasures.

Benjamin, the youngest son of Jacob and Rachel (Gen. xxxv. 16–18). Rachel died immediately after he was born, and with her last breath named him Ben-oni, "son of my sorrow"; but Jacob called him Benjamin, "son of my right hand." He was a great comfort to his father, who saw in him the image of the wife he had buried, and of Joseph, whose loss he also mourned. He could hardly be persuaded to let him go with his brethren to Egypt. The tribe of Benjamin, small at first, was almost exterminated in the days of the Judges, but afterward it greatly increased. On the revolt of the 10 tribes Benjamin adhered to the camp of Judah; and the two tribes ever afterward closely united. King Saul and Saul of Tarsus were both Benjamites.

Benjamin, Charles Henry, American engineer: b. Patten, Me., 29 Aug. 1856. He graduated at the University of Maine, and was professor of mechanical engineering there, 1880–6. Since 1889 he has been professor of the same subject in the Case School of Applied Science, Cleveland, Ohio. Publications: 'Notes on Heat and Steam' (1894); 'Notes on Machine Design' (1895); 'Mechanical Laboratory Practice' (1898); 'Evolution of the Machine Tool' (1898); 'Power Losses in Machine-Shops' (1900); 'Development of Fly Wheels' (1900); and monographs in the 'Transactions' of the American Society of Mechanical Engineers, Vols. XVIII.–XXI.

Benjamin, Judah Philip, American lawyer: b. St. Croix, West Indies, 11 Aug. 1811; d. Paris, 7 May 1884; of English parentage and of Jewish faith. He was educated at Yale College; admitted to the bar in New Orleans in 1832; and elected to the United States Senate in 1852 and 1858. At the beginning of the Civil War he resigned from the Senate and declared his adhesion to the State of Louisiana. In 1861 he accepted the office of attorney-general in the Cabinet of Jefferson Davis, and afterward became successively Confederate secretary of war and secretary of state. After the war he went to London, England, where he was admitted to the bar in 1866. He gained a successful practice, and in 1872 was formally presented with a silk gown. He wrote a 'Treatise on the Law of Sale of Personal Property' (1868).

Benjamin, Marcus, American editor and compiler: b. San Francisco, 17 Jan. 1857. He graduated at Columbia School of Mines, 1878, and was chemist at the United States Appraiser's Store, New York, 1883–5. Since 1883 he has been a reguar contributor to 'Appleton's Annual Cyclopædia' and the 'Cyclopædia of American Biography,' and edited a number of the Appleton guides and handbooks. He was on the editorial staff of the 'Standard Dictionary'; 'Encyclopædic Dictionary'; 'Johnson's Universal Cyclopædia'; and the 'International Year Book'; and has translated Bertholet's 'Explosive Materials' (1883). Since 1896 he has been connected with the United States National Museum.

Benjamin, Park, American journalist, poet, and lecturer: b. Demerara, British Guiana, 14 Aug. 1809; d. New York, 12 Sept. 1864. He studied law, but later took up literary work, helping to found 'The New World' in New York. His poems, of a high order of merit, have never been collected. 'The Contemplation of Nature,' read on taking his degree at Washington College, Hartford, 1829; the satires, 'Poetry' (1843); 'Infatuation' (1849); 'The Nautilus'; 'To One Beloved'; and 'The Old Sexton' are among his works. He was associated editorially with Epes Sargent and Rufus W. Griswold.

Benjamin, Park, American lawyer, editor, and miscellaneous writer, son of the preceding: b. New York, 11 May 1849. A graduate of the United States Naval Academy (1867), he served on Admiral Farragut's flagship, but resigned in

1869. As a lawyer he has been a patent expert. He edited the 'Scientific American' (1872–8), and Appleton's 'Cyclopædia of Applied Mechanics'. He has written 'Shakings: Etchings from the Naval Academy' (1867); 'The Age of Electricity' (1886); 'The Intellectual Rise in Electricity, a History'; 'The United States Naval Academy' (1900); etc.

Benjamin, Samuel Green Wheeler, American traveler, artist, and miscellaneous writer: b. Argos, Greece, 13 Feb. 1837. He was educated at Williams College; was assistant librarian in the New York State Library, 1861–4; and was United States minister to Persia, 1883–5. Among his numerous works, both in prose and verse, are: 'Art in America'; 'Contemporary Art in Europe' (1877); 'Constantinople' (1860).

Benjamin, William Augustus, American journalist, poet, composer: b. 26 July 1865. His most prominent poems are: 'From Then Till Now' (1889); 'The Storm' (1889); 'Musings of Shadow-Silence' (1890); 'Twilight Fancies' and 'The Tide of Life' (1891); etc. Of his musical compositions, 'The Surge of the Sea' (1890); 'The Promise' (1894); and 'Go to Sleep' (1895).

Benjamin of Tudela, Jewish traveler: b. Tudela, Navarre, in the 12th century; is chiefly known by his travels over large portions of Europe, Palestine, Mesopotamia, the East Indies, and Ethiopia. As the first European traveler who penetrated far into the East, he furnishes a great amount of interesting information, and though not free from error or fable, proves himself worthy of the high estimation in which he has always been held among his Jewish countrymen for soundness of judgment and extent of learning. His 'Itinerary,' first printed in Hebrew at Constantinople in 1543, has been translated into many languages. The edition of Asher (London and Berlin 1840–1) contains an English translation.

Benjamin-Constant, Jean Joseph, bŏñ-zhą-măñ-kŏn-stŏñ, zhŏn zhō-sĕf, French painter: b. Paris, 10 June 1847; d. there, 26 May 1902. He studied under Cabanel, and exhibited in the salon of 1869, a scene from 'Hamlet.' His taste inclined him to Oriental subjects and the nude, and his vivid coloring and dramatic treatment made his work fashionable in Paris and London. His work displays much finished and minute detail, but he paid chief attention to harmony of effect and decorative value. Among his Oriental pictures are 'Mahomet II.'; 'Les Chérifas'; 'Les Funérailles de l'Emir'; 'La Justice du Chérif.'

Benkulen. See BENCOOLEN.

Benndorf, Otto, German archæologist: b. 13 Sept. 1838; d. 2 Jan. 1907. He studied at Erlangen and Bonn, went to Italy and Greece, 1864–8, and was professor of archæology at the universities of Göttingen, Zurich, Munich, Prague, and Vienna. In 1875 he made a second archæological tour to Samothrace; in 1881 and 1883 he made two expeditions, at state cost, to southwestern Asia Minor; in 1898 he was made director of the Austrian Archæological Institute. He wrote 'The Ancient Sculptures in the Lateran Museum' (in conjunction with Schöne) (Leipsic 1867); 'Ancient Historical Helmets and Sepulchral Masks' (1878); 'Travels in Southwest Asia Minor' (1884); etc.

Benne Oil, a valuable oil expressed from the seeds of *Sesamum orientāle* and *S. indĭcum,* much cultivated in India, Egypt, etc., and used for purposes similar to those of olive oil. Also called sesamum oil and gingelly oil. See SESAME.

Bennet, Elizabeth, the heroine of Jane Austen's novel, 'Pride and Prejudice.' See Howells, 'Heroines of Fiction' (1901).

Bennet, Henry (EARL OF ARLINGTON), English statesman: b. Arlington, Middlesex, 1618; d. 28 July 1685. He was devoted to the cause of Charles I., and was appointed under-secretary of state; he fought in several battles, and was wounded at Andover, but after the battle of Worcester he retired to Spain. Upon the restoration he returned to England, and was appointed keeper of the privy seal, and shortly afterward secretary of state. In 1664 he was created Baron Arlington; in 1670 became noted as one of the famous Cabal, but is not accused of entertaining their extreme sentiments; he was created Earl of Arlington in 1672. He was one of the plenipotentiaries sent to Utrecht to negotiate a peace between Austria and France, but the mission not being successful, an endeavor was made by his colleagues to cast the odium of the failure upon him. He defended himself, however, before the House of Commons, and was acquitted. The war with Holland, which is said to have been caused by the machinations of the Cabal, lost to Arlington the favor of the king and people; but in spite of this he received the office of chamberlain. In 1679 he became a member of the new council, and retained his office of chamberlain on the accession of James II.

Bennett, Alfred Allen, American chemist: b. Milford, N. H., 30 Nov. 1850. He graduated at the University of Michigan 1877; became professor of chemistry and physics in Iowa Wesleyan University; and since 1885 has been professor of chemistry in Iowa State College. Publications: 'Text Book of Inorganic Chemistry,' 2 vols., and articles in the 'American Chemical Society Journal.'

Bennett, Charles Edwin, American educator: b. Providence, R. I., 6 April 1858. He graduated at Brown University 1878; pursued graduate studies at Harvard and in Germany 1881–4; was professor of Latin at the University of Wisconsin 1889–91; of classical philology at Brown 1891–2; and in the latter year was elected professor of Latin at Cornell. He has been a frequent contributor to classical journals and editor of classical texts. Publications: 'A Latin Grammar' (1895); 'The Foundations of Latin' (1898); 'Critique of Some Recent Subjunctive Theories' (1898); 'The Quantitative Reading of Latin Poetry' (1899); 'The Teaching of Greek and Latin in Secondary Schools' (1900). He has edited: 'Xenophon's Hellenica, Books V.–VIII.' (1892); 'Tacitus, Dialogus de Oratoribus' (1894); 'Cicero, De Senectute' (1897); and 'Cicero, De Amicitia' (1897).

Bennett, Charles Wesley, American Methodist clergyman and educator: b. East Bethany, N. Y., 18 July 1828; d. 17 April 1891. He was principal of Genesee Wesleyan Seminary (1869–71); professor of history and logic at Syracuse University (1871–85); professor of historical theology, Garrett Biblical Institute, Evanston, Ill.

(1885–91). He wrote 'National Education in Italy, France, Germany, England, and Wales' (1878); and 'Christian Art and Archæology of the First Six Centuries' (1888).

Bennett, Edmund Hatch, American lawyer: b. Manchester, Vt., 6 April 1824; d. 2 Jan. 1898. He was graduated at the University of Vermont in 1843, and admitted to the bar in 1847. He practised for many years in Taunton, Mass., and was mayor of that city 1865–7, and judge of probate and insolvency of Bristol County 1858–83. He was lecturer at Harvard Law School 1865–71, and afterward professor and dean at the Law School of Boston University. His works include 30 volumes of 'English Law and Equity Reports'; '9–12 Cushing's (Mass.) Reports'; 'Massachusetts Digest' (3 vols.); 'Bingham on Infancy'; 'Blackwell on Tax Titles'; 'Leading Criminal Cases' (2 vols.); 'Goddard on Easements'; 'Benjamin on Sales'; 'Pomeroy's Constitutional Law'; 'Indermaur's Principles of Common Law'; and 'Fire Insurance Cases' (5 vols.). He has made contributions to professional journals, and has been co-editor of the 'American Law Register.'

Bennett, Emerson, American novelist: b. Monson, Mass., 16 March 1822; d. Philadelphia, Pa., 12 May 1905. He began to write at an early age and published some 60 or more extremely sensational tales which have been popular with uncritical readers. Among them are 'Prairie Flower'; 'The Outlaw's Daughter'; and 'The Forged Will.'

Bennett, James Gordon, American journalist: b. Newmill, Keith, 1 Sept. 1795; d. 1 June 1872. Trained for the Roman Catholic priesthood, he emigrated to the United States in 1819, where he became in turn teacher, proof-reader, journalist, and lecturer. He had acted as casual reporter and writer in connection with several journals, and had failed in one or two journalistic ventures previous to the issue of the first number of the New York *Herald,* which he founded as an independent newspaper, 6 May 1835, price one cent. He spared no effort and expense in securing news, and laid the foundation of its subsequent enormous success. It was the first newspaper to publish the stock lists and a daily money article.

Bennett, James Gordon, American journalist, (son of the preceding): b. New York, 10 May 1841. He became managing editor of the New York *Herald* in 1866, and became its proprietor on the death of his father in 1872. In 1870 he sent Henry M. Stanley on the exploring expedition which resulted in the finding of Dr. Livingstone, and, in conjunction with the London *Daily Telegraph,* supplied the means for his journey across Africa by way of the Congo in 1874–8. He organized a system of storm prognostications of value to shipping-masters; fitted out the Jeannette Polar expedition; and in 1883 was associated with John W. Mackay in organizing the new Commercial Cable Company. He founded the *Evening Telegram* in New York, and established daily editions of the *Herald* in Paris and London. He early gave much attention to yachting, in 1866 taking part in an ocean yacht race from Sandy Hook to the Needles, Isle of Wight, which was won by his schooner Henrietta against two competing yachts in 13 days, 21 hours, 55 minutes. In 1870 he raced in his yacht Dauntless from Queenstown to Sandy Hook, but was beaten by the Cambria by two hours. He resides mainly in Paris, collecting foreign news, and directing by telegraph the management and policy of his newspapers. The New York *Herald* was incorporated in 1899.

Bennett, John, American writer: b. Chillicothe, Ohio, 17 May 1865. He has published 'Master Skylark' (1892); 'The Story of Barnaby Lee' (1900).

Bennett, John Hughes, English physician: b. London, 31 Aug. 1812; d. Norwich, 25 Sept. 1875. He graduated at Edinburgh in 1837, and after four years' study in Paris and Germany settled in Edinburgh as an extra-mural lecturer. A work published in 1841, in which he recommended cod-liver oil in all consumptive diseases, first brought him into notice, and in 1848 he was made professor of the institutes of medicine in Edinburgh University — a post which he held until 1874. His health gave way in 1871, and most of his last years were spent abroad.

Bennett, Joseph M., American philanthropist: b. Juliustown, N. J., 16 Aug. 1816; d. 29 Sept. 1898. He engaged in the clothing business in Philadelphia, Pa., when 16 years old. In 1880 he gave 40 acres of ground in what is now Fairmount Park, valued at $400,000, for a Methodist Orphanage, to the support of which he afterward largely contributed. He also established the Hays Home, and gave valuable properties to the Deaf and Dumb Institute, the University of Pennsylvania, and the Methodist Deaconesses. His property was said to be worth $3,000,000, and it is estimated that he gave $1,000,000 to charity. He bequeathed $500,000 to the University of Pennsylvania for its proposed college for women.

Bennett, Mary E. (Elizabeth Glover), American writer: b. Connecticut, 1841; a writer of New Haven, Conn., whose writings have been published over the pen name Elizabeth Glover. They include 'Cyril Rivers'; 'Six Boys'; 'Asaph's Ten Thousand'; 'Talks About a Fine Art'; 'Family Manners'; 'The Children's Wing'; 'Jefferson Wildrider'; 'The Gentle Art of Pleasing.'

Bennett, Samuel Crocker, American lawyer: b. Taunton, Mass., 19 April 1858. He is a son of Edmund Hatch Bennett (q.v.), and in 1898 succeeded his father as dean of the law school of Boston University. He is one of the editors of 'Federal Decisions'; 'Smith's Leading Cases'; 'Benjamin on Sales'; 'Cyclopedia of Law and Procedure.'

Bennett, Sanford Fillmore, American hymnologist: b. Eden, N. Y., 1836; d. 12 June 1898. He settled in Elkhorn, Wis., in 1860, and became editor of the *Independent.* Resigning this place, he entered the 40th Wisconsin Volunteers and served with them throughout the Civil War. In 1867 he aided J. P. Webster, the composer, in preparing 'The Signet Ring,' a Sunday-school hymn-book, to which he contributed about 100 hymns. 'The Sweet Bye and Bye' was one of the first of these. Many of Mr. Bennett's hymns and songs have been published in sheets.

Bennett, William Cox, English songwriter: b. Greenwich, 14 Oct. 1820; d. Blackheath, 4 March 1895. He suggested that the bust of Longfellow be placed in Westminster Abbey, and formed a committee of 500, with the Prince of Wales at its head, to effect it. He

was the author of 'Poems' (1850); 'The Trial for Salamis' (1850); 'Endowed Parish Schools and High Church Vicars' (1853); 'Queen Eleanor's Vengeance, and Other Poems' (1856); 'War Songs' (1857); 'Songs by a Song-Writer' (1858); 'Baby May, and Other Poems' (1859); 'Our Glory Roll, and Other National Poems' (1867); 'Contributions to a Ballad History of England, etc.' (1869); 'School-Book of Poetry' (1870); 'Songs for Sailors' (1872); 'Narrative Poems and Ballads' (1879); 'Songs of a Song-Writer' (1876); and 'Sea Songs' (1878).

Bennett, Sir William Sterndale, English composer: b. Sheffield 13 April 1816; d. London, 1 Feb. 1875. He became a pupil of the Royal Academy of Music in 1826, studying under Cipriani Potter, Crotch, and Lucas, and afterward Moscheles. By the advice of Mendelssohn, whose friendship he had gained, he studied in Leipsic from 1836 to 1838, and his performances and compositions were held in high esteem by the younger German musicians, and especially by Schumann. After a period spent in teaching, conducting, and composing, he was appointed professor of music at Cambridge in 1856, and was knighted in 1871. In 1868 he became principal of the Royal Academy of Music. He was too entirely dominated by Mendelssohn's influence to do great original work. He is best known by his overtures, 'The Naiads' and 'Parisina'; his cantatas, 'The May Queen' and 'Woman of Samaria'; and his little musical sketches, 'Lake,' 'Millstream,' and 'Fountain.'

Bennigsen, Levin Augustus (Baron Von), Russian soldier: b. Brunswick, 1745; d. 3 Oct. 1826. He entered the Russian service at an early age, and distinguished himself by his bravery in the war against Poland, under the Empress Catherine II. In 1806 he was appointed to command the Russian army which went to the assistance of the Prussians. He afterward fought the battles of Eylau and Friedland. After the Peace of Tilsit he retired to his estates. In 1813 he led the Army of Poland into Saxony, took part in the battle of Leipsic, and blockaded Hamburg. He was commander-in-chief in southern Russia, but finally settled in his native country, where he died.

Bennigsen, Rudolph von, German statesman: b. Luneberg, Hanover, 1825; d. Bennigsen, 7 Aug. 1902. After Hanover became a part of Prussia he was elected to the North German Diet and the Prussian Assembly, becoming vice-president of both. Entering the German Reichstag in 1871, he became prominent as leader of the National Liberals, warmly supporting Bismarck for years, but later opposing his policy toward the Socialists. After some years spent in retirement, Bennigsen re-entered politics in 1887 and continued active until 1898, when he resigned his position as president of the province of Hanover.

Bennington, Vt., town and county-seat of Bennington County, on the Bennington & R. and the Lebanon Springs R.R.'s; 36 miles east of Troy, N. Y., and 55 miles southwest of Rutland. It contains the villages of Bennington, North Bennington, and Bennington Centre; and has large woolen and knit-goods factories; a Soldiers' Home, a memorial battle monument, dedicated on the centennial of the admission of the State into the Union, 19 Aug. 1891; two national banks, public library, numerous churches, and graded public schools. There are valuable deposits of brown hematite ore in the town. The government consists of a town president and a board of trustees elected annually at town meetings under the charter of 1885. The town, which was named after Governor Benning Wentworth of New Hampshire, was settled in 1761, and for many years before Vermont became a State, was claimed by both New York and New Hampshire. Pop. (1900), 8,033.

Bennington, Battle of, one of the early battles of the Revolution, fought at Bennington, Vt., 16 Aug. 1777. The army of Gen. Burgoyne, marching to the south from Canada, and causing the abandonment of Ticonderoga by Gen. St. Clair, created the greatest commotion throughout New England, since Boston was supposed to be its point of destination. Gen. Stark chanced to be at the time at Bennington, having under his command a corps of New Hampshire militia, and he determined to confront a strong detachment of the enemy sent out under Col. Baum to procure supplies. He hastily collected the continental forces in the neighborhood, and on 16 August approached the British, whom, after a hot action of two hours, he forced to a disorderly retreat. The engagement was hardly over when a reenforcement arrived, sent by Gen. Burgoyne, and the battle was renewed, and kept up several hours till dark, when the British forces retreated, leaving their baggage and ammunition. The loss of the enemy was 207 killed, 600 taken prisoners, and 1,000 stand of arms. The Americans lost only 14 killed and 42 wounded.

Benno, Saint, bishop of Meissen (son of the Count of Bultenburg) and Apostle of the Slavs: b. Hildesheim, 1010; d. 1106. At 26 years of age he became a monk in the Benedictine convent of Saint Michael in his native town. His extraordinary virtues and learning caused his brethren to elect him abbot in 1042, but the dignity and office he resigned three months later. During the minority of Henry IV., he was appointed to the see of Meissen, and during his episcopate of 40 years he led the life of an ascetic. In the quarrel between Henry and the Saxon nobles he stood by the latter, and in consequence was led away prisoner when Henry passed through Meissen in 1075 after his victory on the Unstrut. He supported Pope Gregory VII. in the long dispute between the emperor and the Pope. He died at the advanced age of 96 years and his tomb in the Cathedral of Meissen was venerated as a shrine, until the remains were transferred to the cathedral in Munich. The Bavarians chose him as their patron saint after he was canonized by Hadrian VI. in 1523. See his 'Life' by Emser in the Bollandists for June 3d, also his 'Life' by Seyffort.

Benoit, Pierre Leopold Leonard, bĕ-nwä, pē-ār lā-ō-pōld lā-ō-nār, Flemish musician and composer: b. Harelbeke, Belgium, 17 Aug. 1834. He studied under Fétis. He has held the position of director of the Flemish School of Music in Antwerp since 1867, and has written a number of oratorios, cantatas, and operas. In

the first class of these compositions, his 'Lucifer,' 'The Drama of Christ,' and 'The War,' should be mentioned.

Benoit de Sainte-Maure, dė sănt-mōr, French trouvère and chronicler: b. Touraine; fl. in the 12th century. He wrote in about 42,300 octosyllabic verses a 'Chronicle of the Dukes of Normandy' to the year 1135. To him is usually ascribed the 'Romance of Troy,' founded on the story of the siege of Troy as written by Dictys Cretensis and Dares; it was translated into the languages of western Europe. Boccaccio, Chaucer, and Shakespeare would seem to be indebted to Benoit for the story of the loves of Troilus and Briseis (Cryseyde or Cressida being originally called Briseida).

Bensel, James Berry, American poet and novelist: b. New York, 2 Aug. 1856; d. 3 Feb. 1886. He lived most of his life at Lynn, Mass., and was a contributor to magazines. He wrote 'King Kophetua's Wife' (1884), a novel; 'In the King's Garden, and Other Poems' (1886).

Benserade, Isaac de, bäñ-s'räd, ē-säk dė, French poet: b. Lyons-la-Farêt, Normandy, 1612; d. Gentilly, 1691. He wrote for the stage, and composed a great number of ingenious verses for the king and many distinguished persons at court. In the first half of the reign of Louis XIV. the court and its followers patronized songs of gallantry, rondeaux, triolets, madrigals, and sonnets, containing sallies of wit, conceits, and effusions of gallantry in the affected style then prevalent. No one succeeded so well in this art as Benserade, who was therefore, by way of eminence, called *le poète de la cour.* He received many pensions for his performances and lived at great expense. Wearied at last with the life he led he retired to his country-seat, Gentilly.

Bensley, Thomas, English printer: d. 1833. He is much known for an edition of 'Lavater,' printed by him in 1789, in 5 volumes quarto, and for an edition of the English Bible between 1800 and 1815, in 7 volumes quarto. He also printed Shakespeare in 1803, in 7 volumes octavo, and in 1806 Hume's 'England' in 10 volumes folio, which is adorned with elaborate portraits and engravings on copper. He was prominent also in the construction of the machine printing-press invented by Köenig and applied to printing the *Times* newspaper in 1814.

Benson, Arthur Christopher, English author: (son of Edward White Benson, and brother of Edward Frederic, qq.v.) b. 24 April 1862. He was educated at Eton and Cambridge. In 1885 he was appointed master of Eton College. He is the author of several volumes of poems, published in 1893, 1895, 1896, and 1900; and also of 'Memoirs of Arthur Hamilton' (1886); 'Archbishop Laud' (1887); 'Men of Might' (with Mr. Tatham); 'Fasti Etonenses' (1899); 'Life of Archbishop Benson' (1899); 'The Schoolmaster' (1902); and 'Tennyson' (in the 'Little Biographies' Series).

Benson, Carl, pseudonym of **Charles Astor Bristed** (q.v.).

Benson, Edward Frederic, English author: (son of Edward White Benson and brother of Arthur Christopher qq.v.) b. Wellington College, 24 July 1867. He was educated at King's College, Cambridge; worked at Athens for the British Archæological School (1892–5), and in Egypt, for the Hellenic Society (1895). His writings include 'Dodo' (1893), a novel of London society; 'Six Common Things' (1893); 'Rubicon' (1894); 'Judgment Books' (1895); 'Limitations' (1896); 'The Babe' (1897); 'Vintage' (1898); 'The Capsina' (1899); 'An Act in a Backwater' (1904).

Benson, Edward White, Archbishop of Canterbury: b. near Birmingham, 1829; d. Hawarden, 11 Oct. 1896. He graduated at Cambridge in 1852 as a first-class and senior optime, and was for some time a master at Rugby. He held the headmastership of Wellington College from its opening in 1858 to 1872, when he was made a canon and chancellor of Lincoln Cathedral. In 1875 he was appointed chaplain in ordinary to the queen, and in December 1876 was nominated to the newly erected bishopric of Truro. Here he began the building of a cathedral (1880–7), most of the first cost, £110,000, having been gathered by his own energy. In 1882 he was translated to Canterbury to succeed Dr. Tait as primate of all England. A high-churchman, Dr. Benson was frequently select preacher at both universities, and published several volumes of sermons, a small work on 'Cathedrals,' and a valuable article on 'St. Cyprian.' A distinguished ecclesiastical lawyer and diplomatist, he gave the important judgment in the Lincoln case on ritual.

Benson, Egbert, American jurist and politician: b. New York, 21 June 1746; d. Jamaica, N. Y., 24 Aug. 1833. He was graduated at Columbia College 1765; was member of Congress 1784–8, 1789–93, and 1813–15; judge of the supreme court of New York 1794–1801; and became a judge of the United States circuit court. He wrote a 'Vindication of the Captors of Major André,' and 'Memoir on Dutch Names of Places.'

Benson, Eugene, American artist and miscellaneous writer: b. Hyde Park, N. Y., 1840. Residing in Rome, Italy, he has contributed to American magazines. He has written 'Gaspara Stampa' (1881), a biography, with selections from her sonnets; 'Art and Nature in Italy' (1882).

Benson, Frank Weston, American painter: b. Salem, Mass., 24 March 1862. He was educated at the Museum of Fine Arts, Boston, and in Paris; became a member of the Society of American Artists in 1888. He won the Hallgarten and the Clarke prizes at the National Academy of Design in 1889 and 1891; has done much in figure work with outdoor effects, but is best known for his portraits.

Bent, James Theodore, English traveler: b. Liverpool, 30 March 1852; d. London, 6 May 1897. He graduated at Oxford University in 1875, and managed excavations in Greece for the British Museums and the Hellenic Society. His publications include: 'A Freak of Freedom, or the Republic of San Marino' (1879); 'Genoa: How the Republic Rose and Fell' (1880); 'Life of Giuseppe Garibaldi' (1881); 'The Cyclades, or Life Among the Insular Greeks' (1885).

Bent, Silas, American naval officer: b. St. Louis, 10 Oct. 1820; d. 1889. He entered the navy in 1836; served in the Seminole war, and was with Commodore Glynn and Commodore Perry on several cruises to Japan. He was always especially active in survey work; on

Perry's Japan expedition he had charge of the hydrographic survey, and his excellent work became the basis of the surveys undertaken later by the Japanese government. His most important work was to delineate and describe scientifically the Kuro Shiwo, or Black Tide, the great northward-flowing stream of the Pacific, corresponding to the Atlantic Gulf Stream.

Bent-grass (*Agrostis*), a genus of grasses usually regarded as weeds except in soils which cannot produce better. Common bent-grass or purple bent (*A. vulgaris*) is a fine-leaved species with trailing stems rooting at the joints, and small thin panicles of purplish satiny flowers. It overruns dry, gravelly, sandy places with its wiry stems, and becomes a troublesome weed, only to be got rid of by pulling up early in the season before the seed is ripe, or by frequent harrowing. It is, however, sometimes sown in warrens and in places where nothing better will grow. March bent, white bent, or fiorin grass (*A. stolonifera*), has broader leaves than common bent, a much closer and larger panicle, and green or pale flowers. It is very common in low, damp places, which it overruns with its compact, trailing, rooting stems, and is a useful grass in newly reclaimed bogs or land liable to inundation. Brown bent-grass (*A. canina*) is known in the United States as Rhode Island bent-grass, and is highly prized as a lawn grass. Herd-grass (*A. cornucopia* or *dispar*) has large panicles of green flowers, which form an almost level top.

Bentang. See ERIODENDRON.

Benteen, Frederick William, American soldier: b. Petersburg, Va., 24 Aug. 1834; d. 22 June 1898. He was educated in his native state; and at the outbreak of the Civil War went to Missouri and organized a company of Union volunteers. He became first lieutenant of the 10th Missouri Cavalry, 1 Sept. 1861; promoted captain, 1 Oct. 1861; major, 18 Dec. 1862; lieutenant-colonel, 27 Feb. 1864; and colonel of the 138th United States Colored Infantry, 15 July 1865; mustered out of volunteer service 6 Jan. 1866. On 28 July 1866 he was commissioned captain in the 7th cavalry; promoted major of the 9th cavalry, 17 Dec. 1882; and retired 7 July 1888. His most brilliant service after the war was in his campaigns against the Indians.

Benthal Fauna, the abyssal or deep-sea fauna; the great assemblage of animals living at all depths below 150 fathoms in the North Atlantic, to 500 fathoms in the tropics. See also DEEP-SEA LIFE.

Bentham, George, English botanist; nephew of Jeremy Bentham (q.v.): b. near Plymouth, 22 Sept. 1800; d. 10 Sept. 1884. He was privately educated, early attached himself to botany, and having resided in southern France (where his father had an estate), 1814–26, he published in French (1826) a work on 'The Plants of the Pyrénées and Lower Languedoc.' Having returned to England he studied law, and on this subject, as well as logic, he developed original views. Finally, however, he devoted himself almost entirely to botany; was long connected with the Horticultural Society and the Linnæan Society; and from 1861 onward was in almost daily attendance at Kew (except for a few weeks occasionally), working at descriptive botany from 10 to 4 o'clock as a labor of love. Along with Sir J. D. Hooker he produced the great work of descriptive botany, 'Genera Plantarum'; another great work of his was the 'Flora Australiensis' (in 7 volumes). His 'Handbook of the British Flora' is well known.

Ben'tham, Jeremy, English jurist and publicist: b. London, 15 Feb. 1748; d. London, 6 June 1832. After an early education at Westminster School he went to Oxford in his 13th year, taking his bachelor's degree at 15, and his master's degree at 18. He studied English law, but never appeared at the bar, being enabled by easy circumstances to devote himself entirely to literary compositions. He did not, however, publish his chief works himself. They were arranged and translated into French by his friend, Etienne Dumont, and printed partly in Paris and partly in London. Among them are: 'Treatises on Civil and Penal Legislation' (Paris 1802, 3 vols.), and 'Theory of Punishments and Rewards' (London 1801, 2 vols.). Bentham advocated a thorough correction of civil and criminal legislation. His 'Fragments on Government,' in opposition to Blackstone, appeared anonymously in 1776, and with his name, London 1823. In France his literary labors found a better reception than in England or Germany. A small pamphlet on the liberty of the press (London 1821) was addressed by him to the Spanish Cortes during their discussion of this subject; and in another ('Three Tracts Relative to the Spanish and Portuguese Affairs,' London 1821) he refuted the idea of the necessity of a house of peers in Spain, as well as Montesquieu's proposition that judicial forms are the defense of innocence. One of his latest works was the 'Art of Packing' (London 1821), that is, of arranging juries so as to obtain any verdict desired. His previous work, 'Essay on Parliamentary Practice,' edited from the author's papers by Dumont (Geneva 1815), and translated into German, contains many useful observations. His 'Introduction to the Principles of Morals and Legislation' (London 1823, 2 vols.) treats of the principal objects of government in a profound and comprehensive manner. Zanobelli has translated Bentham's 'Theory of Legal Evidence' into Italian (Bergamo 1824, 2 vols.). Among the earlier works of Bentham was his 'Defense of Usury,' showing the Impolicy of the Present Legal Restraints on the Terms of Pecuniary Bargains' (1787). At his death Mr. Bentham bequeathed his body to be dissected for the benefit of science. A complete edition of his works, with a biography by Bowring, was published in London (11 vols. 1843). He was a man of primitive manners, unblemished character, and undoubted earnestness in the cause of the people at large. He is considered the father of the Utilitarians, or those moral, political economists who view everything as it is affected by the principle of «the greatest happiness of the greatest number.»

Benthos, the constantly or periodically submerged vegetation attached to the bottoms of seas and, to some extent, of lakes, distinguished from the floating vegetation. (See PLANKTON.) Commencing at the high-tide line and progressing toward the low-tide line the vegetation gradually becomes more abundant and luxuriant, but reaches its maximum below the low-tide mark in areas wholly submerged, in which at medium depths individual development is

greater than at greater depths. The benthos of the frigid zones are the most remarkable of the world. The leading plants of such formations are green, red, and brown algæ, eel-grass, and rockweed.

Ben'tinck, Lord William Charles Cavendish, English soldier and statesman (second son of the third Duke of Portland): b. 14 Sept. 1774; d. Paris, 17 June 1839. He entered the army at an early age, and served in the Duke of York's campaign in Flanders, and also in Italy with the Russian army under Suwaroff, 1799–1801. In 1803 he proceeded to India as governor of Madras, returned thence in 1805, and subsequently went to Spain, where he commanded a brigade under Sir John Moore at Corunna. In 1810 he visited Sicily as British plenipotentiary, and commander-in-chief of the English troops. The most noticeable feature of this expedition is his bestowment on the Sicilians of a constitution, which, however, was overturned on the restoration of the Bourbons. He conducted in 1813 the expedition from Sicily to Catalonia, and in 1814 took possession of Genoa on the revolt of the inhabitants from French rule. The same year he returned to England, and subsequently entered Parliament as member for Nottingham. In 1827, under Mr. Canning's administration, he was sent to India as governor-general, and held that office till 1835, when he returned to England. Among the principal events of his administration are the abolition of the practice of suttee, the repeal of the restrictions which prohibited all Europeans, except servants of the company, from settling in India, and the recognition of the liberty of the press. In 1836 he again entered Parliament as member for the city of Glasgow, but was now unable from ill health to take any active share in political matters.

Bentinck, Lord William George Frederick Cavendish, generally known as Lord George Bentinck, English statesman (son of William Henry Cavendish, fourth Duke of Portland); b. 27 Feb. 1802; d. 21 Sept. 1848. He entered the army, but quitted it early to become private secretary to Mr. Canning, who had married his mother's sister. In 1827 he entered Parliament as member for King's Lynn, and continued to represent that borough for the rest of his life. Up to 1846 he was a warm adherent of Sir Robert Peel and his measures; but on the latter announcing himself in that year a convert to free-trade principles, Lord George abandoned his old ally and came forward as the zealous and indefatigable leader of the Protectionists in the House of Commons. With the assistance of Disraeli he maintained this position for two years, and though often illogical, and sometimes unscrupulous in his statements, he nevertheless commanded much attention by the vigor and earnestness of his oratory and deportment.

Bentivoglio, Cornelio, bĕn-tē-vōl'yō, cornāl'yō, Italian ecclesiastic and poet: b. Ferrara, 1668; d. Rome, 1732. He early distinguished himself by his progress in the fine arts, literature, philosophy, theology, and jurisprudence, and was a patron of the literary institutions at Ferrara. Pope Clement XI. made him his domestic prelate and secretary to the apostolic chamber, and sent him, in 1712, as nuncio to Paris, where, during the last years of the reign of Louis XIV., he acted an important part in the affair of the bull Unigenitus. The Duke of Orleans, regent after the death of Louis, was not favorably disposed toward him; the Pope therefore transferred him to Ferrara, and in 1719 bestowed on him the hat of a cardinal, and employed him at first in Rome, near his own person, then as legate *a latere* in Romagna, etc. Poetry had occupied his leisure hours. Sonnets composed by him may be found in Gobbi's Collection, Vol. III., and in other collections of his time. Under the name of Selvaggio Porpora he translated the 'Thebais of Statius' into Italian.

Bentivoglio, Guy or **Guido,** gē'dō, Italian historian and ecclesiastic: b. Ferrara, 1579; d. Rome, 1644. He studied at Padua with great reputation, and afterward, fixing his residence at Rome, acquired general esteem by his prudence and integrity. He was an able politician, and his historical memoirs are valuable, especially his 'History of the Civil Wars in Flanders,' written in Italian, and first published at Cologne (1630), a translation of which, by Henry, Earl of Monmouth, appeared in 1654 (London, folio). His own 'Memoirs' and a collection of letters are reckoned among the best specimens of epistolary writing in the Italian language (an edition of which was published at Cambridge in 1727).

Bentley, Charles Eugene, American clergyman: b. Warner's, N. Y., 30 April 1841. He was educated at Monroe Institute and Oneida Seminary. In 1866 he removed to Iowa and in 1878 to Butler County, Neb., where he resided until 1890. He was ordained a Baptist clergyman in 1880 and was in charge of a church at Surprise, Neb. In 1884, he was chairman of the Nebraska Prohibition Convention, and became the unsuccessful candidate for congress, governor, and United States Senator during the next eight years. When the Prohibition party divided in 1896, he became presidential candidate of the faction known as the Liberty Party (q.v.).

Bentley, Gideon, American soldier: b. 1751; d. Constantia, Oswego County, N. Y., January 1858. He was remarkable for his longevity (107 years), and for the excellent though humble services which he rendered as a private soldier in the Revolutionary War.

Bentley, John Francis, distinguished English architect: b. Doncaster, England, 1839; d. Clapham, London, 2 March 1902. Upon the rebuilding of the great parish church in Doncaster, about 1856, Bentley was placed in the office of the clerk of the works, his architectural education practically beginning at this time. In 1862 he began practice as an architect on his own account, and his patrons from that date onward were mainly Roman Catholics. Among his lesser works are the Roman Catholic church and convent at Bocking, Essex; and the new Roman Catholic cathedral in Brooklyn, N. Y.; but the building with which his name will be inseparably associated is the Roman Catholic cathedral at Westminster, a structure of vast proportions with a nave wider than that of any church in England. Bentley left nothing in the way of design to subordinates, but designed and directed everything from the foundation to the minutest decorative feature. Bentley's death took place just as the Royal Institute of British Architects had voted to award him the royal gold medal.

Bentley, Richard, English divine, classical scholar, and polemicist: b. near Wakefield, Yorkshire, 1662; d. Cambridge, 14 July 1742. His father is said to have been a blacksmith. To his mother, a woman of strong natural abilities, he was indebted for the rudiments of his education, and in 1776 he entered Saint John's College, Cambridge. In 1682 he left the university, and became usher of a school at Spalding; a year later he took the position of tutor to the son of Dr. Stillingfleet, dean of St. Paul's. He accompanied his pupil to Oxford, where he availed himself of the literary treasures of the Bodleian Library in the prosecution of his studies. In 1684 he took the degree of A.M. at Cambridge, and in 1689 obtained the same honor at the sister university. His first published work was a Latin epistle to Dr. John Mill on an edition of the 'Chronicle of John Malela,' which appeared in 1691. It displayed so much profound learning and critical acumen as to excite the sanguine anticipations of classical scholars from the future labors of the author. Dr. Stillingfleet, having been raised to the bishopric of Worcester, made Bentley his chaplain, and in 1692 collated him to a prebend in his cathedral. He was chosen the first preacher of the lecture instituted by the celebrated Robert Boyle for the defense of Christianity. The discourses against atheism which he delivered on this occasion were published in 1694; they have since been often reprinted, and translated into several foreign languages.

In 1693 he was appointed keeper of the Royal Library at Saint James'— a circumstance which incidentally led to his famous controversy with the Hon. Charles Boyle, afterward Earl of Orrery, relative to the genuineness of the 'Greek Epistles of Phalaris.' In this dispute Bentley was victorious, though opposed by the greatest wits and critics of the age, including Pope, Swift, Garth, Atterbury, Aldrich, Dodwell, and Conyers Middleton, who advocated the opinion of Boyle with an extraordinary degree of warmth and illiberality. In 1699 Bentley, who had three years before been created D.D., published his 'Dissertation on the Epistles of Phalaris,' in which he proved that they were not the compositions of the tyrant of Agrigentum, who lived more than five centuries before the Christian era, but were written by some sophist under the borrowed name of Phalaris, in the declining age of Greek literature.

Soon after this publication Dr. Bentley was presented by the Crown to the mastership of Trinity College, Cambridge, worth nearly £1,000 a year. He now resigned the prebend of Worcester, and in 1701 was collated to the archdeaconry of Ely. His conduct as head of the college gave rise to accusations of various offenses, including embezzlement of college money. The contest, lasting more than 20 years, was decided against him, a sentence, depriving him of his mastership, being passed; but Bentley's superior skill and mastery of legal forms constantly baffled all attempts to oust him. In 1711 he published a quarto edition of Horace at Cambridge, which was reprinted at Amsterdam; and in 1713 appeared his remarks on 'Collins' Discourse on Free-Thinking,' under the form of a 'Letter to F. H. (Francis Hare), D.D., by Phileleutherus Lipsiensis.' He was appointed regius professor of divinity in 1716, and in the same year issued proposals for a new edition of the Greek Testament, an undertaking for which he was admirably qualified, but which he was prevented from executing in consequence of the animadversions of his determined adversary, Middleton. In 1726 he published an edition of Terence and Phædrus; and his notes on the comedies of the former involved him in a dispute with Bishop Hare on the metres of Terence. The last work of Dr. Bentley was an edition of Milton's 'Paradise Lost,' with conjectural emendations, which appeared in 1732, but this proved a failure. He died at the master's lodge at Trinity, and was interred in the college chapel. The German scholar, J. A. Wolf, wrote an excellent biography of Bentley; and an English biography of him was written by Monk (London, 2 vols. 1833). See also Prof. Jebb's monograph in the 'English Men of Letters Series' (1882).

Bentley, William, American clergyman: b. Boston, 1758; d. 29 Dec. 1819. He graduated at Harvard College in 1777, and was ordained pastor of a church in Salem in 1783. He was distinguished for his antiquarian learning, and collected a valuable and curious library and cabinet, which he bequeathed to the college at Meadville, Pa., and to the Antiquarian Society at Worcester. In theology he was regarded as a Unitarian, and he left several published sermons and discourses.

Benton, Angelo Ames, American clergyman: b. Canea, Crete, 1837. He graduated at Trinity College, Hartford, Conn., 1856, and at the General Theological Seminary, New York city. He was ordained in the Episcopal ministry in 1860. He was professor of Latin and Greek in Delaware College, Newark, Del., 1883–7, and professor of dogmatic theology in the University of the South, 1887–94. His chief publication has been 'The Church Cyclopædia: A Dictionary of Church Doctrine' (Phila. 1884).

Benton, Dwight, an American artist, writer and botanist: b. Norwich, N. Y., 1834; d. Rome, 8 May 1903. After close of the Civil War, in which he fought on the Northern side, he established himself in Cincinnati as a landscape painter. From there he went to Rome where he lived 25 years almost uninterruptedly. In 1895 Hawaii, before its annexation, appointed him its Consul-General to Italy. His most famous canvases are 'Tombs of Keats and Shelly,' 'Sunset in the Roman Campagna,' and 'A Gloomy Day' (*giornata de Tristezza*), owned by the King of Italy. His work, 'Flora of the Roman Campagna and Palatine' is his most important contribution to literature.

Benton, James Gilchrist, American soldier and inventor: b. Lebanon, N. H., 15 Sept. 1820; d. Springfield, Mass., 23 Aug. 1881. He graduated at West Point in 1842, and served in the ordnance department throughout his life. He was in command of the Washington Arsenal and principal assistant to the chief of ordnance during the Civil War, at the close of which he was transferred to the Springfield (Mass.) Arsenal. For signal bravery in rescuing exposed ammunition from fire, he was twice brevetted. The various models of the Springfield rifle, known as the models of 1866, 1868, 1873, and 1879, were made under his direction. He devoted himself especially to the improvement of firearms, and acquired distinction for his valuable inventions in this and other lines of his work. He refused to patent any of them, as he held that since the

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government had educated him it had every right to benefit from his time and talents. He published 'Course of Instruction in Ordnance and Gunnery for the United States Military Academy' (1861; 4th ed. 1875).

Benton, Thomas Hart, American statesman: b. Orange County, N. C., 14 March 1782; d. 10 April 1858. He was the greatest of that most valuable and scarcely appreciated class, the Border State leaders, whose sympathies were with the South, and who had no feeling against slavery, yet at the cost of their influence and much personal peril opposed the political aggressions of slavery and the doctrines of disunion. Early orphaned, the eldest of a large family, after part of a course in the University of Pennsylvania he went with his mother to Tennessee as a pioneer, settling at the present Bentontown. A few years later he took up the study of law, and was admitted to the bar in 1811 under the patronage of his friend Andrew Jackson, then a judge of the Supreme Court. Elected to the legislature, he pushed through a judiciary reform bill, and one to give slaves the right of jury trial. In the War of 1812 he was aide-de-camp to Jackson, raised a volunteer regiment, was made lieutenant-colonel in the regular army, but saw no active service; meanwhile, 4 Sept. 1813, a misunderstanding over a duel of his brother's led to an affray in which the brother was stabbed, Jackson shot, and Thomas H. thrown downstairs, and the former friends were at bitter feud for many years. In 1815 he removed to St. Louis, practised law, and established a newspaper, which involved him in duels (one of which cost his opponent's life, to Benton's lasting regret); but which he used so vigorously to advocate Missouri's admission to the Union as a slave State that she elected him one of her senators on her entrance in 1820, and re-elected him every term for 30 years. During this time he stood as one of the foremost public men of his generation — a speaker of great ability and mastery of facts, a hard-headed logician and tremendous debater, of astonishing memory, unwearying industry, an iron will and physique, and a power of wit, sarcasm, and denunciation that made most men shrink from a contest with him. Being the spokesman of the Western Democrats, his policy and political feelings were coincident with Jackson's, their personal quarrel was at last arranged, and Benton became Jackson's first lieutenant and admiring champion. In every regard he supported Western interests: he secured the passage of laws for pre-emption, donation, and graded prices of lands, for throwing open the government mineral and saline lands to occupancy, and for repeal of the salt tax; advocated transcontinental exploration and post-roads, a Pacific railroad, occupation of the mouth of the Columbia, trade with New Mexico, military stations through the Southwest, amicable relations with Indian tribes, and everything conducive to opening up the West and making it prosperous. This made him invincible there till the slavery question drove him into opposition. He supported Jackson in his refusal to re-charter the United States Bank; and made a series of speeches urging the adoption of a metallic currency only, which were widely circulated, gained him the nickname of «Old Bullion,» and had much to do with the creation of the sub-treasury scheme. When Jackson removed the secretary of the treasury, Duane, for refusing to check out the deposits in the bank, the Senate adopted a resolution censuring him for it; Benton set about having the resolution expunged from the records, and after a protracted struggle succeeded, despite the logical absurdity of his motion, in accomplishing his purpose by a series of fervid panegyrics on Jackson. In the Nullification contest, Benton was Calhoun's chief opponent, not only as Jackson's supporter, but by conviction; and the two men of might — the chiefs of the State-Rights and Nationalist wings of the Democracy — remained deadly foes until Calhoun's death. In the Oregon boundary dispute Benton opposed the «fifty-four forty or fight» war-cry; it was dropped, but the Polk administration was glad of an excuse to drop it in order to push the Mexican war, and had no notion of diminishing the area of slavery to enlarge that of freedom. He favored the vigorous prosecution of the war, and came near being made commander-in-chief, from his close acquaintance with the territory. But from this time on, the slavery problem swallowed up every other. Benton fought Calhoun's State-Rights resolutions in retort to the Wilmot Proviso (q.v.), and they never came to a vote; but Calhoun sent them to various State legislatures to adopt and utilize for instructing their senators, and they were pushed through the Missouri legislature without Benton's knowledge. He denounced them as misrepresenting the people, canvassed his State for re-election in a long-famous series of powerful and caustic speeches, and carried his party, but was defeated by a fusion of Whigs and anti-Benton Democrats, and his senatorial service ended with 1850. He opposed the Clay compromise resolutions of that year, however (see COMPROMISE of 1850), with sarcasm still quoted. In 1852 he canvassed Missouri for election to the lower House, and was triumphantly returned. He supported Pierce for election, and in Congress till the Kansas-Nebraska bill came up. Against that he made one of his greatest speeches, and the administration thereupon ousted all his Missouri supporters, and he was defeated for re-election by the now dominant ultra-Southern sentiment in the Democratic party. The time of mediators and middle courses had gone by. He now set about writing his remarkable 'Thirty Years' View' (1854–6), a most valuable account of his senatorial experiences and the secret political history of the years 1820–50. In 1856 he ran for governor, but a third ticket in the field defeated him. In the campaign of 1856 he supported Buchanan against his own son-in-law, Frémont, as representing the party of union; but materially changed his mind before his death. In these last two years, though in extreme old age, he carried through the immense and useful labor of compiling an abridgment of the debates in Congress, from the foundation of the government to 1850, published later in 15 volumes. He also published an 'Examination of the Dred Scot Case' (1857).

Benton Harbor, Mich., a city in Berrien County, situated on the St. Joseph's River, one and a half miles from Lake Michigan; on the Cleveland, C. & C., and Père Marquette R.R.'s. It is also connected with the lake by a ship canal and thus by steamboat lines with Chicago and Milwaukee. It has a large trade in lumber, grain, and fruits, especially the latter, and has

also considerable manufacturing interests, including manufactories of fruit packages, furniture, machinery, flour, vinegar, and canned fruit. Pop. (1900) 6,562.

Bentonville, Ark., a town and county-seat of Benton County, situated northwest of Little Rock; on the Arkansas & O. R.R. It is the seat of Bentonville College, and a Baptist academy; is the centre of a fruit-growing region, has some trade in fruit, tobacco, and grain. It has a large fruit-evaporating plant. Pop (1900) 1,843.

Bentonsville, N. C., a village in Johnston County, noted as the place of a stubborn battle during the Civil War. Here, during his march from Savannah through the Carolinas, Sherman, at the head of 65,000 National troops, encountered 24,000 Confederates under Johnston. A battle took place 18 March 1865, Johnston having come up in great haste from Smithfield, intending to surprise Sherman. The latter, however, was ready for him, and Johnston was thrown on the defensive near Mill Creek. Johnston was partially defeated and retreated to Smithfield.

Bentzel-Sternau, bĕnt'zĕl-stär'now, **Count Karl Christian Ernst von,** German novelist: b. Mentz, 9 April 1767; d. Mariahalden, Switzerland, 13 Aug. 1843. He is esteemed as a humorist after the manner of Jean Paul; and his satirical romances, 'The Golden Calf' (1802–3); 'The Stone Guest' (1808); 'Old Adam' (1819–20); 'The Master of the Chair,' together form a series.

Bentzon, Th., the pseudonym of **Marie Thérèse Blanc** (q.v.).

Benue, bĕn'wē, or **Binue,** a river of west Africa, the chief tributary of the Niger. It rises in the Bub'n Jidda hills on the east of Adamawa, flows for a short distance northwest then west to Bassama, after which its course is generally southwest to its junction with the Niger at Lokoja. Its length is about 850 miles. The source of the Benue was long unknown. Dr. Barth, who came upon the river in 1851, while traveling in Adamawa, near the confluence of the Faro, which joins it on its left bank about lat. 12° 30′ E., was told that it came from the southeast, a distance of nine days' journey. In consequence of this discovery an expedition was fitted out by the British government for the purpose of exploring the Niger from its mouth upward. The exploration was made in a small steamer called the Pleiad, and was under the command of Dr. William Balfour Baikie. After reaching the point of confluence of the Benue with the Niger, about lat. 7° 40′ N., Dr. Baikie followed the former eastward for a direct distance of about 370 miles. The point thus reached was about lat. 9° 25′ N.; lon. 11° 30′ E. There was sufficient depth of water, though the river was only rising, to allow a still further exploration. The natives, however, had begun to display their hostility in such a manner as made it necessary to return. The result was to show that a large, fertile, and populous tract of a region of Africa previously in a great measure unknown was accessible by means of a navigable river. A second expedition, also under Dr. Baikie, explored the same river in 1857. In 1879 a small steamer belonging to the Church Missionary Society went up the river 140 miles, and its source was discovered by Flegel in 1883.

Benvolio, bēn-vō'lĭ-o, in Shakespeare's 'Romeo and Juliet,' a friend of Romeo and nephew of Montague.

Benwood, W. Va., a town in Marshall County; on the Baltimore & O. R.R. It is the centre of a large iron-mining region and has several rolling mills and blast furnaces. Pop. (1900) 4,511.

Benzal'dehyde, or **Benzo'ic Al'dehyde,** a colorless, volatile oil, familiarly known as "oil of bitter almonds." Benzaldehyde does not occur in the bitter almond in nature, but is formed, when the kernels are crushed and allowed to stand in water, by the decomposition of a glucoside known as "amygdalin." It has the chemical formula $C_6H_5.CO.H$, boils at 354° F., and has a specific gravity of about 1.05, and a refractive index of 1.56. Benzaldehyde is prepared, artificially, by boiling benzyl chlorid with nitrate of lead, copper, or sodium, and subsequent treatment with sodium acid sulphite, with which the benzaldehyde forms a crystalline compound that may be easily separated from the mother liquor by filtration or otherwise.

Ben'zene, an aromatic hydrocarbon discovered by Faraday in 1825, and called, by him, "bicarburet of hydrogen." It has the chemical formula C_6H_6, and is the fundamental substance from which the extensive series of "aromatic compounds" is obtained. In 1849, C. B. Mansfield proved its existence in coal tar, and that substance now constitutes its most important commercial source. In the manufacture of benzene, coal tar is distilled at a temperature not exceeding 300° F., and the distillate is treated with caustic soda to remove phenols, and subsequently with sulphuric acid to remove basic substances. It is then re-distilled, the temperature (at least in the upper part of the still) being kept as low as 212° F., in order to prevent toluene from passing over. In order to effect a still further purification, the benzene so obtained may be cooled by a freezing mixture of ice and salt. The true benzene solidifies when thus treated, and the fluid impurities that it contains may be expelled by pressure, or by the aid of a centrifugal drier. Pure benzene is a colorless liquid, strongly refractive, boiling at about 176° F., and freezing at 43° F. It does not mix with water, but mixes readily with alcohol, acetone, glacial acetic acid, chloroform, and ether. It crystallizes in the trimetric system when solidified by cold, and dissolves iodine, phosphorus, sulphur, oils, resins, fats, and alkoloids. It expands by about 0.00075 of its own bulk, per degree increase in its temperature, on the Fahrenheit scale. Its specific gravity is about 0.88, and its specific heat is 0.40. For the chemical constitution of benzene, see Aromatic Compounds.

Benzene forms two general classes of compounds, known respectively as "addition" and "substitution" products. In forming an "addition" compound, benzene merely takes up atoms or molecules of some other substance, without parting with any of its own atoms; the new substance being simply "added" to the benzene. Benzene hexabromid, $C_6H_6Br_6$, is a good example of a benzene addition compound. It is formed by dropping bromine into boiling benzene, in direct sunlight; the hexabromid crystallizing out upon cooling. The "substitution" compounds of benzene are far more numerous

and important than the «addition» compounds, however. They are formed by replacing one or more of the typical hydrogen atoms in the benzene by an equal number of other atoms or monad radicals. The general theory of benzene substitutions is given under AROMATIC COMPOUNDS; but a few of the more important examples of such substitution products may be given here. The radical C_6H_5 (which is not capable of independent existence) is called «phenyl,» and is often represented by the symbol Ph. The mono-substitution compounds of benzene, in which one atom of the hydrogen in the original benzene has been replaced by a radical (or by an atom different from hydrogen), may then be regarded as addition compounds of the radical phenyl. Thus «monochlorbenzene,» $C_6H_5.Cl$, may also be regarded as chlorid of phenyl, and its formula may be written PhCl. Benzene itself may even be regarded as hydrid of phenyl, its formula being written $C_6H_5.H$, or PhH. Carbolic acid (or «phenol») is hydrate of phenyl, its formula being PhOH, the radical OH being here substituted for one atom of the hydrogen in the original benzene. Nitrobenzene, $PhNO_2$, is formed from benzene (PhH) by the action of nitric acid, in accordance with the equation

$$PhH + HNO_3 = PhNO_2 + H_2O.$$

It is used in the arts for the manufacture of aniline (q.v.). Aniline itself is an amide of phenyl, obtained by replacing an atom of H in ammonia (NH_3) by phenyl, or by replacing an atom of hydrogen in benzene by the radical NH_2. The formula of aniline may be written $PhNH_2$, and aniline may be called «amidobenzene,» or «phenylamine.» (See AMINE and AMIDE.) Methyl-benzene, $C_6H_5.CH_3$, in which one of the original hydrogen atoms of the benzene is replaced by the radical CH_3 («methyl») is also an important benzene substitution compound, and is known to chemists as toluene (q.v.). That portion of the original benzene which remains intact, after a substitution, is called the «benzene residue.» In a mono-substitution compound of benzene, further substitutions may be made, by replacing one or more of the hydrogen atoms in the «benzene residue» by monovalent radicals, and secondary, tertiary, and higher substitution compounds may be thus formed. The classification of the secondary substitution compounds is given under Aromatic Compounds. For the classification of higher compounds, special treatises on organic chemistry must be consulted. It may be mentioned, however, that if A, B, C and D are monad radicals, there are no less than 30 distinct substances possible, which shall all have the same general formula $C_6H_2.ABCD$. This fact illustrates the exceeding complexity of the general theory of benzene substitution compounds. The full theory is even more complex than this example indicates, however, for it often happens that the hydrogen in a substituted radical can be replaced by another radical, as well as the hydrogen of the «benzene residue.» Thus in methylbenzene (or toluene), $C_6H_5.CH_3$, the radical OH may be substituted for one of the hydrogen atoms. If the hydrogen so displaced occurs in the «benzene residue,» the resulting compound will be «cresol,» $C_6H_4(OH).CH_3$, a substance which (since it is a di-substitution compound) can exist in three isomeric forms. If, on the other hand, the OH takes the place of one of the hydrogen atoms of the «methyl» radical, the resulting compound will be «benzyl alcohol,» $C_6H_5.CH_2(OH)$.

When a primary amine of the fatty series is acted upon by nitrous acid (HNO_2), the NH_2 group of the amine is replaced by OH, with the formation of an alcohol; but when nitrous acid acts upon aromatic amines, the products are quite different, and are known as «diazo-compounds.» Thus when nitrous acid acts upon aniline nitrate, a compound having the formula $C_6H_5.N_2.NO_3$, and known as «diazobenzene nitrate,» is formed. This is regarded by chemists as a compound of the hypothetical monovalent radical $C_6H_5{-}N{=}N{-}$. When the free affinity of this radical is saturated by the addition of phenyl (C_6H_5), the resulting compound, $C_6H_5.N_2.C_6H_5$, is known as «azobenzene,» or as «benzene-azo-benzene.» Azobenzene may be prepared by heating nitrobenzene with a solution of $SnCl_2$ in aqueous caustic soda. It is deposited from a solution in benzene in the form of bright red trimetric plates, and owes its importance largely to the fact that aniline yellow, $C_6H_5.N_2.C_6H_4(NH_2)$, is one of its derivatives.

Benzene is an exceedingly inflammable substance, burning with a luminous flame and the generation of a great amount of heat. It is volatile, and its vapor forms a dangerously explosive mixture with air, when present in any considerable quantity. Mansfield, mentioned above as having first demonstrated its existence in coal tar, lost his life, on 25 Feb. 1855, while experimenting with a considerable quantity of benzene, through the mass accidentally taking fire. Benzene may be formed synthetically by heating acetylene gas (C_2H_2) to dull redness in a glass tube. Polymerization occurs, and, among numerous other substances, benzene is formed in accordance with the equation $3C_2H_2 = C_6H_6$. In works on chemistry, benzene is often called «benzol.» (Compare BENZINE.)

This product is so widely employed in the industry of the aniline dyes that chronic poisoning is by no means uncommon. It is usually breathed as vapor in the vat rooms, and causes, after some exposure, dizziness in the head, ringing in the ears, nausea and vomiting, coughing, and sleepiness, which latter may deepen to unconsciousness, somewhat resembling the narcosis caused by breathing chloroform. In some instances there are blood changes, with cyanosis and death. Treatment by fresh air, oxygen, free diuresis, catharsis and diaphoresis, and if the blood changes are marked, infusion of physiological salt solution may be necessary.

Ben'zidine, an important substance belonging to the benzene (or aromatic) series, and used in the arts for the manufacture of Congo red, chrysamin, and other so-called «coal-tar colors.» The coloring matters derived from benzidine have the unusual and valuable property of dyeing cotton without the use of a mordant to fix them upon the fibre. Benzidine has the formula $H_2N.C_6H_4.C_6H_4.NH_2$, and is prepared, commercially, by heating nitrobenzene (see BENZENE) with caustic soda and zinc dust, and subsequent treatment with hot dilute hydrochloric acid. Pure benzidine crystallizes in silvery scales which melt at 252° F., and boil at a temperature probably above 700° F. It is easily soluble in alcohol and ether; it also dissolves readily in hot water, but is almost insoluble in cold water.

Ben'zine, the commercial name for a mixture of the lighter and more volatile hydrocarbons that pass off in the earlier stages of the distillation of crude petroleum. It is essentially different from benzene (q.v.), the latter being a definite chemical substance, belonging in the group of Aromatic Compounds (q.v.); while "benzine" is a more or less indefinite mixture of hydrocarbons that chiefly belong to the paraffin series. Benzine differs but little from naphtha and gasolene, such slight differences as exist being due to variations in the proportions in which the constituent hydrocarbons are present. Benzine is a colorless, mobile liquid, very volatile and inflammable. It is valuable as a solvent for fats, oils, and resins, and is much used about the household as a cleansing agent. Its vapor, when mixed with air, is highly explosive, and serious accidents are common, as the result of using it in the vicinity of lighted lamps or tobacco pipes, or near stoves in which fires are burning. In printing offices it is used for cleaning type, and for removing ink from press rolls. It is also used in large quantities for enriching illuminating gas. Benzine is much lighter than water, and will not mix with it. It boils at from 160° to 190° F.

Poisoning by benzine is rare. The vapor has been used, combined with chloroform and ether, for purposes of narcosis, but it is questionable if it will ever be very popular. Instances of sudden death following the prolonged breathing of benzine vapor have been reported.

Benzo'ic Acid, an organic acid, belonging in the aromatic series, and having the formula $C_6H_5.COOH$. It occurs in benzoin gum, and in certain other resins and balsams. It may be obtained also from the hippuric acid that occurs in the urine of the horse and other herbivorous animals, by boiling that acid with concentrated hydrochloric acid. Benzoic acid is used as a mordant in calico printing, and in the manufacture of aniline blue. It is also used in medicine, and as a preservative agent for anatomical specimens. The benzoic acid that is used for medical purposes is obtained by the direct distillation of benzoin gum over a sand bath, at a temperature of about 340° F. When so prepared, the acid has a pleasant, vanilla-like odor, which is imparted to it by a trace of an aromatic oil that comes over with it from the gum. For most of the purposes for which it is used in the arts, benzoic acid is formed by oxidizing benzyl chlorid with dilute nitric acid.

Benzoic acid dissolves in hot water, but crystallizes out, upon cooling, in needles or pearly prisms. It is soluble in ether, alcohol, and benzene. It melts at 250° F., boils at 480° F., and may be sublimed at intermediate temperatures. Its salts are called "benzoates."

In medicine benzoic acid and its salts, the benzoates (sodium, ammonium, lithium), are widely employed for diseases of the bladder and of the mucous membranes of the lungs. They are also used as intestinal germicides. Benzoic acid has marked bactericidal properties, and may be used for sterilizing purposes. Taken into the intestines it prevents excessive bacterial decomposition; absorbed into the blood it is partly broken up, and in the kidneys is eliminated in part as hippuric acid, rendering the urine acid. It is therefore useful in alkaline fermentations of the urine, particularly in cystitis, pyelitis, etc. Benzoic acid is partly eliminated by the lungs, here acting to increase the amount of mucus; it is therefore used to loosen the mucus in tight coughs. As a parasiticide, benzoic acid is very valuable in scabies. Benzoates are practically useless in gout.

Benzo'ic Al'dehyde. See BENZALDEHYDE.

Ben'zoin, -zo-in, an aromatic compound, soluble in hot alcohol, and crystallizing in colorless, six-sided prisms having the formula $C_6H_5.CH(OH).CO.C_6H_5$. Benzoin is best prepared by acting upon pure benzaldehyde with a hot alcoholic solution of cyanide of potassium. Upon cooling, the benzoin separates and may be removed by filtration. The action of the cyanide is not known, because the chemical change involved in the foregoing process of manufacture appears to consist merely in the uniting of two molecules of benzaldehyde to form a single molecule of benzoin.

Ben'zoin Gum, -zo-in, or **Gum Benjamin,** a reddish brown resin that exudes from the tree *Styrax benzoin,* which grows in Sumatra, Java, and other parts of the East. It is a mixture of various resinous substances, together with free benzoic acid. Cinnamic acid is also present in the free state in many cases, but it is absent from the Siamese gum. Benzoin gum has a pleasant odor when burned, and for this reason has been much used for incense, and in making pastilles. It has antiseptic properties, and preparations of it are used as a dressing for wounds, and in the manufacture of court-plaster. Benzoin is also administered internally, especially in asthma and other pulmonary affections, and chronic catarrh. It is readily soluble in alcohol, and when the tincture so formed is dropped into water, it forms a white, milky fluid, which is used in France as a cosmetic, under the name "*lait virginal.*" The gum is obtained from the styrax-tree by making incisions in the bark, through which the resin oozes. It is allowed to harden by exposure to the air before removal. The best gum is obtained during the first three years of the tree's life, though a good quality may be had for seven or eight years subsequently. The Siamese gum is esteemed more highly than that from Sumatra.

Benzol. See BENZENE.

Benzoni, Girolamo, bĕn-zō'nē, jē-rō-lä'mō, Italian traveler: b. Milan, 1519; d. after 1566. He went to Spanish-America in 1542, visited the principal places then known, and frequently joined the Spaniards in raids on Indian settlements; and after returning to Italy (1556) published a narrative of his adventures, 'History of the New World' (Venice 1565).

Ben'zoyl, -zo-il, in chemistry, the monovalent radical $C_6H_5.CO$. Benzoyl cannot exist in the free state, but it occurs in the combined state in many organic substances. Benzaldehyde (or oil of bitter almonds), $C_6H_5.COH$, may be regarded as its hydrid, and benzoic acid, $C_6H_5.COOH$, as its hydrate.

Ben'zyl, the monovalent organic radical $C_6H_5.CH_2$, which does not exist in the free state, but which has numerous important compounds. Toluene (q.v.) is its hydrid. Benzylamine, $C_6H_5.CH_2NH_2$, is derived by substituting benzyl for one of the hydrogen atoms in ammonia, by heating benzyl chlorid with alcoholic ammonia. Benzyl chlorid, which is

used as a source of "oil of bitter almonds" ("benzaldehyde") and of benzoic acid, has the formula $C_6H_5.CH_2Cl$, and is obtained by passing chlorine into cold toluene, in direct sunlight. Benzyl alcohol, $C_6H_5.CH_2(OH)$, is the hydrate of benzyl, and is obtained by the action of an alcoholic solution of potash upon benzaldehyde.

Beothuk, bā'ō-thŭk, a linguistic stock of North American Indians, habitants of the region of the Exploits River in northern Newfoundland, and believed to have been limited to a single tribe, the last known survivor of which died in 1829. The Beothuks painted their bodies and their property with red ochre, and from this circumstance their stock and tribal name was derived. They were also known as the Goodnight Indians, from the incorrect translation of a Micmac word that sounded like Beothuk. It is not known whether the Beothuks became extinct by reason of wars and famine or by absorption among other tribes.

Beowulf, bā'ō-wŭlf, an Anglo-Saxon epic, the only manuscript of which belongs to the 8th or 9th century, and is in the Cottonian Library (British Museum). From internal evidence it is concluded that the poem in its essentials existed prior to the Anglo-Saxon colonization of Britain, and that it must be regarded either as brought to Britain by the Teutonic invaders, or as an early Anglo-Saxon translation of a Danish legend. From the allusions in it to Christianity, however, it must have received considerable modifications from its original form. It recounts the adventures of the hero Beowulf, especially his delivery of the Danish kingdom from the monster Grendel and his equally formidable mother, and, lastly, the slaughter by Beowulf of a fiery dragon, and his death from wounds received in the conflict. The character of the hero is attractive through its noble simplicity and disregard of self. The poem, which is the longest and most important in Anglo-Saxon literature, is in many points obscure, and the manuscript is somewhat imperfect.

Bibliography.— Morley, 'English Writers,' Vol. I. (1887); Ten Brink, 'Early English Literature' (1883); translation by Garnett (1885); English prose translation by Tinker (1892).

Beppo, a satirical poem on Venetian life by Byron, published in 1818, and named for the chief figure. In Auber's opera, 'Fra Diavolo,' is a character of the same name.

Beppu, bĕp'poo, Japan, a bathing place and seaport on the Island of Kyushu, famed for its hot alkaline baths.

Béranger, Pierre Jean de, bā-răñ-zhā, pē-ăr zhŏñ dĕ, national poet of France: b. Paris, 19 Aug. 1780; d. there, 16 July 1857. His father was a restless and scheming man, and young Béranger, left in a great measure to himself, ran a great chance of spending his life as a gamin and vagabond in the streets of Paris. A few days after the destruction of the bastile he was conveyed to Peronne and placed under the charge of an aunt who kept a tavern, and to whom for a time he acted as waiter. At the age of 14 he was apprenticed to M. Laisnez, a printer in Peronne, but after remaining in that employment for some time, was suddenly summoned to Paris by his father, who wished his assistance. The improvidence and prodigality of his father was constantly involving them in difficulties, and Béranger, with as yet no settled vocation in life, was enduring all the hardships and privation which men of genius in a similar position to himself have frequently had to encounter before the recognition of their talents. He had now, besides making an unsuccessful attempt in the drama, produced a number of poems, including his 'Roger Bontemps,' 'Le Grenier,' 'Les Gueux,' and 'Le Vieil Habit.' Some of these were sent by him in 1804 to Lucien Bonaparte, in the hope thereby of obtaining some patronage or assistance. In this, probably the only application he ever made for aid in the course of a long life, Béranger was not disappointed. Lucien sent for him, encouraged him to proceed in his poetical career, and made over to him his own income as member of the French Institute. He was afterward employed in editing the 'Annales du Musée,' and in 1809 received an appointment as clerk in the office of the secretary to the university. Many of his songs had now become extremely popular and in 1815 the first collection of them was published. A second collection was published in 1821, but Béranger had made himself extremely obnoxious to the Bourbon government by his satires on the established order of things; and in addition to being dismissed from his office in the university, he was prosecuted and sentenced to three months' imprisonment and a fine of 500 francs. A third collection appeared in 1825, and a fourth in 1828, which last publication subjected him to a second state prosecution, an imprisonment of nine months, and a fine of 10,000 francs. Nothing, however, could daunt his spirit, and in prison he still continued to busy himself in the composition of his songs and lyrical satires upon government. In 1833 he published his fifth and last collection, which contains some of the most powerful effusions of his genius. The concluding years of his life were spent in a dignified retirement and he received the honor of a public funeral, at which the most eminent men of France, both of the world of literature and politics, attended.

The great attraction of Béranger's songs is the unequaled grace and sprightliness which they display, combined with great descriptive powers, much comic humor, and occasional bursts of indignation and invective when some social or political grievance is denounced. They are sometimes also, it must be admitted, marked by a tendency to levity and looseness of morals, but in this respect they partake eminently of the French character. No one, indeed, was more thoroughly French than Béranger, and the glory of his beloved *patrie*, as paramount to all other considerations, appears constantly as the inspiring genius of his poetry. The intense nationality of his songs constitutes one of their principal charms, and in this respect he bears some resemblance to Thomas Moore. He has sometimes been called the Burns of France, but though like him essentially a poet of the people, he falls far beneath the pathos and depth of feeling displayed by the Ayrshire Bard in depicting the passion of love. In private life Béranger was the most amiable and benevolent of men, beloved by his friends alike for his social qualities and kindliness of heart, while his charities were so numer-

ous and extensive as often to exceed the bounds of prudence. See Janin, Béranger et son temps' (1866); Sainte Beuve, 'Portraits contemporaires'; Nivalet, 'Souvenirs historiques et étude analytique sur Béranger et son œure' (1892).

Berar, bā-rär', or the **Hyderabad Assigned Districts,** a commissionership of India, in the Deccan, south and west of the central provinces and north of Hyderabad, touching Bombay territory on the west; with an area of 17,718 square miles. It consists chiefly of a fertile plain bordered on the north and south by low ranges of hills. It is intersected by the Purna, and is partly bounded north and south by the Wardha and Penganga flowing east to the Godavari. It has a fertile soil, which produces much good cotton and millet, the best wheat in India, as well as oil-seeds and other produce. The rainfall is regular, and this province is in the position of being able to export food to other parts of India. It is intersected by the railway from Bombay to Nagpur, and ultimately to Howrah, opposite Calcutta. After being ruled by independent sovereigns, it was added in the 17th century to the Mogul empire, and latterly became part of the Nizam's dominions (Hyderabad), to which it still in a sense belongs. In 1853 it was assigned or handed over to the British authorities to provide for the payment of the body of troops which the Nizam had been previously bound to furnish in time of war for the Indian government. A new treaty was concluded in 1860 by which certain territorial alterations were brought about, and a considerable debt due by the Nizam was canceled. The province has greatly prospered under British rule. It consists of six districts: Ellichpur, Amraoti, Akola, Buldana, Basim, and Wun. The largest towns are Ellichpur and Amraoti (Oomrawuttee). Berar is under the administration of a revenue and fiscal commissioner superintended by the resident at Hyderabad. There is also a judicial commissioner, who superintends the working of the courts of justice. The surplus revenue, after the expenses of administration and the cost of the Hyderabad contingent of troops are defrayed, is handed over to the government of the Nizam. Pop. (1901) 2,752,400.

Berard, Augusta Blanche, American educator and historical writer: b. West Point, N. Y., 29 Oct. 1824; d. 1901. She was the daughter of a former professor at West Point Military Academy, and her life was spent mainly in teaching. She was the author of school histories of the United States and England; 'Spanish Art and Literature'; 'Reminiscences of West Point in the Olden Time.'

Berard, bā-rär, **Frédéric,** French physician: b. Montpellier, 8 Nov. 1789; d. there, 16 April 1828. When only 20 years of age he wrote a thesis entitled 'Theory of Natural Medicine, or Nature Considered as the True Physician, and the Physician as an Imitator of Nature.' He afterward went to Paris, where he was engaged to write in the 'Dictionary of Medical Science.' In 1816 he returned to Montpellier as professor of therapeutics in a private course of lectures to the medical students of the college. At this period he published a work explanatory of the 'Doctrines of the Medical School of Montpellier.' With Rouzet, he published Dumas' work on 'Chronic Diseases,' with instructive commentaries. In 1823 he also published in Paris his work on 'The Relations of the Physical and the Moral Organism, as a Key to Metaphysics and the Physiology of Mind.' In this he explains his own views of human nature and the principles of life, in opposition to the views of Cabanis. He also took occasion to publish at the same time, a manuscript letter of Cabanis, on 'Primary or Final Causes,' accompanied by numerous annotations.

Berat, bā-rät', a town of Albania, on the river Beratinos, the ancient Apsus. It is the seat of a pashalic and Greek archbishopric, and was taken by Ali Pasha fom his rival Ibrahim. Amurath II. captured Berat, and his troops held it notwithstanding a desperate attempt by Scanderbeg with a strong body of Italian auxiliaries to retake it. Pop. 12,000.

Béraud, Jean, bā-rō, zhŏn, French painter of great power: b. St. Petersburg, Russia, 1849. After serving with distinction in the French army during the Franco-Prussian war he became a pupil of Bonnat. His subjects are usually chosen from Parisian life. His latest works have been modernized scenes from the New Testament. 'La Madeleine' represents a Parisian harlot at the feet of Christ in a Paris restaurant; the scene of the 'Descent from the Cross,' is Montmartre overlooking Paris, with a group of working men and women.

Beraun, bā-rown', a town of Bohemia, 18 miles to the southwest of Prague, on the river Beraun, with manufactures of cotton, sugar, etc. Pop. (1890) 7,265.

Berbe, a west African, much-spotted genet (*Germetta pardina*). See GENET.

Ber'ber, a town of Nubia, on the right bank of the Nile, below the confluence of the Atbara. It is a station on the route from Khartum to Cairo, and a point to which caravans go from Suakin on the Red Sea. In the course of Gen. Graham's operations against Osman Digna in 1885, a railway was projected from Suakin to Berber, and the work was actually begun, but was ultimately abandoned when military protection was taken away. Pop. (estimated) 10,000.

Ber'bera, the chief port and town of British Somaliland, on the African coast, of the Gulf of Aden and south of Aden. It has a small but well-sheltered harbor and a long pier; a European quarter with stone houses and warehouses, and a native quarter laid out with broad streets but consisting chiefly of huts or sheds. There is a considerable export trade in the products of the country, such as hides and skins, gums, ostrich feathers, ghee, sheep, goats, and cattle; rice, millet, dates, cottons, tobacco, etc., being imported. The traffic is chiefly with Aden. The population is perhaps 5,000, increased to 30,000 during the trading season. The Somauli Coast Protectorate extends along the coast for about 400 miles and inland for about 200, the area being about 80,000 square miles. Besides Berbera it contains also the ports of Zeilah and Bulhar. It was acquired in 1884, and is administered by a political agent and a consul. A number of Indian troops are stationed in the territory. The trade is of some importance and is increasing.

Ber'berine, a poisonous alkaloid discovered by Buchner in 1837 in the root of the common barberry, and now known to exist in many other plants also. It crystallizes, ordinarily, in yellow, silky needles, having the composition $C_{20}H_{17}NO_4 + 4\frac{1}{2}H_2O$; but when thrown down from solution in alcohol the needles are said to be red — probably from the absence of water. Berberine forms numerous salts, and is used to a considerable extent in medicine, occurring in notable quantities in preparations of hydrastis. The alkaloid itself is soluble in from four to five parts of water at ordinary temperatures, and is also moderately soluble in alcohol; but it is insoluble in both ether and chloroform.

Ber'beris, the generic name of the barberry (q.v.).

Berbers, the name of a people spread over nearly the whole of northern Africa. From their name the appellation Barbary is derived. They are considered the most ancient inhabitants of the country. Their different tribes are scattered over the whole space intervening between the shores of the Atlantic and the confines of Egypt; but the different branches of Atlas are their principal abode; while to the south they extend to the Soudan. The chief branches into which they are divided are: the Amazirgh, Amazigh, or Mazigh, estimated to number from 2,000,000 to 2,500,000, and who inhabit Morocco. They are for the most part quite independent of the Sultan of Morocco, and live partly under chieftains and partly in small republican communities. Second, the Shillooh or Shellakah, who number about 1,450,000, and inhabit the south of Morocco. They practise agriculture and carry on some manufactures. They are more highly civilized than the Amazirgh. Third, the Kabyles in Algeria and Tunis, who are said to number about 1,000,000; and fourth, the Berbers of the Sahara, who inhabit the oases, and consequently live for the most part at wide intervals from each other. Among the Sahara Berbers the most remarkable are the Beni-Mezâb and the Tuareg. To these we may also add the Guanches of the Canary Islands, now extinct, but undoubtedly of the same race. The Berbers generally are about the middle height; their complexion brown, and sometimes almost black, with brown and glossy hair. Individuals of fair complexion and light hair and even with blue eyes are said to be not uncommon among them. They are generally thin, but extremely strong and robust, and their bodies are beautifully formed. The head of the Berber is rounder than that of the Arab, and the features shorter, but of an equally marked character, although the fine aquiline nose, so common among the latter, is not often seen among the Berbers. The language of the Berbers is said to have affinities with the Semitic tongues. Such of them as mingle with the Arabs speak or understand Arabic; but those who dwell in the interior of the mountains understand no other language than their own. The Berbers often leave their mountains to plunder travelers on the plain. They generally dwell in huts, or rude houses, the latter rectangular, with two gable ends, covered with thatch and entered by a low and narrow door. These dwellings are often built in little groups, scattered about in the valleys and upon the sides of the mountains, and in some parts each group of huts is situated in the midst of a plantation, with a portion of ground laid out as a kitchen-garden. Although the Berbers have always lived in ignorance, and have had but little connection with civilized nations, they are remarkably industrious. By working the mines in their own mountains they produce lead, copper, and iron. With the iron they manufacture gun-barrels, implements of husbandry, and many rudely formed utensils. They understand the manufacture of steel, from which they make knives, swords, and other instruments, not very elegant in form, but of good quality. They likewise make gunpowder for their own use, and this powder is said to be of very superior quality. One of their articles of commerce is a species of black soap, which they make with olive-oil and soda obtained from sea-weed. The tribes inhabiting the borders of the plains and some of the great valleys breed sheep and cattle in considerable numbers. Their sheep are small and yield very little wool. They have likewise numerous herds of goats, which supply them with milk, and of the flesh of which they are very fond. Their cows and oxen are of a small species, but their asses and mules are much esteemed.

Berbice, bėr-bēs', a district of British Guiana, intersected by the river Berbice. It extends from the river Abary on the west to Corentyn River on the east, about 150 miles along the coast, the boundary inland not being fixed. The chief town is New Amsterdam; pop. about 9,000. The principal productions are sugar, rum, cotton, coffee, cocoa, and tobacco. The coast is marshy and the air damp. Berbice came finally into British possession in 1815, having previously belonged to the Dutch. Till 1831 it formed a separate colony from Demerara and Essequibo. Pop. (1891) 51,176. See GUIANA.

Berbice, a river of British Guiana; flows generally northeast into the Atlantic. It is navigable for small vessels for 165 miles from its mouth, but beyond that the rapids are numerous and dangerous.

Berchem, bėrH'ėm, or **Berghem, Nikolaas,** Dutch painter: b. Haarlem, 1624; d. there, 18 Feb. 1683. Having studied under his father and Van Goyen, Weenix the elder, and other masters, he spent several years in Italy, where he soon acquired an extraordinary facility of execution. His industry was naturally great, and his innumerable landscapes now decorate the best collections of Europe. The leading features of Berchem's works, besides the general happiness of the compositions, are warmth and coloring, a skilful handling of lights, and a mastery of perspective. His etchings are also highly esteemed. See Buxton and Poynter, 'German, Flemish and Dutch Painting' (1881).

Berchet, bār-shā', **Giovanni,** Italian poet and prose writer: b. Milan, 23 Dec. 1783; d. 1851. He was a friend of Manzoni and Silvio Pellico. In 1826 he became a frequent contributor to a liberal journal at Milan, called the *Conciliatore.* When this was suppressed and its contributors cast into prison or exiled by the Austrian government, Berchet settled in Geneva. At the time of his death he was a member of the Sardinian parliament. His writings include: 'Profugi di Praga'; 'Romanze';

(Fantasie) (1829). His collected poems appeared in 1863, with biographical sketch.

Berchta, bĕrH'tạ, a female hobgoblin, in the folk lore of southern Germany, of whom naughty children are much afraid. Her name is connected with the word bright, and originally she was regarded as a goddess of benign influence.

Berchtesgaden, berH-tĕs-gä'dĕn, a village of Bavaria, situated in a most picturesque and much-visited region, about 12 miles south of Salzburg, on the Achen, or Alm, a stream which issues from the beautiful lake called the Königssee. It lies on a mountain slope surrounded by meadows and trees, consists of well-built houses, and has a fine old abbey, now a royal residence; the abbey church, with fine Romanesque transepts of the 12th century; a royal villa, etc. Wood-carving is extensively carried on, and there is an important salt mine. It is the principal settlement in the district of the same name. Pop. (1895) 2,349.

Berck, bărk, France, a bathing resort on the English Channel, an hour's ride south from Boulogne. It is the terminus of a railway, and has an excellent beach, a kursaal and two hospitals for children.

Berckheyde, bĕrk'hī-dĕ, **Gerrit,** Dutch painter: b. Haarlem, 1638; d. 1698. He was a younger brother of Job Berckheyde and with him was employed at the court of the Elector Palatine. Among his most important works are: 'View of Amsterdam'; 'View of Cologne'; 'View of Heidelberg Carlto.'

Berckhyde, Job, Dutch architectural and genre painter: b. Haarlem, 1630; d. 1693. He was a pupil of Jacob de Wet and Franz Hals and was accepted as master in the Haarlem Guild in 1654. Of the brothers Berckhyde Job is the finer artist. Some of his most famous paintings are: 'Joseph's Brethren in Egypt' (1669); 'Interior of Old Exchange at Amsterdam' (1678); 'Courtesan's Room'; 'Winter Landscape'; 'Interior of Haarlem Cathedral'; 'Artist's Portrait.'

Bercy, bĕr-sẹ, formerly a village on the Seine (here crossed by a suspension bridge), but since 1860 forming part of the southeastern quarter of Paris. The Parisian wine merchants have here their stores of wine, spirits, etc., and there are several important tanneries, sugar-refineries, and paper-mills. A large palace, Le Grand Bercy, was built by Levau at the close of the 17th century.

Berdiansk, bĕr-dyänsk', a seaport of southern Russia, in the government of Taurida, on the northern shore of the Sea of Azof. It contains many handsome houses, arranged in spacious streets, and has a good anchorage, sheltered on all sides except the south. It is the chief entrepôt for the surrounding governments, and exports large quantities of grain, oil-seeds, and wool. It has also a large inland trade in wood, coal, fish, and salt, the last obtained from apparently inexhaustible mines in the vicinity. Pop. (1897) 24,247.

Berditchev, bĕr-dẹ'chĕf, a city of European Russia, in the government and 129 miles southwest of Kiev. It is an ill-built place, mainly Jewish, but contains several churches and synagogues, and a large Carmelite convent, in the church of which is an image of the Virgin Mary, the object of pilgrimages. It carries on a considerable trade in corn, wine, cattle, honey, wax and leather. Pop. (1897) 53,728.

Berea, Ky., town in Madison County; on the Louisville & N. R.R., 41 miles southeast of Lexington. It is the centre of a large agricultural section and is the seat of Berea College (q.v.), founded in 1853. Pop. (1900) 1,000.

Bere'a, Ohio, a village in Cuyahoga County, on several railroads; 13 miles southwest of Cleveland, with which, and Elyria and Oberlin, it is connected by electric lines. It was founded in 1829; is lighted by natural gas and electricity; has extensive quarries of sandstone (Berea grit); and is the seat of Baldwin University, German Wallace College (both Methodist Episcopal), and a German orphan asylum. Pop. (1900) 2,510.

Berea College, a co-educational, non-sectarian institution, in Berea, Ky.; organized in 1855. It has 30 members in its faculty, and some 850 students. Its building and grounds are valued at $150,000, and its library contains 20,000 volumes. The distinguishing feature of the college is its work in the southern mountain region, where it carries on, through traveling libraries, social settlements, and lectures, a very valuable kind of university extension.

Berea Grit, a variety of sandstone, great deposits of which are found at Berea, Ohio. It is widely famous for its evenness of texture, and color, and exemption from the impurities that would deteriorate its marketable value. See CARBONIFEROUS SYSTEM.

Bere'ans, in modern Church history an insignificant sect of dissenters from the Church of Scotland, founded by Rev. John Barclay (1734–98) in 1773. They take their title from, and profess to follow the example of, the ancient Bereans (see Acts xvii. 10–13) in building their system of faith and practice upon the Scriptures alone, without regard to any human authority whatever. They agree with the great majority of Christians, both Protestants and Roman Catholics, respecting the doctrine of the Trinity, which they hold as a fundamental article of the Christian faith; but differ from the majority of all sects of Christians in various other important particulars. For instance, they say that the majority of professed Christians stumble at the very threshold of revelation by admitting the doctrine of natural religion, natural conscience, etc., not founded upon revelation or derived from it by tradition. With regard to faith in Christ, they insist, that as faith is the gift of God alone, so the person to whom it is given is as conscious of possessing it as the being to whom God gives life is of being alive, and therefore he entertains no doubts either of his faith or his consequent salvation through the merits of Christ, who died and rose again for that purpose. Consistently with the above definition of faith, they say that the sin against the Holy Ghost is simply unbelief. Their mode of practice and Church government differs but little from those of many other dissenting sects.

Berendt, bā'rent, **Karl Hermann,** German ethnologist: b. Dantzic, 1817; d. 1878. After studying medicine he began to practise in Breslau, where he lectured in the university. In 1851 he went to Nicaragua and thence to Vera

Cruz, where he devoted some years to ethnological study and research. He subsequently traveled in Yucatan and Guatemala, making a careful study of Mayan dialect. He published 'Analytical Alphabet of the Mexican and Central American Languages' (1869); 'Los escritos de Don Joaquin Garcia Icazbalceta' (1870); 'Los trabajos linguisticos de Don Pio Perez' (1871); 'Cartilla en lengua Maya' (1871).

Berengar, bā'rĕn-gär, two kings of Italy in the 9th and 10th centuries. BERENGAR I., son of the Duke of Friuli by a daughter of Louis-le-Debonnaire, during the confusion which followed on the dissolution of the empire of Charlemagne, laid claim to the crown of Italy, and after a civil war obtained it in 888. At a later period, having been invited by Pope John X. to repel the Saracens who were devastating the south of Italy, he was crowned emperor of Rome. His warlike expeditions had generally been fortunate, and his internal government was generally acceptable to his subjects; but his nobility, jealous of his authority, stirred up a new competitor for the throne in the person of Rudolf II., who invaded Italy in 921, and ultimately obliged Berengar to take refuge in Verona, where he was assassinated in 924. BERENGAR II., nephew of the former by a daughter, was at first Marquis of Ivrea, while the throne of Italy was occupied by Hugo, count of Provence, a tyrant who had incurred the enmity of almost all the great feudal lords of the kingdom. Berengar, taking advantage of this feeling, put himself at the head of a force collected in Germany in 945, and was almost universally welcomed. Hugo abdicated in favor of his son Lothario, who reigned nominally for a few years, and was succeeded in 950 by Berengar, in whom all the powers of the government had previously centred. A quarrel with the Emperor Otho in the following year deprived him of his throne, but he was permitted to resume it on agreeing to acknowledge Otho as his liege lord. In a second quarrel he was not allowed to escape so easily. After losing his territories he shut himself up in the fortress of St. Leo, and defended himself bravely till famine compelled him to submit. He was imprisoned at Bamberg, and died there in 966.

Berengaria, bā-rĕn-gā'rĭ-ạ, the queen of Richard I. of England: d. Le Mans, about 1230. She was a daughter of Sancho VI. of Navarre and was married to Richard at Limasol in Cyprus, 12 May 1191. She remained at Acre while the king was warring with the Saracens and resided in Poiton during his imprisonment in Germany. She became estranged from him soon after his release and seems never to have joined him again. She was buried at Espan in the Church of Pietas Dei, which she had founded.

Berenga'rio, Jacopo, Italian anatomist: b. Carpi, about 1470; d. Ferrara, 1530. He taught anatomy and surgery at Pavia, and finally settled at Bologna till a clamor caused by a rumor that he had got possession of two Spaniards affected by a loathsome disease, and was intending to dissect them alive, obliged him to retire to Ferrara. This rumor, caused doubtless by the fact that Berengario looked upon the dissection of the human body as the only means by which the science of anatomy could be advanced, points out the source of the many important discoveries which he made, and the others for which he paved the way, leaving them to be followed out by Vesalius, Eustachius, and Fallopius. He is justly regarded as one of the principal founders of modern anatomy. He was also a dexterous operator, and published a practical work entitled, 'De Cranii Fractura.'

Berenga'rius of Tours, French theologian: b. Tours, about 1000; d. 6 Jan. 1088. He is renowned for his philosophical acuteness as one of the scholastic writers. While admitting the real presence of Christ in the Eucharist, he questioned the doctrine of transubstantiation and held that the substance of bread and of wine continued to exist with the body and blood of Christ (consubstantiation). He was condemned by several councils and several times recanted, but finally died fully reconciled with the Church. He is the first in theological history to call the doctrine of transubstantiation in question. He was treated with forbearance by Gregory VII., but the scholastics belonging to the party of Lanfranc, Archbishop of Canterbury, were irritated against him to such a degree that he retired to the Isle of St. Cosmas, in the neighborhood of Tours, in the year 1080, where he closed his life in pious exercises. On the history of this controversy, which has long occupied the attention of theologians, new light was shed by Lessing in his 'Berengar' (1770), and also by Stäudlin, who likewise published the work of Berengarius against Lanfranc. This Berengarius must not be confounded with Peter Berenger of Poitiers, who wrote a defense of his instructor Abelard.

Berenhorst, Francis Leopold von, German military writer: b. 1733; d. 1814. He was one of the first writers by whom the military art has been founded on clear and certain principles. He was a natural son of Prince Leopold of Dessau, and in 1760 became the adjutant of Frederick II. After the Seven Years' war he lived at Dessau.

Berenice, bĕr-ẹ-nī'sẹ (a bringer of victory). (1) This was the name of the wife of Mithridates the Great, king of Pontus. Her husband, when vanquished by Lucullus, caused her to be put to death (about the year 71 B.C.), lest she should fall into the hands of his enemies. (2) The wife of Herod, brother to the great Agrippa, her father, at whose request Herod was made king of Chalcis by the Emperor Claudius, but soon died. In spite of her dissolute life, she insinuated herself into the favor of the Emperor Vespasian and his son Titus. The latter was at one time on the point of marrying her. (3) The wife of Ptolemy Euergetes; who loved her husband with rare tenderness, and when he went to war in Syria made a vow to devote her beautiful hair to the gods if he returned safe. Upon his return Berenice performed her vow in the temple of Venus. Soon after the hair was missed, and the astronomer Conon of Samos declared that the gods had transferred it to the skies as a constellation. From this circumstance the constellation near the tail of the Lion is called *Coma Berenices* (the hair of Berenice).

Berenice, a city of Egypt, on the Red Sea, whence a road, 258 miles in length, extended across the desert to Coptos, on the Nile. This

road was constructed in the reign of the second Ptolemy. Berenice was one of the principal centres by which the trade of Egypt, under the Macedonian dynasty, and that of the Romans subsequently, were carried on with the remote East. During the Roman period, a sum equal to $2,000,000 is said to have been annually remitted to the East by the Roman merchants as payment for its precious products, which sold at Rome for a hundred-fold more than their original price. Nothing now remains of Berenice but a heap of ruins, adjoining the modern port of Habest. BERENICE, or Hesperis, a city of Cyrenaica, near which the ancients imagined the gardens of the Hesperides to be situated. The village, named Bengazi (q.v.), now occupies a portion of its site.

Berenson, Bernhard, Russian-American art critic: b. Wilna, Russia, 26 June 1865. He was educated in the schools of Boston and at Harvard University and has lived for many years in Florence, Italy. He has contributed much in the way of art criticism to the New York *Nation* and to French and German art reviews, and has published 'Venetian Painters of the Renaissance' (1894); 'Lorenzo Lotto: An Essay in Constructive Art Criticism' (1895); 'Florentine Painters of the Renaissance' (1896); 'Central Italian Painters of the Renaissance' (1897); 'The Study and Criticism of Italian Art' (1901).

Beresford, Lord Charles William de la Poer, English naval officer: b. Ireland, 10 Feb. 1846. He became a rear-admiral in 1897. In 1882 he commanded the Condor in the bombardment of Alexandria, and was especially mentioned and honored for his gallantry. After the bombardment he instituted an efficient police system in the city. In 1884–5 he served on Lord Wolseley's staff in the Nile Expedition; and subsequently commanded the naval brigade in the battles of Abu Klea, Abu Kru, and Metemmeh. He commanded the expedition which rescued Sir Charles Wilson's party in «Safia,» and was commended for his gallantry in both Houses of Parliament. He received the thanks of the French government for assisting the grounded Seignalay. In 1893–6 he was in command of the naval reserve at Chatham, and in December 1899 was appointed the second in command of the British squadron mobilized in the Mediterranean Sea. Lord Beresford accompanied the Prince of Wales on his visit to India in 1875–6, as naval aide-de-camp, and held the same relation to the queen in 1896–7. He has sat at various times in Parliament, as member for Waterford, East Marylebone, York, and Woolwich. Besides numerous honors for gallantry as an officer he has received three medals for saving life at sea under trying circumstances. In 1898 he visited China at the request of the Associated Chambers of Commerce of Great Britain to make a study of the complicated commercial conditions existing there; and on his return, in 1899, he passed through the United States, and was received with distinguished honors by official and commercial bodies. He has done much to promote the «open door» policy as a condition of international commerce in China. His publications include 'Life of Nelson and His Times'; 'The Break-Up of China' (1899), and many essays and special articles.

Beresford, William Carr, Viscount, English general, was a natural son of the first Marquis of Waterford: b. 2 Oct. 1768; d. Bedgebury Park, Kent, 8 Jan. 1854. He entered the army, and served at Toulon, and in Corsica; in the West Indies under Abercromby; and in Egypt under Baird. In 1806 he was raised to the rank of brigadier-general, and the same year commanded the land force in the expedition to Buenos Ayres. Having been ordered to Portugal in 1808, he was intrusted there with the remodeling of the Portuguese army — an office which he accomplished with great success; and in acknowledgment of his services was created a Marshal of Portugal, Duke of Elvas, and Marquis of Santo Campo. He subsequently took part in the siege of Badajoz, and the battles of Salamanca, Vittoria, and Bayonne. For his bravery at the battle of Toulouse he was raised to the peerage, with the title of Baron Beresford, afterward superseded by that of Viscount Beresford, conferred on him in 1823. In political principles he was a high Conservative; and a thorough supporter of the Duke of Wellington. In 1828, when the Duke became premier, he was made master-general of the ordnance, a post he held till 1830.

Berezin, byĕr-yĕ-zēn′, **Ilya Nikolayevitch,** Russian Orientalist: b. 1818; d. 1896. He studied Oriental philology at the University of Kazan, where in 1846 he was appointed professor, and in 1855 became professor of Turkish at the University of St. Petersburg. Some of his important works in Russian are 'Library of Oriental Authors' (1849–51); 'Tour Through Daghestan and Trans-Caucasia' (1850); 'A Grammar of the Persian Language' (1853); 'The Mongol Invasion of Russia' (1852–4); 'Popular Turkish Sayings' (1857). He wrote in French 'Recherches sur les dialectes Musulmans' (1848–53), and edited the 'Russian Encyclopedic Dictionary' in 16 volumes.

Berezina, byĕr-yĕ-zẹ-na′, a river in the Russian province of Minsk, rendered famous by the passage of the French army under Napoleon, 26–27 Nov. 1812. Admiral Tchitchakoff, with the Moldavian army, forced his way from the south to join the main army, which, after Borizoff had been retaken, was to assist the army led by Wittgenstein from the Dwina, and in this manner cut off Napoleon from the Vistula. Napoleon was therefore obliged to make the greatest efforts to reach Minsk, or at least the Berezina, and to pass it earlier than the Russians. After the advanced guard of the Moldavian army had been repelled to Borizoff by Oudinot, and the bridge there burned by them, early in the morning of 26 November, two bridges were built near Sembin, about two miles above Borizoff, an undertaking the more difficult, because both banks of the river were bordered by extensive morasses, covered, like the river itself, with ice not sufficiently strong to afford passage to the army, while other passes were already threatened by the Russians. Scarcely had a few corps effected their passage, when the greater part of the army, unarmed and in confusion, rushed in crowds upon the bridges. Those who could not hope to escape over the bridges sought their safety on the floating ice of the Berezina, where most of them perished, while many others were crowded into the river by their comrades. Besides the multitudes who were obliged to remain beyond the Berezina, the division of Par-

touneaux, which formed the rear-guard, was also lost. It was intrusted with the charge of burning the bridges in its rear, but it fell into the hands of the enemy. According to the French bulletins only a detachment of 2,000 men, who missed their way, was taken; according to the Russian accounts the whole corps, 7,500 men and five generals. The river is a tributary of the Dnieper and has a course of some 335 miles. A canal system connects it with the Dwina.

Berezov, byĕr-yä'zōf (the town of birch-trees), a town in Siberia, in the government of, and 400 miles north from, Tobolsk, on a height above the left bank of the Sosva, one of the branches of the Obi. It consists of wooden houses carefully built of large timbers, and generally with high steps in front, and contains three churches and a chapel. Its inhabitants, who are chiefly Cossacks, subsist by the chase and by fishing; they barter furs, skins, fish, etc., for flour, flesh-meat, tobacco, ironware, and brandy, brought by the Tobolsk dealers, whose craft are floated down the Irtish into the Obi. Prince Menzikoff, the favorite of Peter the Great, died here in exile in 1731, having been banished by his grandson Peter II. Pop. (1897) 1,073.

Berezovsk, byĕr-yä-zōvsk', a village in the Russian province of Perm, near Ekaterinburg, which gives name to a famous gold field, wrought since 1744. The mines are on the eastern slopes of the middle Ural chain, and the field is more than five miles long. The washings on the Berezovka River are also very productive.

Berg, bĕrg, **Friedrich Wilhelm Rembert,** Russian general: b. 1790; d. 1874. He is chiefly notorious for the severity with which he treated the unfortunate population of Poland during the insurrection of 1863, and which excited the horror and indignation of the civilized world.

Berg, bĕrg, **Joseph Frederick,** American clergyman: b. Antigua, W. I., 3 June 1812; d. New Brunswick, N. J., 1871. He came to the United States in 1825, entered the German Reformed ministry, in which he served, 1835–52, and then entered the Dutch Reformed Church and was professor of theology in the Dutch Reformed Theological Seminary at New Brunswick from 1861 till his death. He was distinguished for the intensity of his opposition to the Roman Catholic Church, on which theme he wrote extensively, his best known work being 'Synopsis of the Moral Theology of Peter Dens, as Prepared for Romish Seminaries and Students of Theology' (1842).

Berg, an ancient duchy of Germany, now included in the governments Arnsberg, Cologne, and Düsseldorf. It extended along the Rhine from the Ruhr to the frontiers of Nassau, and is everywhere hilly. It is more a manufacturing than an agricultural district, and has long been famed for its minerals, which include iron of the finest quality, lead, copper, zinc, and the precious metals. In addition to the employment furnished by these minerals, the inhabitants, who are very industrious, have with considerable success superadded textile manufactures. It is now indeed the chief manufacturing district in Germany, and the most densely peopled. It contains the important towns of Elberfeld and Barmen. The duchy of Berg, founded in 1389. had been long consolidated with the Prussian dominions when (1806) Napoleon revived the title, and conferred it, with an enlarged territory, on Murat. On Murat's receiving the kingdom of Naples, Napoleon named his nephew Louis Napoleon (brother of the late Emperor Napoleon III.) hereditary Grand-duke of Berg, and increased its limits still farther. At the Congress of Vienna, in 1815, the whole was given to the king of Prussia.

Berga, a town of Spain, in the province of Barcelona, in a hilly district near the river Lobregat. There is an old castle overlooking the town, which carries on some manufactures of cottons. Pop. (1903) 6,072.

Bergama, bĕr'ga-ma, a town of Asia Minor, about 20 miles inland from the west coast, on the Selinus, a tributary of the Caïcus, 46 miles north by east of Smyrna. It occupies the site of the ancient Pergamus (q.v.), and contains numerous remains attesting its ancient magnificence. In the centre are the remains of a large Roman basilica, a Byzantine church now converted into a mosque, and a curious double tunnel 200 yards long through which the river runs. To the east of the town is a steep hill with the acropolis and the remains of a Roman palace on the top. To the west of the town are the ruins of the ancient amphitheatre with arches of fine workmanship. It was built so that the arena could be flooded with water from a stream, thus affording an opportunity for nautical sports. Bergama is a flourishing town noted for its manufactures of morocco leather. Pop. about 6,000.

Bergami, Bartolommeo. The celebrated trial of Queen Caroline, wife of George IV. of England, was principally founded upon a charge of adulterous intercourse with Bergami, who, in 1814, upon recommendation of the Marquis Ghislieri, in whose previous employment he had been, was attached to her household. Bergami, who had fought his way up in the Italian army from a common soldier to the rank of quartermaster, belonged to a respectable family, and the Marquis Ghislieri described him to the queen as a person of character and attainments superior to his condition, and bespoke for him a kind treatment. This, and the personal advantages of Bergami, who was singularly good-looking, combining athletic strength and stature with almost feminine beauty, naturally disposed the queen in his favor. Moreover, he was full of loyalty and devotion, and on one occasion nearly became the victim of poison intended for her. The queen treated his whole family, especially a little child of his, with the greatest generosity and kindness. All these circumstances were used by her enemies as so many indications of her criminality, and during the trial one of the Italian witnesses, Teodore Majocchi, excited special indignation by his admitting every fact unfavorable to the queen, and by answering every question which might tell in her favor with *Non mi ricordo.* Bergami, who was at Pesaro during the trial, exclaimed, when he was apprised of her acquittal, but at the same time of her death, that she had been poisoned, and never could be convinced to the contrary. To the last he ever spoke of the queen with the greatest reverence and affection, and his deportment before and after her death led to the

conclusion that he looked upon her rather as a benefactress than as a mistress. However, wherever he went he became the observed of all observers. During his occasional excursions to Paris his apartments were crowded with visitors, consisting principally of ladies, who, under the pretext of having been friends of Queen Caroline, gratified their curiosity and obtained an interview with the portly courier. When at home he lived in great splendor; in the capitals of Italy, Rome, Naples, Milan, he was a lion, and the houses of «the best families» were open to him. At the time of the trial many different statements about Bergami's character were circulated in the House of Lords, but however contradictory in many other respects, they all agreed in this one fact, that he was as inoffensive as he was good-looking a person, who probably would never have been heard of beyond the precincts of Italian barracks if it had not been for his relation with Queen Caroline, and for the peculiar construction which was put upon it by her enemies at the trial. His name in England was, by a curious mistake, spelled with a P.

Bergamo, bĕr'gą-mō, Italy, city and capital of the province of Bergamo, situated in the district lying between the rivers Brembo and Serio. It consists of two distinct portions, the Città Alta (High Town), situated on hills, and now attainable by a cable tramway, and the much more extensive new quarters in the plain. Bergamo trades largely in silk, silk goods, grain, etc. At its fair goods to the value of a million sterling have sometimes been sold. It has an academy of painting and sculpture, a museum, an athenæum, a public library, several secondary schools, and various manufactories, especially of silk. There is a cathedral, but some of the other churches are of greater interest. There is a small Protestant congregation. The comic characters in the Italian masked comedy are Bergamese, or affect the dialect of the country people in the neighborhood of this city. In 1796 Bonaparte took Bergamo, and it was subsequently made the capital of the department of the Serio, in the kingdom of Italy. Among many distinguished men born here are Tiraboschi, the historian of Italian literature; the composer Donizetti, and Cardinal Mai. Pop. (1901) 46,000.

Ber'gamot, a shrub or small tree of the genus Citrus (natural order *Butaceæ*) variously placed as a variety of the orange (*C. aurantium*) and of the citron (*C. medica*). The plant is largely cultivated in southern Europe, especially Italy, for its green, bitter volatile oil, known as oil or essence of bergamot which is expressed or distilled from its highly aromatic rind for use in perfumery. The name is also applied, mainly in Europe, to many varieties of pears and in both Europe and America to several species of the natural order *Labiatæ;* for example, *Mentha aquatica* (Europe), *Monarda didyma* and *M. fistulosa* (America). The name seems to be a corruption of the Turkish *beg armūdi,* a lord's pear. See Citrus.

Bergedorf, bĕrg'ĕ-dôrf, a town of Germany, 10 miles southeast of Hamburg, and in the territory belonging to that city, on the Bille, a tributary of the Elbe. It has flourishing glass works and manufactures of enamel ware. It was held jointly by Lubeck and Hamburg till 1867, when Lubeck assigned its rights to Hamburg on payment of 200,000 thalers. Pop. (1900) 10,243.

Bergen, Joseph Young, American educator: b. Red Beach, Me., 22 Feb. 1851. He graduated at Antioch College, Ohio, 1872, and for a time was on the Ohio Geological Survey and professor of natural sciences at Lombard University, becoming later a teacher of science in the Boston high and Latin schools. He is joint author of 'The Development Theory: the Study of Evolution Simplified for General Readers' (1884); Hall and Bergen's 'Physics'; 'Elements of Botany'; and 'Foundations of Botany.'

Bergen, Norway, a seaport on the west coast, capital of a province or diocese of the same name, formerly the principal town of the kingdom, but now the second. It is 186 miles northwest of Christiania, and about 25 from the open sea, and is situated on and about the head of two inlets, one of which forms the harbor. The tongue of land between the harbor and the other inlet (Puddefjord) is an elevated ridge crowned by an old fort, while the entrance on the other or northeast side is commanded by the old fortress of Bergenhus, now partly used as a prison. Rocky hills from 800 to 2,000 feet high encircle the town on the land side and furnish many picturesque spots. The climate is comparatively mild, on account of the sheltered situation, but is remarkable for rain, the annual rainfall being about 73 inches. The town is well built and clean, but the houses are mostly of wood, and many of the streets are crooked and uneven, on account of the irregularity of the site. There are a number of squares or open spaces, including the market-place. There is a cathedral (built in 1537), and several other churches, the oldest being St. Mary's, built after a fire in 1249. The public institutions include schools, a library of 60,000 volumes, a theatre, a museum, and other useful institutions. The inhabitants of the middle coast of Norway bring timber, tar, train-oil, hides, etc., and particularly dried fish (stock-fish), to Bergen to exchange them for grain, flour, and other necessaries. The town carries on a large trade in these commodities, and its exports of dried fish, herrings, tar, etc., are especially large. A considerable amount of ship-building is carried on. A United States consul is resident here. Bergen was founded by King Olaf Kyrre in 1070. The Hanseatic league established a factory here about 1340 and long monopolized the trade. Bergen is the native place of the poet Holberg. Pop. (1901) 72,179.

Bergen-Op-Zoom, berg'en-ŏp-zōm', a town of Holland, in a marshy situation on the Scheldt, where the Zoom enters it, 20 miles north-northwest of Antwerp. It was formerly a strong fortress, the morasses around it making it almost inaccessible to an assailing force, while its fortifications consisted of regular works, constructed by the celebrated Coehorn. It is well built, but has no edifices deserving of particular notice. It made an important figure during the Spanish war, and successfully resisted the attacks of the Duke of Parma in 1581 and 1588, and of Spinola in 1622. It was taken by the French in 1747 after a siege of nearly three months; and in 1795 the French under Pichegru again gained possession of it by capitula-

tion. It was unsuccessfully attempted by the British under Sir Thomas Graham, afterward Lord Lynedoch, in 1814. Its trade has suffered greatly from the proximity of Antwerp. Pop. (1899) 13,668.

Berg'engren, Anna (FARQUHAR), MARGARET ALLSTON, American novelist: b. Brookville, Ind., 23 Dec. 1865. She is the wife of R. Bergengren, (q.v.), and has published 'The Professor's Daughter' (1899); 'Her Boston Experiences' (1900); 'The Devil's Plough' (1901); 'Her Washington Experiences' (1901).

Bergengren, Ralph Wilhelm Alexis, American journalist and cartoonist: b. Gloucester, Mass., 2 March 1871. He has published a collection of verses and cartoons entitled 'In Case of Need' (1899).

Bergerac, bär-zhrąk, **Cyrano de,** a famous five-act tragedy by Edmond Rostand, founded on the life of Savinien Cyrano de Bergerac. It was first played in Paris, 28 Dec. 1897, with Coquelin in the title role and in New York 3 Oct. 1898 with Mansfield in the same role. See ROSTAND, EDMOND.

Bergerac, Savinien Cyrano de, French author: b. 1619; d. 1655. He was distinguished for his courage in the field, and for the number of his duels, more than a thousand, most of them fought on account of his monstrously large nose. His writings, which are often crude, but full of invention, vigor, and wit, include a tragedy, 'Agrippina,' and a comedy, 'The Pedant Tricked,' from which Corneille and Molière have freely borrowed ideas; and his 'Comical History of the States and Empires of the Sun and the Moon' probably suggested 'Micromégas' to Voltaire, and 'Gulliver' to Swift. His works have been frequently republished. He was made the hero of a drama bearing his name, written by Edmond Rostand, the French playwright, which had a phenomenal success in the United States in 1899–1900, and was the occasion of a suit for plagiarism. See ROSTAND, EDMOND.

Bergerac, a town of France, in the department of the Dordogne, and on the river Dordogne. Among its industries are paper-mills, ironworks, distilleries, etc. The town, 48 miles east of Bordeaux, gives the name to an agreeable wine cultivated on the banks of the Dordogne, in France sometimes called *petit champagne.* Pop. (1896) 15,642.

Bergerat, bärzh-ra, **Auguste Emile,** French journalist, playwright, and novelist: b. Paris, 29 April 1845. He is son-in-law of Théophile Gautier, and since 1884 particularly known as the amusing chronicler of the 'Figaro' under the pseudonym of CALIBAN. His *feuilletons* for that paper were published collectively as 'Life and Adventures of Sieur Caliban' (1886); 'The Book of Caliban' (1887); 'Caliban's Laughter' (1890), etc. He also wrote two novels, 'Faublas in Spite of Himself' (1884); 'The Rape' (1886); besides two volumes to the memory of his father-in-law, 'Théophile Gautier, Painter' (1877), and 'Th. Gautier, Conversations, Souvenirs, and Correspondence' (1879).

Bergh, bèrg, **Henry,** American philanthropist and author: b. New York, 1823; d. there, 12 March 1888. He was educated at Columbia College, and from 1861 to 1864 was in the diplomatic service, being secretary of the American legation and United States consul at St. Petersburg. In 1865 he founded the American Society for the Prevention of Cruelty to Animals, was chosen its president, and in 1866 secured the passage of an act giving the society the power of making arrests and carrying on prosecutions for violations of the statute on which the organization was instituted. He remained president of the society until his death, being ever its guiding spirit, living entirely in its work, and serving without compensation. At the beginning of his work no State or Territory had any statute relating to the prevention of cruelty to animals. At the time of his death 39 States had proper laws on the subject, and in 36 of them branch societies of the organization had been formed. He was the author of a volume of tales and sketches 'The Streets of New York'; a successful drama, 'Love's Alternative,' produced in Baltimore, 1881; 'The Portentous Telegram'; 'The Ocean Paragon'; and 'Married Off: a Poem' (1859).

Bergh, Johann Edvard, Swedish landscape artist: b. Stockholm, 1828; d. 1880. He was a professor in the Stockholm Academy and is looked upon as the founder of a new school of landscape art in Sweden, distinguished by accurate drawing, intelligent representation of nature, and a very decided nationalism. Among his most noted subjects are 'Wood Interior'; 'View of Stockholm'; 'View in Dalecarlia.'

Bergh, Pieter Theodoor Helvetius van den, Dutch dramatist and poet: b. Zwolle, 1793; d. 1873. He attracted attention with his comedy 'The Nephew' (1837), considered one of the best in modern Dutch literature, but did not justify expectations by his subsequent dramatic efforts. He also published 'De Nichten,' and a collection, 'Prose and Poetry' (3d ed. 1863).

Berghaan, bèrg'hän, a Dutch and colonial name in South Africa for several large hill-haunting eagles, especially the bataleur (q.v.).

Berghaus, bèrg'hows, **Heinrich,** German geographer: b. Cleve, 3 May 1797; d. Stettin, 17 Feb. 1884. He served in 1815 in the German army in France, and was from 1816 to 1821 employed in trigonometrical survey of Prussia under the war department. From 1824 to 1855 he was professor of applied mathematics in the Berlin Academy of Architecture. Besides his various maps and his great 'Physical Atlas' (republished in a remodeled form in 1886–92), he published 'Allgemeine Länder-und Völkerkunde' (1837–41); 'Die Völker des Erdballs' (1852); 'Grundlinien der physikalischen Erdbeschreibung' (1856); 'Grundlinien der Ethnographie' (1856); 'Deutschland seit hundert Jahren' (1859–62); 'Was man von der Erde Weiss' (1856–60); 'Sprachschatz der Sassen, or Low German Dictionary' (incomplete); etc.

Berghem, Nikolaas. See BERCHEM, NIKOLAAS.

Bergk, Theodor, German classical philologist: b. Leipsic, 22 May 1812; d. Ragaz, Switzerland, 20 July 1881. He became an indisputable authority on Hellenic poetry, producing two works of surpassing importance in that department of scholarship: 'Greek Lyric Poets' (4th ed. 1878–82), and 'History of Greek Literature' (1872); the latter not quite completed at his death, but brought to perfection with the aid of his posthumous papers. He contributed

much of value, likewise, to our knowledge of special departments of classical learning.

Berg'mann, Ernst von, German surgeon: b. Riga, 16 Dec. 1836; d. Wiesbaden, 25 March 1907. He served in the Prussian army 1866–70; was professor of surgery in the Univ. of Würtzburg 1878–82; and became director of the surgical clinic at the Univ. of Berlin in 1882. He wrote 'The Putrid Poison'; 'The Embolism of Fatty Tissues'; 'The Poison'; 'Instruction Concerning the Putrid Intoxication,' etc.

Bergmann, Julius, German philosopher: b. Opherdike, Westphalia, 1840. He was professor of philosophy at Marburg from 1875. Among his more important writings are 'Grundlinien einer Theorie des Bewusstseins' (1870); 'Zur Beurteilung des Kriticismus' (1875); 'Reine Logik' (1879); 'Sein und Erkunnen' (1880); 'Der Grundprobleme der Logik' (1882); 'Geschichte der Philosophie' (1892–4); 'Untersuchungen über Hauptpunkte de Philosophie' (1900).

Bergmann, Karl, American musician: b. Ebersbach, Saxony, 1821; d. New York, 10 Aug. 1876. Participation in the revolutionary outbreaks of 1848 obliged him to go into exile and he came to New York. He organized and conducted the first great German music festival, held in the Winter Garden Theatre (1855); in 1856 introduced German opera at Niblo's Garden, and for several years prior to his death conducted the concerts of the Philharmonic Society. He composed several orchestral pieces, and excelled as a player of the violoncello and the piano.

Bergmann, Torbern Olof, Swedish natural philosopher and chemist: b. Katharineberg, West Gothland, 20 March 1735; d. 1784. In 1758 he became doctor of philosophy and professor of physics at Upsal. Upon the resignation of the celebrated Wallerius, Bergmann was a candidate for the professorship of chemistry and mineralogy. His competitors charged him with ignorance of the subject, because he had never written on it. To refute them he shut himself up for some time in a laboratory, and prepared a treatise on the manufacture of alum, which is still considered as a standard work. In 1767 he became professor of chemistry, and devoted himself with ardor to this science. He invented the preparation of artificial mineral waters, and discovered the sulphuretted hydrogen gas of mineral springs. We are indebted to him for a knowledge of the characters which distinguish nickel from other metals. On a number of minerals he made chemical experiments, with an accuracy before uncommon. He published a classification of minerals, in which the chief divisions are based on their chemical character, and the subdivisions on their external form. In preparing this work he was much aided by his former discovery of the geometrical reations between different crystals of the same substance, which may be deduced from one primitive form, and are produced by the aggregation of similar particles, according to fixed and obvious laws. His theory of the chemical relations is still esteemed, and although it has received new developments from the further researches of Berthollet, has not been overthrown. The order of Gustavus Vasa was bestowed on Bergmann. Among his works the first place is due to 'Opuscula Physica, Chemica, et Mineralia' (1779–94), of which an English translation appeared. His famous essay on 'Elective Affinities' was translated into English by Dr. Beddoes.

Bergmehl, bĕrg'māl, a whitish earth, consisting almost entirely of the flinty shields of microscopic plant growths. It occurs in bog and ancient lake deposits in many parts of northern Europe, and, during times of great scarcity, it has been, when mixed with flour, eaten as food. Some writers assert that hundreds of carloads are consumed every year by the inhabitants of northern Sweden. From analysis, it does not appear to contain any positive nutriment.

Bergsoe, bĕrg'sę, Jorgen Vilhelm, Danish novelist, poet, and naturalist: b. Copenhagen, 8 Feb. 1835. While suffering partial blindness, caused by excessive use of the microscope in his memorable biological researches at Messina, he turned to literary composition; and soon appeared the first of a cycle of novels, 'From the Piazza del Popolo' (1866), which had an extraordinary success. The following year he published his first volume of poems, 'Now and Then.' Of his many novels, the one which excels for fineness of touch is, 'Who was He?' All his stories are characterized by rich imagination, fine observation, and great originality; his poetry is inferior in these respects to his prose.

Bergues, bărg, France, a town in the department of Le Nord, in a marshy district, five miles south of Dunkirk; population (1891), 5,380. It ranks as a fortress of the second class, is well built of brick, and having a basin which admits vessels of 250 tons, is the centre of a considerable trade. Its principal edifices are the townhouse, and a beautiful and richly ornamented belfry about 160 feet high. It owes its origin to the castle of Berg, to which St. Winnoc retired in 902, was first fortified by Baldwin II., Count of Flanders, afterward adorned with a magnificent monastery of St. Winnoc by Baldwin IV., and in the 13th century possessed flourishing manufactures. It suffered dreadfully during the wars in the Low Countries. Pop. (1896), 4,700.

Ber'gut, or **Bearcoot,** the Tartar name in Central Asia for the golden eagle (see EAGLE), there trained by Kirghiz for use in falconry.

Berhampur, bĕr-hăm-poor', the name of two towns of India. (1) The capital of the Ganjam district, Madras, 525 miles northeast of Madras, with which it is connected by rail. A good road leads from it to the coast town of Gopalpur, nine miles distant. As the headquarters town of the district, it contains the usual official buildings. Silk cloth is manufactured, and there is a considerable trade in sugar. The climate is unhealthy. Pop. (1891), with cantonment, 25,653. (2) A town of the Moorshedabad district, Bengal, on the left bank of the Bhagirathi, 5 miles south of Moorshedabad. The first open act of the Sepoy mutiny took place here on 25 Feb. 1857. The town contains a government college. Pop. (1891) 23,515.

Beriberi, bā-rĭ-bā'ri, an epidemic form of multiple neuritis formerly very prevalent in China, but now common in Japan, the Philippines, and associated tropical countries. It is said to be not infrequent among sailors in and about the ports on the Gulf of Mexico, particu-

larly New Orleans (Bondurant). It is supposed to be of bacterial origin, although an exclusive rice diet is claimed to be at least a predisposing cause. The disease exhibits three main types, an acute pernicious, the atrophic or dry, and the dropsical or wet forms. The symptoms are those of a multiple neuritis (q.v.), and the treatment is that for this disease.

Bering, bē'rĭng, or **Behring, Vitus,** Danish navigator: b. Horsens, 1680; d. 19 Dec. 1741. Being known as a skilful seaman, he was employed by Peter the Great in the navy established at Cronstadt. His talents and the undaunted courage displayed by him in the naval wars against the Swedes, procured him the honor of being chosen to command a voyage of discovery in the sea of Kamchatka. He set out from St. Petersburg, 5 Feb. 1725, for Siberia. In the year 1728 he examined the northeastern coasts of Asia, discovered the strait named after him, and proved that Asia is not united to America. It remained, however, to be determined whether the land opposite to Kamchatka was in reality the coast of the American continent, or merely islands lying between Asia and America. On 4 June 1741 he sailed, with two ships, from Okhotsk, and touched the northwest coast of America. Tempests and sickness prevented him from pursuing his discoveries; he was cast on a desolate island covered with snow and ice, where he died. See Life by Lauridson (Chicago 1890).

Bering Sea, that part of the north Pacific Ocean between the Aleutian Islands, in 55°, and Bering Strait, in 66° N., by which latter it communicates with the Arctic Ocean. It has on its west side Kamchatka and the Chukchi country, with the Gulf of Anadyr, and on its east the territory of Alaska, with Norton Sound and Bristol Bay; contains several islands, and receives the Yukon River from North America and the Anadyr River from Asia. Fogs are almost perpetual in this sea. Ice is formed and melted in the sea every year, the northern part becoming closed to navigation about the beginning of November. Pack ice gradually extends southward to a little below the latitude of St. Matthews Island (60½°), beyond which ice is found in floes. The southern limit of the ice usually extends from Bristol Bay, Alaska, to about 35 miles south of Pribilof Island, though in exceptionally severe winters it reaches as far south as Unimak Pass. It usually leaves Pribilof Island about 1 May, and vessels following in its wake may reach Bering Strait between about 15 and 25 June. A strong and comparatively warm current sets northward at about two to three knots an hour, through Bering Strait, and after following the Siberian shore turns north toward Herald Island. A cold current also passes out through the strait.

Bering Sea Controversy, an international dispute over the territorial status of that sea, chiefly between the United States and Great Britain, and growing out of attempts of the former to protect its fur-sealing industries there from the Canadian subjects of the latter. This industry rests on three great herds in the North Pacific, which resort regularly to certain islands in the breeding season, from May or June till the autumn storms, then move southward to about 35° N., and gradually work northward the next spring. At the islands the elder males remain with the young on the beach while the females go in search of food, sometimes 200 miles. The younger males, or "bachelors," two to four years old, herd apart, and should furnish all the commercial sealskins, the pelts of the old males being unsalable and the killing of females a blow at the continuance of the species. But this selection can only be made on shore; pelagic or ocean sealing is at best indiscriminate if done during migrations, and is almost exclusively of females during the breeding season, while every mother seal then killed means a young seal starved ashore. The largest of these "rookeries" is on the Pribiloff Islands in Bering Sea, where the Russian-American Company carried on sealing till their cession to the United States in 1867, when it was taking some 40,000 seals a year; the herd being protected by restrictive regulations. In 1821 Alexander I. issued a ukase claiming Bering Sea as Russian property, and forbidding trespass on pain of confiscation; but the United States and Great Britain protested so vigorously that the claim was dropped. After the cession, the rivalry of competing companies would speedily have made an end of the seals in the Northern Ocean, as it long since had in the Southern, had not the United States leased the islands for 20 years to the Alaska Commercial Company (which then leased the Russian seal-islands also) for $55,000 a year and $2.62½ a skin, restricting the catch to 100,000 a year. In fact the company kept a little under that mark; but the contract was so profitable that vessels were soon fitting out from British Columbia, Hawaii, and Australia, which intercepted the seals as they passed between the Aleutian Islands northward or southward, or entered Bering Sea and caught the females as they ranged the seas for food. The poaching grew in volume, and a stream of protest from the Alaska Company flowed in year after year to the government at Washington, which in 1881 was goaded into officially reversing its former contention, and declared Bering Sea east of the treaty meridian of 1867 American waters; but took no further step till 1886, when under President Cleveland it seized and condemned three Canadian sealers. Great Britain protested, and proceedings were suspended pending discussion; but in 1887 five more were seized, and the question at once became a burning one in our diplomacy. Secretary Bayard attempted to convene delegates from Great Britain, France, Germany, Sweden, Russia, and Japan, to meet with our own and frame regulations to prevent the extirpation of the northern seals; but in June 1888 Great Britain withdrew, under pressure from Canada. In 1889 several more Canadian vessels were seized, and Great Britain sent a practical menace of war if this were not stopped. There being but three alternatives, abandonment of the sealing interest to destruction, which the country would not endure; seizure of all poaching sealers, which meant war; and arbitration — the latter was decided on in 1890. The same year the Alaska Company, its lease expired, was succeeded by the North American Company; the herd, estimated in 1867 at over 3,000,000 on the Pribiloff Islands, had shrunk so enormously under the pelagic sealing that the price had risen from $2.50 to $30 per skin, and the new company's limit of capture was restricted to 20,000, with a royalty

of $10 a skin. On 15 June 1891 a *modus vivendi* was agreed on for joint policing of Bering Sea by British and American vessels; and on 29 Feb. 1892 a treaty of arbitration was signed, under which on 23 March 1893 a tribunal met at Paris, composed of Baron de Courcel (France), Marquis Emilio Visconti-Venosti (Italy), Judge Gregers W. W. Gram (Sweden-Norway), Lord Hannan (England), Sir John S. D. Thompson (Canada), Justice John M. Harlan, and Senator John T. Morgan (United States). The United States case was conducted by the secretary of state (John W. Foster); counsel, Edward J. Phelps, James C. Carter, Frederick R. Coudert, and Henry Blodget. The decision on the legal points was entirely against the United States; Bering Sea was held part of the high seas and no one's preserve, and seals *ferœ naturœ* and no one's property. But on the point of equity in our case, that the preservation of the seals from extinction was a common interest of the civilized world, it agreed with us, and framed regulations binding for five years to prohibit all pelagic sealing within 60 miles of the Pribiloffs, or from 1 May to 31 July in the North Pacific east of 180° or north of 35°, with other regulations. The restrictions proved absurdly ineffective, and Great Britain would not antagonize Canada to make them less so; in 1894 the pelagic catch was the enormous one of 142,000, far beyond any former record, and for several more seasons was very great, till the herds showed signs of rapid exhaustion. Great Britain obstinately refused to make any change in the regulations till the five years were up, sent an expert to the spot who laid all the blame on the North American Company, and refused to send a delegate to meet those of Russia, Japan, and the United States, who agreed to prohibit pelagic sealing to their subjects if Great Britain would do so. Meantime, to put pressure on the latter, Congress prohibited the importation of all sealskins except the North American Company's, in order to destroy the market for Canadian-caught skins and make their business unprofitable; but England still refused to agree to the provisional treaty, on the ground that it would injure Canada, was not necessary to protect the seals, and that the North American Company was solely in fault. But on 18 Nov. 1897 a joint meeting of English, American, and Canadian experts was held, and unanimously supported the American contention at every point; that the herds had diminished by from 66⅔ to 80 per cent, and markedly so even from 1896 to 1897; that the North American Company was handling its business with entire propriety; that pelagic sealing, involving the killing off of the females, was the sole cause of the reduction, which was threatening the entire extinction of the fur seal. Another year would bring about the time for changing the Paris regulations; and the United States agreed to prohibit all seal killing even on the Pribiloffs for a year, but Canada would not consent because it would scatter the crews of her sealing fleet. Meantime, Congress on 14 June 1898 appropriated $473,151.26 to pay for the Canadian vessels seized years before. On 30 May 1898, a joint Canadian and American commission was authorized; it met at Quebec in August, adjourned to November at Washington, continued till February 1899, adjourned to the summer, and never reassembled. Most unfortunately, its scope included all the questions at issue between the two governments: the sealing problem became entangled at the outset with impossible bargains for general commercial reciprocity, then with the Alaska boundary question (q.v.) made acute by the Klondike gold discoveries, and at the adjournment not a single issue before it had been decided. The Paris regulations had expired, no new ones had been established, and the seals were left wholly without protection; while even so, as the United States forbade pelagic sealing to its citizens while England did not, all the profit of the perishing industry was being reaped by foreigners. The Canadian fleet of 1899 numbered 26 vessels, that of 1900 numbered 33, with a catch of over 35,000 each year, considerably more than half females. The same conditions have prevailed since; the North American Company has been increasing its efforts in order to obtain its share while the seals last; and in the Congressional session of 1901–2 it was seriously proposed to kill off the entire herd at once, and thus end the question by putting an end to the seals. (The latest work on this subject is the chapter in Henderson's 'American Diplomatic Questions,' 1901; earlier aspects were discussed in Stanton's 'Bering Sea Controversy' 1892.) See U. S.— Diplomacy of the.

Bering Strait and **Island.** The strait is the channel that separates Asia from America, and connects the North Pacific with the Arctic Ocean. Its breadth at the narrowest part, between Cape Prince of Wales on the American coast and East Cape in Asia, is about 36 miles, and its depth in the middle varies from 29 to 30 fathoms. On both sides are several commodious bays; but the country is barren and rocky, with scanty vegetation. The sea here is frozen over every winter, and foggy, hazy weather is almost perpetual. Whales frequent the strait, and the walrus occurs in vast numbers. The inhabitants on either shore support themselves chiefly by hunting and fishing; but those on the Asiatic side are greatly superior, both physically and intellectually, to those on the American. The strait is called after Vitus Bering, by whom it was first discovered. It was more fully explored by Capt. Cook in 1778. Bering Island is in the southwest part of the above sea, off the east coast of Kamchatka. It is uninhabited, and is without wood. It has, however, several springs of excellent water. Here the navigator Bering died in 1741.

Ber'ington, Joseph, English Roman Catholic theologian: b. Shropshire, 1744; d. Berkshire, 1 Dec. 1827. His first work was 'A Letter on Materialism, and Hartley's Theory of the Human Mind' (1776). About this time, the English Roman Catholics found their position much stronger in the arena of public opinion, and began to think of appearing there openly. Berington, in 1779, published a letter to Fordyce, on his 'Sermon against Popery.' In 1780 appeared his 'State and Behavior of English Catholics from the Reformation till 1780.' In 1786 he came forward with 'An Address to the Protestant Dissenters,' who had lately petitioned for a repeal of the corporation and test acts. In 1787 appeared the 'History of Abelard and Heloise,' with their genuine letters, and 'An Exposition of Roman Catholic Principles, in reference to God and the Country,' and other

pamphlets. In 1790, Berington gave to the world a 'History of Henry II.' (of England), vindicating the character of Becket from Lord Lyttleton's attacks. In 1793 appeared his 'Memoirs of Gregorio Panzani,' papal legate to England in 1634–6, translated from the Italian. But his most important work appeared in 1814, a 'Literary History of the Middle Ages,' giving an account of the state of learning from "the close of the reign of Augustus to its revival in the 15th century."

Beriot, bā-rẹ-ō, **Charles Auguste de,** Belgian violinist: b. Louvain 20 Feb. 1802; d. there 20 April 1870. He studied with Robbrecht and Tiby, and, in Paris, with Baillot; and became a professor in the Conservatory in Brussels in 1842. In 1836 he married the celebrated singer, Malibran. He published a 'Violin Method' (1858).

Berislav, bā'rẹ-släf, or **Borislav,** Russia, a fortified town on the Dnieper River. It is the centre of trade for the district. Pop. (1903) 13,700.

Berkeley, George, English philosopher and bishop: b. Kilcrin, Ireland, 12 March 1685; d. Oxford, 14 Jan. 1753. He was educated at Trinity College, Dublin, where he took a keen interest in the philosophical problems then under discussion. He received the degree of A.B. with honors in 1704, being afterward successively scholar and fellow. Almost immediately he began his career of authorship. He published in 1709 his first important work, the 'New Theory of Vision,' which is the logical preliminary to his system and gives expression to certain of its fundamental principles. A year later his philosophy finds complete statement in the 'Treatise Concerning the Principles of Human Knowledge.' During the next 15 years Berkeley advanced to a position of prominence in the English Church. In 1711, shortly after his ordination to the diaconate, he published his 'Discourse on Passive Obedience,' a treatise upon ethics, in which he develops a system of theological utilitarianism. The 'Dialogues,' published in 1711, present his philosophy in literary form, clothing subtle argument in a garb of rhetorical beauty. In the years immediately following, several new works appeared, accompanied by increasing fame and prosperity. He was appointed successively to the deaneries of Dromore and of Derry, the latter of which yielded a large income. But this he resigned in order to devote himself to a plan for the establishment of a college in the Bermudas, where the Indians of America were to be enlightened and Christianized. For the furtherance of such a plan he obtained a promise from the government for a grant of £20,000. Upon the strength of this he sailed for America in 1728, accompanied by his wife and a few friends. They went first to Rhode Island, where they planned to await the expected grant. Here Berkeley purchased a farm and waited three years in quiet and study. Finally, upon the failure of the government to make good its promise, he was compelled to give up his cherished plan and return to England in 1731. Soon after his return he was made Bishop of Cloyne. During the remaining years of his life he published a number of works upon philosophy, economics, and other subjects. Notable among these were 'Alciphron, or the Minute Philosopher,' the result of his quiet studies in Rhode Island, and 'Sirus,' a remarkable essay in which the author interweaves his convictions concern the healing properties of tar-water with the deepest and most profound of his philosophic reflections.

Although the representative English idealist, Berkeley proceeds in his thought from the empirical philosophy of Locke. It was Locke's contention that in knowledge we are concerned with our own ideas only, and that these ideas are derived entirely from experience. He made an important distinction among these ideas, however, with reference to their representation of objective or material reality. Ideas of color, sound, taste, etc., called secondary qualities, are subjective processes, and reveal nothing of the nature of material reality. But ideas of extension, figure, motion, etc., called primary qualities, reveal directly the nature and constitution of that reality which exists without the mind in the material world. Berkeley agreed with Locke that we know only our own ideas, but he attacked vigorously this distinction between primary and secondary qualities. He maintained that ideas of primary qualities are wholly subjective, and tell us no more of the nature of material reality than do our ideas of secondary qualities. He attempts a partial proof of this in his 'New Theory of Vision,' by showing that distance, magnitude, and situation, are not directly perceived by sight, but are inferred in an indirect manner. These ideas of distance, magnitude, and situation are results of judgment based upon visual sensations. Such visual sensations have no essential relation to the ideas in question, however — they are simply associated with them in experience. For example, consider our idea of distance. We find connected with this idea: (1) Sensation of movement in the eye; (2) confusion in vision due to nearness of the object; and (3) strain of fixation. These sensations are associated by custom with degrees of distance. Hence we have in this idea of distance no direct revelation through vision of the nature of material reality. Rather we have the product of our own judgment, based upon sensations which have themselves no objective reference. So it is with other ideas of primary qualities which have been held to bring us into immediate contact with material reality. In ideas of figure and motion we have sensations of light, color, and strain, and the remainder is due to association and judgment. Thus Berkeley concludes that we have in visual ideas not a revelation of the nature of matter, but a universal language of symbols whereby we interpret our sensations of touch, and so regulate our actions as to preserve and promote our lives. In his 'Treatise Concerning the Principles of Human Knowledge,' he uses this conclusion to disprove the existence of a material world apart from, and independent of, the perceiving mind. The very notion of matter or corporeal substance involves insoluble contradiction. By matter is meant inert, senseless substance in which extension, figure, and motion reside. But these so-called attributes of matter are ideas in the mind, and are shown to be every whit as subjective as ideas of colors and tastes. Now, ideas can be similar only to ideas. Hence to suppose that our ideas copy or represent a material substance that is unperceiving and

unperceived, is a crass absurdity. Ideas are the only objects of our thought. To exist as an object is to be perceived. (*Esse est percipi.*) Although confined to our own ideas, we may observe their various characteristics and combinations. Sense qualities are simple states of consciousness. Sense-objects are sensation-complexes. There is in our consciousness a continuous succession of these perceptions, in which we perceive perceptions newly excited, perceptions changed, and perceptions obliterated. For all this phenomena there must be some cause. This cause cannot be an idea or combination of ideas; for it is the appearance and arrangement of ideas which must be explained. This cause must be a substance, a ground of existence. Matter, or corporeal substance, is an impossibility. We are compelled, therefore, to find the cause of our ideas in an incorporeal, active substance, or spirit. But we observe an important difference in the production of our ideas. Those ideas actually perceived by the senses of the individual are not dependent upon his own mind or will. Hence there must be some other will or spirit which produces them. This is God, the Author of Nature. The ideas of sense are imprinted upon our minds by the direct influence of the Divine Mind. Hence they are strong, orderly, and coherent. Their source guarantees their trustworthiness, and with good reason they may be called "real things." In this way our knowledge acquires an objective validity much more adequate than if our ideas were aroused by the action of a material substance upon our sense-organs. The laws of nature, which we properly regard, represent the regular operation of the Divine Mind upon our minds. There is consequently no difficulty in distinguishing the order of ideas which is real and objective, from the train of subjective fancies and imaginations.

The best edition of Berkeley's works is that by Fraser (2d ed. 1902), containing a 'Life.' Consult further: Fraser's briefer 'Life' (1881; new ed. 1901; in 'Philosophical Classics'); Frederichs, 'Ueber Berkeleys Idealismus' (1870); Spicker, 'Kant, Hume und Berkeley' (1875); Janitsch, 'Kants Urtheil über Berkeley' (1879).

H. W. WRIGHT,
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Berkeley, George Charles Grantley Fitzhardinge, English writer: b. 10 Feb. 1800; d. Poole, Dorsetshire, 23 Feb. 1881. In 1832–52 he was a member of the British Parliament, and for a time he was in the army. His 'My Life and Recollections' (1864–6), an extensive work, attracted some attention. Among his further works are: 'Berkeley Castle' (1836); 'Sandron Hall, or the Days of Queen Anne' (1840); 'The English Sportsman on the Western Prairies' (1861); 'Anecdotes of the Upper Ten Thousand at Home and Abroad' (1867); and 'Tales of Life and Death' (1870).

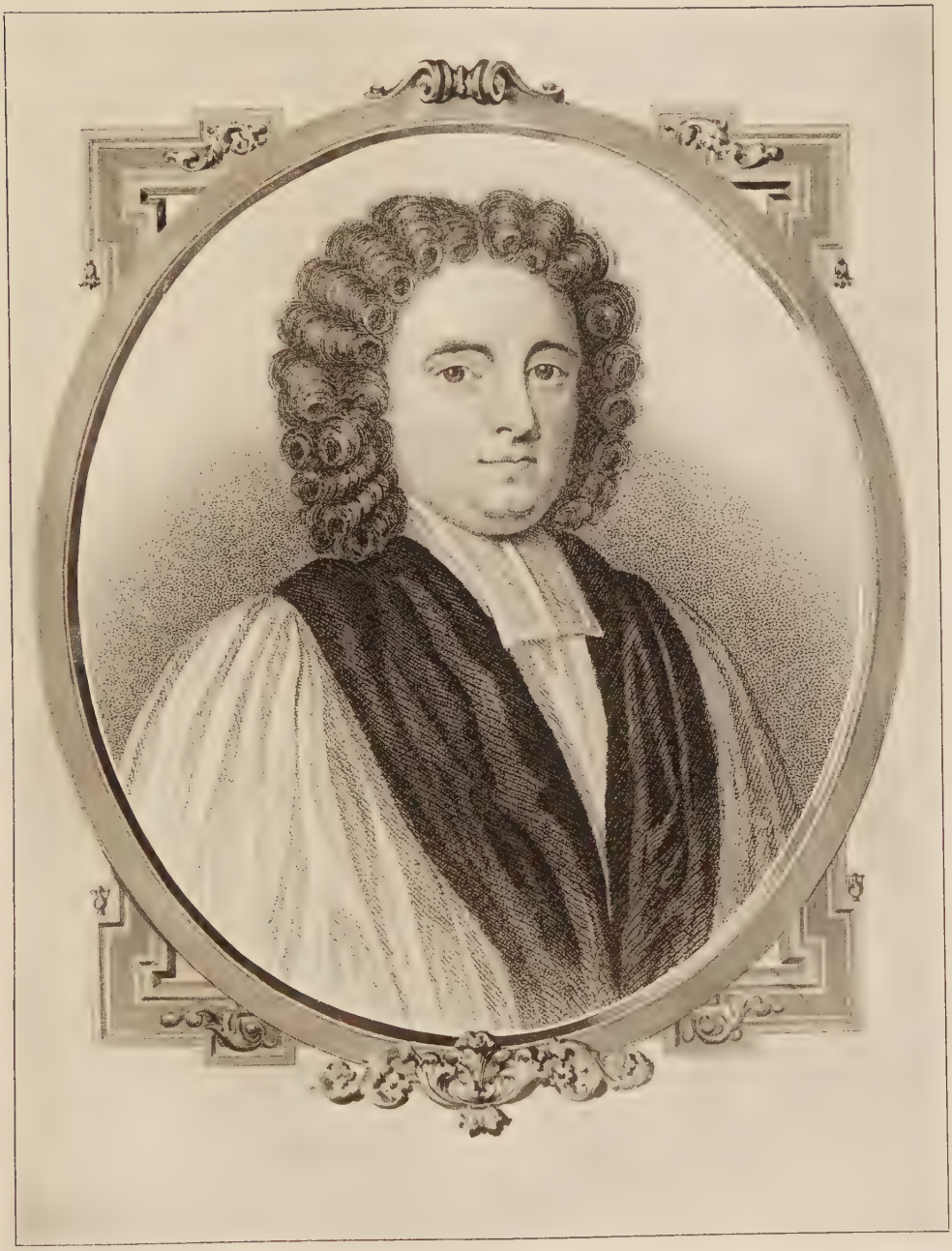
Berkeley, SIR **George,** English engineer: b. London 26 April 1821; d. there 20 Dec. 1893. In 1835 he began experimenting with methods for operating atmospheric railways. In 1841 he associated himself with Robert Stephenson and continued his experiments. On Stephenson's death he became engineer of the Great Indian Peninsular Railway. In 1892 he was made president of the Institute of Civil Engineers. He wrote papers on atmospheric railways and on the strength of iron and steel; and was knighted in 1893.

Berkeley, SIR **John,** English nobleman, one of the proprietors of New Jersey: b. 1607; d. 28 Aug. 1678. He was a prominent Royalist during the contest of Charles I. with Parliament. Charles II. granted him, with Sir George Cartaret, a proprietary interest in New Jersey and Carolina.

Berkeley, Miles Joseph, English botanist: b. Biggin, Derbyshire, 1803; d. Sibbertoft, Leicestershire, July 1889. Educated at Christ Church, Oxford, he took orders, was curate at Margate (Kent) and Market Harborough (Leicestershire), and subsequently was made vicar of Sibbertoft. He soon became the leading British authority on fungi and plant pathology, and especially well known for his achievements in mycology. About 6,000 species of fungi are credited to him; his most important work was the section on fungi contributed to Hooker's 'British Flora' (1836), and his 'Outlines of British Fungology' (1860), and he assembled a fine herbarium of more than 9,000 species, now at the Kew Gardens, and regarded as one of the most noteworthy in the world. A bibliography may be found in the 'Catalogue of Scientific Papers' of the Royal Society. Consult, also, Vol. XLVII. (1890) of the 'Proceedings of the Royal Society' for a sketch by Hooker.

Berkeley, Stanley, English artist. He has constantly exhibited at the Royal Academy in recent years, and is a national gold medallist and a member of the Royal Institute of Painter Etchers. Among his paintings are 'The Victory of Candahar'; 'For God and the King'; 'Prince Rupert at the Battle of Edgehill'; 'Completely Routed'; 'An Australian Bush Fire'; 'Heroes of the Tugela'; 'The Meet'; 'Atbara'; 'Omdurman'; 'The Charge of Scarlett's Three Hundred'; Gordons and Greys to the Front'; 'Full Cry'; 'Desperate Odds'; 'Dargai'; 'Cornered at Last'; 'The Death'; 'The Charge of the French Cuirassiers at Waterloo.' He has also done much in the way of illustrating books and newspapers.

Berkeley, SIR **William,** American colonial governor: b. near London about 1610; d. 13 July 1677. His father and brother were colonial proprietors. Graduating from Oxford 1629, he traveled on the Continent for a year; was appointed a commissioner of Canada 1632, and won a high reputation there. In 1641 he was made governor of Virginia, and arriving in 1642, was for a time very popular. He experimented in the cultivation of rice, cotton, indigo, hemp, flax, and silk, the manufacture of potash and naval stores, and the cutting and export of masts; pleased the Royalist party by expelling the New England Puritans in 1643, and all parties by capturing the Indian chief Opechancanough in 1644, after a series of Indian massacres. Always with an eye to profit, however, he received from the king a monopoly of the fur trade. During the English revolution he adhered to the royal side, and offered an asylum in Virginia to exiled or dissatisfied Royalists; many hundreds availed themselves of this. When Cromwell felt strong enough he sent a fleet (in 1651) to bring him back for punish-



GEORGE BERKELEY.

ment; but Berkeley succeeded in making terms with it by mingled "bluff" and finesse, and was allowed to retire in safety to his plantation, though deprived of his office. When the Restoration began to seem probable, the colonists elected Berkeley as governor to gain favor in such event; Berkeley accepted it provisionally, and Charles II. on accession confirmed it. But in this second term all Berkeley's evil side showed itself, till it ended in the atrocities of 1676. Besides expelling and confiscating the goods of Puritans and Quakers, a measure popular at the time, he frowned on the establishment of schools, and absolutely refused to have a printing-press set up, as making people too censorious of their superiors. He formed a council of the wealthier planters, and having obtained during the spasm of Restoration loyalty in 1662 an ultra-royalist House of Burgesses, would not issue writs for another election for 14 years, simply adjourning annually the "Long Assembly," as it came to be called; and in 1670 abolished universal suffrage, substituting a property qualification, purely as a precaution for the future, as no elections were held for years before and after. These, however, were only means to the end of profiting himself and his friends, and the rapacious crew of civil officers sent over by Charles to quiet their importunities. The heavy taxes and fees imposed on the colony, drove them to desperation, so that as early as 1667 they were ripe for revolt. Besides Berkeley's share in various extortions, he had one monopoly which led directly to the catastrophe, that of the Indian trade, which he gained by underhand means. The colony allowed no trade with the Indians without license; Berkeley therefore licensed a small number of men to trade in furs with them, which secretly included liquor, firearms, and other things, and exacted a third of the profits. It was believed to be this gain which led him to refuse permission to the colonists to protect themselves against the Indians in 1675–6, while hundreds of them were being massacred and tortured and scores of plantations laid waste, and to dissolve force after force assembled to protect them. How Nathaniel Bacon chastised the Indians in spite of him, was proscribed for it, forced into open rebellion, drove Berkeley into retreat and burned his capital, and died at the moment of his victory, is told under 'Bacon's Rebellion.' Berkeley's soul was as full of senile fury as it had been of senile avarice; he slaughtered right and left, hanging a score of victims with such vindictive haste and ruffianly insult that the Assembly remonstrated, and the royal commissioners, who came in January to investigate the condition of the colony, made a report that led the king to remove him, with the comment, "The old fool has put to death more people in that naked country than I for the murder of my father." He sailed 27 April, his departure celebrated with bonfires and salutes of cannon; and expected to justify himself to the king and return. But Charles kept postponing an interview, and in a few weeks Berkeley died — of chagrin, it was believed.

Berkeley, Cal., a town in Alameda County, on the Southern P. R.R.; 8 miles northeast of San Francisco. It is the seat of the State University of California (q.v.); the State Agricultural College; the State Institution for the Deaf, Dumb, and Blind; and six college preparatory schools. The town is well equipped with electric light and street railroads; and has soap works, iron foundries and machine shops, furniture factory, and other industries. Pop. (1900) 13,214.

Berkeley, England, a market town, 16 miles southwest of Gloucester, pleasantly situated on the right bank of the Avon, in the rich vale of Berkeley, and celebrated for its castle, where Edward II. was confined and barbarously murdered. Pop. (1901) 6,277.

Berkeley Divinity School, an Episcopal theological school at Middletown, Conn. It was organized by Bishop John Williams of Connecticut while he was president of Trinity College, at Hartford, and was at first intended to be the theological department of the college. It was later placed upon an independent basis and removed to its present location. The value of its buildings is about $90,000, and its endowment fund is not far from $350,000.

Berkeley Sound, next to Stanley Sound the most frequented inlet of the East Falkland Island, near its northeast extremity. Though it is difficult to enter, it contains some of the best harbors in the South Atlantic.

Berkeley Springs, W. Va., a town and county-seat of Morgan County; 2 miles south of the Potomac and 77 miles northwest of Washington; on a branch of the Baltimore & O. R.R. It is in an agricultural region, and has been widely known and popular for more than a century because of its mineral springs. The site of the town was a part of the vast estate of Lord Fairfax, and Washington owned considerable property here. It is the oldest pleasure resort in the South, and as far back as the colonial days the gentry of Virginia came here in warm weather and lived in log huts in order to enjoy or be benefited by the baths and swimming pools. Pop. (1900) 781.

Berk'enhout, John, Dutch-English physician and general writer: b. Leeds, about 1730; d. 1791. Having entered the Prussian service, he rose to the rank of captain. In 1756 he quitted that service and entered into that of England, where he obtained the same rank. At the peace in 1760 he went to Edinburgh and began the study of physic; while there he published his 'Clavis Anglica Linguæ Botanicæ,' a book of great merit, and later his 'Pharmacopœia Medici,' which passed through three editions. In 1778 he attended the British commissioners to America, and at Philadelphia he was committed to prison, but he soon afterward was set at liberty, and returned with the commissioners to England, where he obtained a pension. He was an industrious writer, and his publications possess considerable merit.

Berkhampstead, bĕrk'hăm-stĕd, or **Berkhamsted, Great,** a town in Hertfordshire, England, beautifully situated in a hollow, surrounded by hills, on the London & N. W. R.R. It consists almost wholly of one main street, and has a fine old church, restored 1871–87; several chapels; Berkhamsted School, with a fine chapel (1895); a high school for girls; many other schools; etc. There are works for wooden ware, a large chemical work, a boat-building yard, brush, coach, and mantle factories, an iron foundry, etc. The poet Cowper

was born here in 1731. In the small parish of Little Berkhampstead, some miles to the north, the famous Bishop Ken was born. Pop. (1891) 5,034.

Berkhey, bĕrk'hī, **Johannes Lefranca van,** Dutch writer of eminence: b. Leyden, 23 Jan. 1729; d. there, 13 March 1812. His work, entitled 'Naturlyke Historie van Holland,' first brought him into notice. He also distinguished himself as a poet, though he often manifests a tendency to bombast, and indulges in false pathos. One of his best poems is entitled 'Het Verheerligkt Leyden.'

Berkley, Va., a town in Norfolk County on the Elizabeth River opposite the city of Norfolk. It is on the Norfolk & W. and the Norfolk & S. R.R.'s. The Berkley College and Military Institute and several private schools are located here. Shipyards, foundries, and knitting-mills are also among the features of the town. Pop. (1900) 4,988.

Berkshire, a midland county of England, with an area of 450,132 acres or 712 square miles. Its shape is very irregular, and has been compared to that of a shoe or slipper. A range of chalk hills crosses the country in a westerly direction, and forms a boundary to the fertile vale of Whitehorse, so called from the gigantic form of a horse which has been scooped out on the side of a chalk hill, so as to become conspicuous to all the country round, referred to in Thomas Hughes' 'The Scouring of the White Horse.' The cultivated parts of the county, and more especially this vale, are peculiarly fruitful in barley. They also contain much rich pasturage and many excellent dairy farms. Timber abounds, particularly oak and beech, in Windsor Forest and toward the west. Turnips are an important crop. There are but few manufactures carried on in this county, the principal being agricultural implements and artificial manures, flour, paper, sacking and sailcloth, and biscuits (at Reading). Malt is made in great quantities, and chiefly sent to London. The principal towns of Berkshire are Reading (the county town), Newbury, Maidenhead, Wokingham, Wallingford, Windsor, Abingdon, Wantage, and Farringdon. Pop. (1901) 255,000. See Graves, 'The Way About Berkshire' (1898).

Berkshires, The, or **Berkshire Hills,** a range of mountains in the northwest of Massachusetts; in Berkshire County; stretching 16 miles north and south on the east of the valley of the Upper Hoosic River. They are a favorite summer and autumn resort. The highest summits are Greylock in the north, 3,535 feet, and Mount Everett, or the Dome, in the south, 2,635 feet.

Berlad, bĕr-lăd', Rumania, a town on the Berlad River, and Teucuci-Baslui R.R., about 68 miles northwest of Bucharest. It is the trade centre of a grain-raising district and has many distilleries. It is a well built town, with good schools and a theatre. Pop. (1903) 26,892.

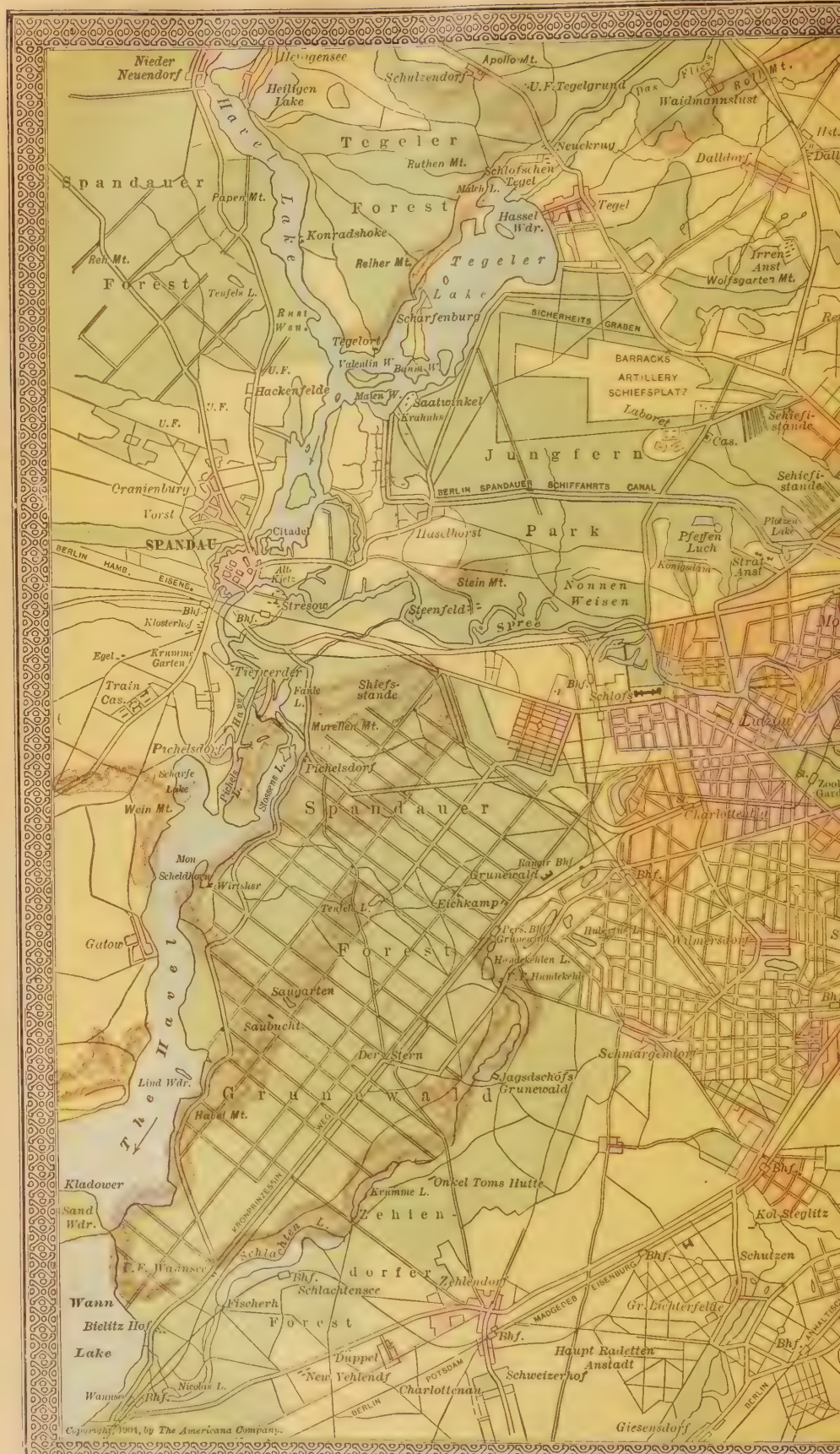
Berleburg, bĕr'lĕ-boorg, or **Berleburger Bible,** a translation of the Scriptures published at Berleburg, Germany (1726–42). Its unknown editors have given an original version with accompanying exposition more or less mystical in character.

Berlichingen, bĕr'lih-ĭng-ĕn, **Götz,** or **Godfrey von,** German soldier of fortune: b. Jaxthausen, Swabia 1480; d. 23 July 1562. He was a bold, restless, warlike, and honorable knight. He placed himself at the head of a body of the rebellious peasants, in the war which they waged against their oppressors, but was soon made prisoner. Before that time he had lost his right hand, and therefore wore one made of iron. His biography, written by himself, was printed at Nuremberg in 1731 and 1775, and, for the third time, at Breslau in 1813. This book contains an excellent picture of the social life and customs of the time, and has furnished Goethe with the subject of his drama, 'Goetz von Berlichingen,' translated by Sir Walter Scott.

Berlin, Canada, town and county-seat of Waterloo County, Ont.; on the Grand R. and the Grand T. R.R.; 62 miles west of Toronto. It has manufactories of furniture, leather, boots and shoes, pianos and organs, buttons, gloves, etc.; excellent sewerage system, waterworks, street railway, and gas and electric light plants; a Roman Catholic college, 15 churches, and several daily, weekly, and monthly periodicals. Pop. (1901) 9,747.

Berlin. No account of the earliest settlement of Berlin has come down to us, but it is supposed that the city was founded during the decade from 1230 to 1240. Indeed, the margraves John I. and Otto III. are said to have established the city as a stronghold against the Slavs. The name Berlin is probably of Slavic origin, although some scholars trace the word to «Bärlein,» from the fact that a bear appears on the coat of arms of the city. The new city, or town, was situated on the old commercial highway which led from Leipsic to Stettin and was known especially as a market for herring, grain, and wood. Cologne (Colonia), the near-by sister city on the river Spree, seems to have been established as an independent municipality simultaneously with Berlin and was united with Berlin, temporarily, in the year 1307. Though the margrave had his castle in the city, the municipal government was left to the mayor and aldermen, who enjoyed full sway.

In 1134 the mark of Brandenburg had come into the hands of Albrecht the Bear, of the House of Ascan, to which family also belonged the founders of Berlin, who ruled in common. After the extinction of this family (1323) the German emperor, Ludwig of Bavaria, gave Brandenburg to his son Ludwig as a fief, who in 1351 passed it to his brother, Ludwig the Roman. His successor, Otto the Lazy, sold the mark to the emperor Karl IV. (1373). Karl's son, the emperor Sigismund, appointed Friedrich von Hohenzollern, burggrave of Nürnberg, viceroy of the mark in 1411 and made him an elector in 1415. This increased dignity, which indeed had already been worn by Ludwig the Roman, gave the ruler of the mark an importance that redounded to the good of the country and of the city. The first Hohenzollern had a difficult position to fill, in that he had to put down a rebellious and, in part, thievish nobility. This nobility, especially the family of Quitzows, did great damage to the trade of Berlin (1406–1410). Just as his father had had to contend with the nobility, Frederick II., the second Hohenzollern, had to fight against the populace of Berlin-Cologne. Soon after he un-


Nieder Neuendorf
Hermsdorfersee
Apollo Mt.
Schulzendorf
U.F. Tegelgrund
Das Fliess
Roll Mt.
Waidmannslust
Heiligen Lake
Havel
Tegeler
Forest
Neukrug
Ruthen Mt.
Schlofschen Tegel
Dallidorf
Spandauer
Forest
Papen Mt.
Marsh L.
Tegel
Hassel Wdr.
Konradshoke
Reit. Mt.
Reiher Mt.
Tegeler
Lake
Irrenanst
Wolfsgarten Mt.
Teufels L.
Rust Wan
Scharfenburg
SICHERHEITS GRABEN
Tegelort
Valentin W.
Bumm W.
BARRACKS
ARTILLERY
SCHIEFSPLATZ
U.F.
Hackenfelde
Malen W.
Saatwinkel
Krahnhs
Laboret
Schiefistande
Cas.
Jungfern
BERLIN SPANDAUER SCHIFFAHRTS CANAL
Cranienburg
Vorst
Citadel
Hasselhorst
Park
Pfeffen Luch
Konigsfan
Strafanst
SPANDAU
BERLIN HAMB. EISENB.
Alt Kietz
Stein Mt.
Nonnen Weisen
Bhf.
Stresow
Steenfeld
Spree
Egel
Krumme Garten
Tiefwerder
Train Cas.
Fasle L.
Shiefsstande
Schlofs
Murellen Mt.
Pichelsdorf
Scharfe Lake
Pichels L.
Stoewers L.
Wein Mt.
Spandauer
Charlottenhof
Mon Scheidhorn
Wirrsbar
Grunewald
Eichkamp
Teufel L.
Gatow
Forest
Hundekehlen L.
Saugarten
Saubucht
Der Stern
Schmargendorf
Jagdschofs Grunewald
Lind Wdr.
The Havel
Grunewald
Hahel Mt.
Kladower
Krumme L.
Onkel Toms Hutte
Sand Wdr.
Zehlendorf
Schlachten L.
Schutzen
Bhf.
Schlachtensee
Wann
Fischerh
Gr. Lichterfelde
Bielitz Hof
Forest
Lake
Duppel
Haupt Raletten Anstadt
New Yehlendf
Schweizerhof
Charlottenau
Nicolas L.
Giesensdorf
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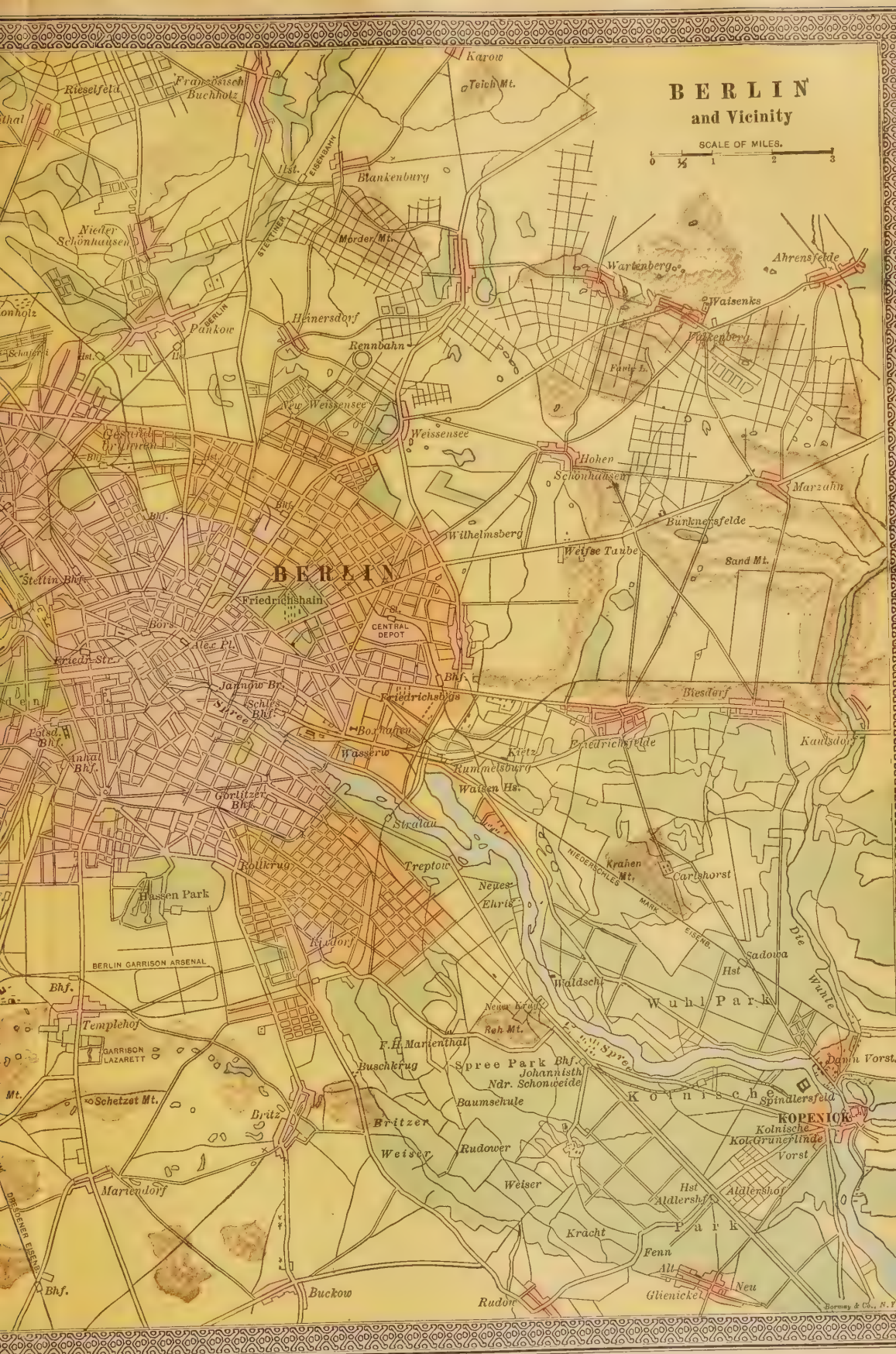
BERLIN
and Vicinity
SCALE OF MILES.
0 ½ 1 2 3
BERLIN
Karow
Teich Mt.
Rieselfeld
Französisch Buchholz
Blankenburg
Eisenbahn
Niedr. Schönhausen
Stettiner
Mörder Mt.
Wartenberg
Ahrensfelde
Waisenks
Falkenberg
Pankow
Heinersdorf
Rennbahn
Forts L.
New Weissensee
Weissensee
Hohen Schönhausen
Marzahn
Bunknersfelde
Wilhelmsberg
Weisse Taube
Sand Mt.
Stettin Bhf.
Friedrichshain
Central Depot
Bors.
Alex Pl.
Friedr. Str.
Jannow Bf.
Schles. Bhf.
Spree
Friedrichsh'g
Bor. hafen
Wasserw.
Kietz
Rummelsburg
Waisen Hs.
Friedrichsfelde
Biesdorf
Kaulsdorf
Potsd. Bhf.
Anhalt Bhf.
Görlitzer Bhf.
Stralau
Treptow
Rollkrug
Neues Elysium
Krähen Mt.
Carlshorst
Niederschles. Märk. Eisenb.
Hasen Park
Rixdorf
Berlin Garrison Arsenal
Bhf.
Templehof
Garrison Lazarett
Schetzet Mt.
Britz
Britzer
Weiser
Rudower
Mariendorf
Dresdener Eisenb.
Bhf.
Buckow
Rudow
Sadowa
Hst
Wuhle
Wuhl Park
Waldschl.
Neue Krug
Roh Mt.
F. H. Marienthal
Buschkrug
Spree Park Bhf.
Johannisth.
Ndr. Schöneweide
Baumschule
Dam'n Vorst.
Spindlersfeld
Kolnische
KÖPENICK
Kolnische Kol. Grünerlinde
Vorst
Hst Aldershof
Aldershof
Park
Kracht
Fenn
All
Neu
Glienicke
Bormay & Co., N.Y.

dertook the government he began a strong citadel in Cologne, on the bank of the Spree.

This same citadel, enlarged and extended during the centuries, now serves the present emperor both as a residence, and as the palace where he receives his princely guests. With the building of the citadel the margrave removed to Berlin; and the result was that Berlin and Cologne had to surrender much of their authority to him. At first the cities had become involved in a dispute over constitutional and administrative matters and had called in Frederick II. as arbiter; but soon they were quarrelling with the prince himself, and he defeated both of them.

Since Berlin-Cologne has been the residence of the Hohenzollerns the history of the city has been intimately connected with that of the reigning family. The rulers have always been particularly interested in building up the city. In this respect the work of the Great Elector, Frederick William (1640–88), was noteworthy. He added two new wards to the city, Friedrichswerder and Dorotheenstadt, built magnificent fortifications (though later these were removed), and summoned architects and engineers from Holland to finish the palace and lay out public grounds, as the Lustgarten and the Linden-promenade. His successor, Frederick III., the first king of Prussia, added to the city Friedrichstadt and other suburbs. Supported by artists like Schlüter and Eosander he enlarged and beautified the palace and gave the city a number of fine statues and public buildings, particularly the Zenghaus, which is one of Berlin's conspicuous monuments of architecture. The fine equestrian statue of the Great Elector, on the bridge near the palace, is by Schülter. Frederick William I. was especially interested in building private residences. He made presents of building-lots and even furnished lumber gratis and made other concessions.

His son, Frederick the Great, turned his attention to the erection of new buildings in Potsdam, his favorite residence. After the Seven Years' War, in which Berlin had been burned twice, the king began, at great personal expense, the construction of houses for those who enjoyed his favor. External architectural beauty was aimed at, rather than convenience. Among the public structures erected by Frederick the Great may be mentioned the two domes of the German and the French church, the King's Colonade, and the Royal Library. In 1763 he established the Royal Porcelain Manufactory.

The famous Brandenburg Gate, a triumphal arch in classic style, was erected in 1793, during the reign of Frederick William II. It was ornamented by the sculptor Schadow with a bronze statue of Victory driving a four-horse chariot. When Berlin was taken by the French in 1807 this was taken to Paris, but was recovered in 1814 after Paris had been taken by the allies. Under Frederick William III. the present Royal Theatre and the Old Museum were built, and under Frederick William IV. the statue of Frederick the Great. The wonderful progress made by Berlin during the reign of William I. gave the city quite a different appearance in a short time. Buildings of a monumental character, both public and private, sprang up everywhere.

This development continues; and the present emperor is doing all he can to beautify the city, chiefly with monuments and statues. Likewise the activity of private citizens along the same lines is now far greater than in former centuries. The great historical events which created the German Empire and made Berlin the capital of it found a happy echo in the populace. The new development of the city to the metropolis of the political life and of national and international trade has not been external and artificial as formerly, but has been internal and necessary. This fact cannot be set forth in an account of buildings and monuments. It would be necessary to examine the statistics of trade and commerce, of banking, and of the industries, etc., etc. If one studies the statistics, then it becomes clear that those material aspects of the city that amaze one and compel admiration are the only manifestation of a powerful historical development, which cannot by any means be regarded as having reached its zenith.

Area, Population, Suburbs, etc.— Besides Cologne, other neighboring towns were built up later, as Friedrichwerder (with Friedrichstadt), and Dorotheenstadt. All four of these towns, though lying in immediate proximity to one another, remained completely independent of each other till 1709, when Frederick I. fused them into one municipal corporation. At that time the population was about 57,000. Now, after nearly 200 years, we find a similar situation as regards a plurality of independent cities. Immediately adjoining Berlin there are some 20 completely independent municipalities of one kind and another. For the most part these towns and cities have, to all appearance, become fused with Berlin, and boundary lines have been obliterated; but each one has its own independent municipal government. As yet there is no centralized, unifying government to bind them together. Among the larger cities thus related to Berlin may be mentioned Charlottenburg, with 237,000; Rixdorf, with 153,000, and Schöneberg, with 141,000 inhabitants. Berlin proper has at present a population of 2,036,000; or, including the immediate suburbs, nearly 3,000,000. The area of Berlin is 6,350 hectares (1 hectare = 2½ acres), being less than that of several other German cities, for instance, Cologne (11,100 hectares), Frankfurt-on-Main (8,000 hectares), Strasburg (7,800 hectares), Munich (7,500 hectares), and Mannheim (6,600 hectares). Though, to be sure, if we include the immediate suburbs, the area runs up to 16,500 hectares.

There has been no considerable extension of the corporate limits of Berlin into this neighboring territory since 1860, though the necessity for such a proceeding has been urged repeatedly in various quarters. To do this, and thus effect a union of these several municipalities, the consent of both the State government and the Parliament is necessary. For a long time the Prussian government was inclined to carry out such a plan, but the city of Berlin objected to assuming the burden which the poor condition of the streets and public utilities of the suburbs would have imposed upon her. At present the State government encourages the incorporation of the smaller country suburbs into towns, and sooner or later all these elements, large and small, will be brought together under one municipal government.

The present fragmentary condition of the city entails upon Berlin many practical difficulties. For instance, the city has bought in the suburbs not less than 14,200 hectares of land for the utilization of the sewage, and the laying of the pipes through these neighboring municipalities often gives occasion for long and tedious negotiations. Similar difficulties attend the construction of street-car lines. In every case the company in question has to secure a concession from every suburb concerned. This always involves long negotiations as to details.

Municipal Government.— The administration of the city of Berlin is in the hands of a municipal council of 34 members, including the mayor. Half of these fill honorary positions, half receive pay. Among the salaried members may be mentioned, the chief mayor (Oberbürgermeister), the mayor, two syndici, a minister of finance, two school commissioners, and two commissioners on buildings. The members of the council are elected, for a limited period, by the board of aldermen. The aldermen themselves are elected by vote of the citizens. The sessions of the council are secret; those of the board of aldermen are usually public. All important innovations require the consent of both bodies. Besides, there are a number of committees, composed of members of the council and of the board of aldermen. In certain branches of the administration the authority of these committees is competent, but in important matters transcending their special departments their authority is conditioned by the consent of the municipal council.

The aldermen, 144 in number, receive no salary, their position being honorary. They are represented by a chairman and his deputy. A further category of honorary and unsalaried officials is formed by the citizen-deputies, who are elected by the board of aldermen; also the poor-law guardian and the members of the poor commission. Altogether, there are several thousand persons working for the city without any salary. The city police force is employed and controlled by the State, but the city has to make appropriation for this object.

Finances.— The administration of the city of Berlin costs something more than $35,700,000 yearly. The city owns real estate worth $110,000,000, and other assets to the extent of $170,000,000. The obligations of the city run up to about $80,000,000.

The receipts come principally from taxes. The taxes collected for the year 1904–5 amounted to nearly $20,000,000, *i.e.*, about $10 per head. Of this amount $7,400,000 was from the income tax. This tax is levied on incomes just as is the corresponding State tax, and at present the rate is the same in both cases. Further, $2,260,000 was realized from the special tax assessed against incomes derived from trade. The tax on real estate was $6,400,000, to which must be added a sewage tax of $1,450,000. The tax on transfers of real estate was $1,300,000, not to mention other and less important sources of income. It may be added that the State taxes in Berlin, direct and indirect, amounted to $7,740,000 and $11,900,000, respectively, while the imperial taxes were $13,100,000. Thus we see that in the year 1904–5 the citizen of Berlin paid, on an average, about $25 in taxes.

Of the expenditures, schools and education received $6,550,000. Other items were, gas manufacture, $5,000,000; administration, $4,290,000; charity, $3,800,000; interest on loans, $2,850,000; care of health, $2,620,000, and $1,790,000 borrowed money returned. In considering these figures it must be noted that general indebtedness forms a separate account, the expenditures under this head not being reckoned to the departments concerned; further, that the commercial enterprises of the city, as gas-works, water-works, sewage, stock-yards, slaughter-houses, etc., are included in the general budget.

Public Utilities.—As regards gas and lighting, the city has not a monopoly. By reason of old contracts a small part of the city is entirely dependent for gas on an English company, and the same company operates, but not exclusively, in a large part of the city. The water supply is entirely in the hands of the city. There are several water-works, the water being obtained in part from deep wells. Other wells are to be bored soon. Sewage is also provided for by the city, the waste being brought through pressure pipes to the city's farms in the country, where it is prepared for agricultural purposes.

The city has a stock-yard, which serves as a general market for live stock, also a slaughter-house, where all slaughterings must take place. Here the fresh meat is at once officially inspected. All meats shipped into Berlin are inspected, unless an official inspection has taken place elsewhere. There are 14 city market-houses for the retail trade and one special market-house for the wholesale trade.

There are five regular city hospitals and a smaller sick-house, which are open to the public; also three State hospitals and nine other public hospitals. The large Virchow city hospital is in course of construction. Besides, there are three city asylums for the insane. The city also maintains a disinfecting establishment for furnishings, flats, etc. There are seven public bathing places for hot baths, and 16 with cold running water.

The city also runs a savings bank («Sparkasse»). The deposits amount to some $75,000,000. There is also a royal pawn-office, and a number of private benevolent institutions which are, in part, supported by the city.

The Central Employment Office is of particular significance, and its management is unusual. In many German cities such an institution is managed directly by the city administration. A special office is fitted up for the purpose, notices of vacancies of one kind and another are received, and those seeking employment are informed of such opportunities for work. Now, in Berlin, this general employment agency is not directly in the hands of the city, but receives support from the city. This support on the part of the city, which has been extended to $10,000, was given after a number of high city officials had identified themselves with the management of the agency in question, which was called the *Central-Verein.* This employment agency has a special building for its purposes, containing separate offices for different kinds of work; also youthful applicants are separated from the mature. A number of

smaller employment agencies and unions of one kind and another have joined this general union. The condition for thus joining is that an executive committee be formed for each trade, consisting equally of workmen and employes, with a chairman belonging to neither party.

Charities, etc.— The city council spends annually about $80,000, aiding various private charitable associations; for instance, nine organizations for nursing the sick, 15 for the care of children, five for the care of women lying-in, and 43 other aid associations; also 23 educational institutions, besides a large number of foundations partly under the administration, partly under the inspection of the city.

The city has two asylums for the homeless, one for families, the other for such persons as only require a shelter for the night. A similar institution, an "Asyl," is maintained by a private association. In fact, it is characteristic of Berlin that public and private charity supplement each other. The care of the poor, as such, is in the hands of the city administration, and about 4,000 persons are employed in this work, though in honorary positions and without salary. The daily expenditure on the poor is about $13,000, the average number receiving aid being 34,000. The number of orphans in the care of the city is about 6,000.

In addition to these means of providing for the poor must be mentioned the system of insurance for the working classes. The statute regulating insurance against sickness was passed in 1883, though previous to that time such insurance had already been made compulsory. The obligation is placed upon the employer, who pays the assessments and deducts the amount from the wages of the workman. At present there are 129 branches of this kind of insurance under the control of the city council, besides a few branches that are controlled by the State, and a number of private associations. The number of workingmen and women insured already exceeds 700,000, and in 1904 the sum of $6,430,000 was paid out in sick insurance. According to the law, the weekly allowance during sickness is paid for as long as 26 consecutive weeks, but, under special circumstances, it may be paid for as long a period as 52 weeks. The city has built upon its own land homes for the convalescent, which are for the complete recovery of the sick. For the rest the city hospitals are open to the insured, but their expenses must be paid out of the insurance money.

There is in Berlin a State institution for the care of invalid workmen. In connection with the same there are several sanatoria which care for those who are about to become invalids. The sanatorium at Belitz may be mentioned. It is fitted up in magnificent style and is probably the best sanatorium on the continent of Europe.

Educational Institutions.— In the field of education the University of Berlin takes the first place. It was founded by Frederick William III. in 1810. During the winter term of 1904–5 there were enrolled 7,400 regular students, besides almost as many more so-called *Zuhörer, i.e.,* mostly persons who have secured permission to attend lectures, but whose previous education is not sufficient to enable them to take up systematic studies leading to a degree. In connection with the university is the Seminary for Oriental Languages.

Further, of special significance is the "Technische Hochschule," which has nearly 3,000 students; also the "Bergakademic," and the Hochschulen for agriculture, for fine art, and for music.

All these are State institutions. To them will soon be added a Hochschule for Commerce, which is being erected by the "Aeltesten der Berliner Kaufmannschaft." This is a society of merchants which was licensed by Frederick William III. in 1820. Formerly they exercised the function of a board of trade. Since the Chamber of Commerce was formed some years ago they have had to give up this function and have extended their activity into the field of commercial education.

As to Gymnasia and Realgymnasia, Berlin has five royal and 20 city institutions. There are, besides, 13 city Realschulen, two royal, and six city high schools for girls, four city finishing schools, a normal school, a royal seminary for male teachers, a similar one for female teachers and teachers of gymnastics, a royal theatre-school and school for deaf-mutes, a city school for deaf-mutes, and a city school for the blind. Elementary instruction is represented by 273 city district schools, with 5,000 teachers, 222,000 children, and 4,800 classes. Instruction in these schools is free. It may be added that each of the suburbs has its own schools of various kinds.

Museums and Collections.— The more important picture galleries and collections are, the Old and the New Museums, the National Gallery, the Pergamon Museum, and the Emperor Frederick Museum — all maintained by the State. Further, the Ravené Museum. Among historical collections may be mentioned the Royal Hohenzollern Museum, the Zenghaus, the Provincial Museum — a city institution, the Post Museum, and the royal museums for anthropology and German ethnology. The liberal arts are represented by the Royal Museum for Liberal Arts and by the exhibit of the Royal Porcelain Manufactory. Further, there are the royal museums for science, for agriculture, for mining and smelting, and for pathology. The Zoölogical Garden belongs to a private company, but it is in the nature of a public utility. The Acquarium is also owned by private parties, but is subventioned by the authorities. The State maintains a botanical garden. There is also the Hygienic Museum, the Colonial Museum, and the Institute for Hydrography, which serve further the interests of science and the technic of shipbuilding. A curious recent creation is a permanent exhibition of contrivances for the betterment of the conditions of labor. There are three astronomical observatories, a State observatory, and two private ones. The latter are always open to the public.

Many libraries, including the Royal Library of about a million volumes, provide opportunities for study in every field of knowledge.

Monuments and Public Buildings.— There are a large number of monuments on the streets and public squares of the city. A considerable number of them have been erected during the reign of the present emperor, and, in fact, under his immediate influence.

The number of the palaces and public build-

ings is likewise very large, though, as compared with other German cities, Berlin is poor in specimens of old architecture.

There are numerous theatres, including the Royal Play House, the Royal Opera House, the New Royal Opera-Theatre, 13 other large theatres, and about a dozen smaller ones, a number of so-called "cabarets," and two permanent circuses.

Churches.—The oldest churches in Berlin are the Nokolai Church and Saint Mary's. Both were built in the 13th century but have been restored. Further, Saint Peter's may be mentioned. There are more than 40 evangelical churches, the most important being: the Emperor William Memorial Church, built in 1891–1895 in beautiful Romanic style (two large neighboring houses are in the same style of architecture); the Emperor Frederick Memorial Church, beautifully situated in the Thiergarten; and the New Cathedral (dedicated in 1905), built in Italian Renaissance style and ornamented with numerous sculptures. A French church was built in 1701–1705; and there are also an English and an American church. Saint Hedwig's Church (Catholic) dates from the middle of the 18th century. Of the two larger synagogues the oldest and finest dates from the year 1866.

Monumental Buildings.— To be mentioned here especially are: the Royal Palace, the palaces of Emperor William I., Emperor Frederick, and Prince Albrecht, and the palace at Charlottenburg; further numerous state buildings, *e. g.*, those occupied by the Departments of War and Education, the Foreign Office, the Imperial Health Office, the Imperial Insurance Office, the Patent Office, the Abgeordnetenhaus, and the large Reichstag building, in Italian Renaissance style; also various railway stations and palatial structures of the Postal Department. Of municipal buildings the City Hall deserves mention; further, the city museum and numerous public schools; also the new City Hall in Charlottenburg. The magnificent structures of the large banks, stores, breweries, insurance companies, etc., add much to the beauty of the city. The arcade between Frederick street and Unter-den-Linden may also be mentioned.

Bridges, Statuary, Fountains.— The following are the more notable of the monumental bridges in Berlin: Heydtbrücke, Potsdamerbrücke, Belle Alliancebrücke, Kurfürstenbrücke, Wilhelmbrücke, Friedrichbrücke, Schlossbrücke, Moltkebrücke, and Oberbaumbrücke. Aside from the National Monument, the most noteworthy statues in the central part of the city are those of William I., Frederick the Great, the Great Elector, Frederick William III., Emperor Frederick, Empress Augusta, the two Humboldts, Helmholz, Luther, Schiller, Waldeck, and Schulze-Delitzsch. In front of the Reichstag building is an immense bronze statue of Bismarck. Near by are the statues of Moltke and Roon and the Column of Victory, which overlooks the 32 marble groups of Brandenburgian and Prussian statesmen and rulers in the Avenue of Victory. Other notable statues in the Thiergarten are those of Goethe, Lessing, Richard Wagner, Frederick William III., and Queen Louise. Some of the numerous fountains worthy of note are: the large fountain before the palace, which was designed by Begas and presented by the city on the accession of the present emperor; the Hercules Fountain on Lützowplatz, which was designed by Lessing; further, the artificial water-fall in Victoria Park.

Transportation and Population.— The character of the population of Berlin is subjected to a gradual change, which is caused partly by the building up of new industries, partly by the removal of well-to-do taxpayers to the suburbs. This migration of the wealthier classes is attended by an influx of the laboring classes, especially in the newly-built parts of the city, so that the laboring population is constantly increasing. Again, the inner residential part of the city is coming to be used more and more for business purposes, so that here the population is decreasing continuously.

The development of facilities for transportation has contributed much to these changes. The "Stadtbahn," a railway which crosses the city from east to west, then encircles it both on the north and on the south, was and is yet the cause of the wonderful growth of the western suburbs. Migration was encouraged by the exceedingly low fare of 10 pfennigs to the fifth station, or 20 pfennigs for the entire distance, not to mention the great reduction allowed on monthly tickets. This has led to the building of new stations along the outer parts of the "Stadtbahn" and to the institution of suburban trains, on which one may have a monthly ticket at a price varying with the distance.

In this connection must be mentioned also the "Grosse Berliner Strassenbahn." This is a private traction company which owns nearly all the street cars in the city. Since on most of the lines the fare is only 10 pfennigs this company has had great influence in the development of the suburbs. In the inner part of the city there are many omnibuses, drawn mostly by horses, but partly by motors. The fare is 5 and 10 pfennigs. The electric elevated and underground road passes along the southern periphery of the city from east to west. The prices are higher than on the other lines. A plan is now being agitated to supply Berlin with a number of such subways.

In the year 1904, the "Stadtbahn" carried 111,000,000 persons; the street-car lines, 395,000,000; the omnibus lines, 94,000,000; the elevated-subway line, 32,000,000.

Under the influence of improved facilities for transportation the composition of the population in the various parts of the greater city has become quite varied. The well-to-do live in the west and in the western suburbs, while the working classes have settled in the east and the north, and partly in the southeast. The large factories are situated in the east and in the northwest. While in Berlin 80 persons out of every thousand pay tax on an income of $750 and upward, the proportion of people in Rixdorf, a southeastern suburb, who have such an income is only 27 out of a thousand. On the other hand, in the wealthy western suburbs, Grunewald and Wilmersdorf, the proportion is 441 and 228, respectively, out of every thousand. Similar differences can also be noted in the interior of the city.

The city maintains a statistical bureau that keeps a careful record of all these conditions. Undoubtedly, such differences in the composition of the population will be found to account

1. Schlossbrücke, with Lust Garten.
2. Palace of Emperor William I.

for the varying rate of mortality in the different parts of the city, as well as for the varying rate of taxation.

Death Rate.— To be sure, the mortality in Berlin is not only low, but is still decreasing. In 1904 the rate was 17 out of a thousand, while in the seventies of the past century the death rate was almost double this. Still, the rate is not uniform, varying from 8 in the wealthier parts of the city to 22 per thousand in the poorer quarters. The decrease of mortality is due to better hygienic conditions, especially to water-supply and sewage. Though the death rate among children is still high the city authorities are doing everything possible to combat the evil. Building ordinances have been made stricter, and the hygienic conditions of flat-houses have been thereby greatly improved, especially in the newly-built portions of the city.

Tenements.— Still the principal evil persists, *i.e.*, the crowded condition of apartment-houses. On an average such a house in Berlin shelters 77 persons, and the flat of a workman, which usually consists of only two rooms, closet, etc., must not only shelter the family, but provide sleeping quarters for one or two outsiders. The explanation of this is to be found in the relatively high rents for such flats, the minimum being $5 per month, or about one fourth of a laborer's income. The desire to cut down the rent by letting sleeping quarters is amply met by the large number of workmen moving into Berlin.

The building of model tenements for the betterment of living conditions among the poor has not taken place to any considerable extent. Aside from a co-operative company that built 269 small homes for workingmen in the suburbs, which were sold to the members of the company, there are seven building companies of philanthropic nature, but their houses offer accommodations for less than 10,000 persons. Besides, the administrations of some of the State industries have placed homes at the disposal of their workmen, and both the city and the State aid such benevolent enterprises by furnishing capital at a low rate of interest.

Aside from the evils of high rents, and, consequently, overcrowded flats, the conditions are not bad. The plumbing in the newer flat-houses leaves nothing to be desired. In fact, both in Berlin and the suburbs, the better class of such houses have all modern conveniences, and are comparatively luxurious.

Streets.—The streets of Berlin are well cared for and are in excellent condition. Already 40 per cent. of the streets are paved with wood or asphalt, the rest being paved with stone or cement. But the work of improvement continues. The yearly pay-roll for street cleaning amounts to $531,000. Much more is spent now on parks than formerly. Within the city limits there are seven State and five city parks. For the most part, the city is illuminated by gas, but, since recently, in part by electricity. The city maintains an efficient fire department, which also acts as a good Samaritan in all cases of distress, whether from fire or otherwise. In accordance with an ordinance of more than a hundred years standing, all buildings must be insured in the city «Feuercasse.» The average insurance valuation per house is $41,500.

Naturally, the great demand for real estate and the more luxurious style of architecture have increased valuations considerably. On an average property is worth about $65 per square metre. The total real valuation may be placed at about $2,000,000,000.

Climate.— The mean temperature is 9° Centigrade, the thermometer varying from about 0.7° below zero in the middle of January to 19° above zero in the middle of July. During the months of December, January, and February the mean temperature varies from 0.7° below zero to 0.8° above zero. The mean temperature for other months is as follows: March, 3.5°; April, 8.5°; May, 13.3°; June, 17.4°; July, 18.9°; August, 18.1°; September, 14.6°; October, 9.5°; November, 3.8°. The mean barometer is 76.2, the lowest, 56.9 centimetres. West winds prevail.

While, in general, healthful, the climate has been found to be unfavorable to young children in the summer. Stomach troubles are aggravated by the heat, and the death rate among infants is thereby considerably increased. The city has been free of epidemics for years.

Recent Development.— Since about 1865 the capital city of the empire has had, in many respects, a brilliant development. In this short period the population has trebled, hygienic conditions have been wonderfully improved, and the city has become one of the most beautiful, and one of the most visited, cities in the world. More than a million strangers register in the hotels annually, not including the large number of visitors who find their temporary quarters in those parts of the greater city which are under separate municipal control. Indeed, for the stranger, who cannot see the imaginary boundary lines, it is all Berlin. Socially and industrially it is really only one city, and the entire complex of separate municipal corporations might be fittingly called Greater Berlin.

Doctor E. Hirschberg,
Director of Statistical Bureau of Berlin.

Berlin Cathedral. This edifice was planned by the emperor Frederick and his empress to be the «Westminster Abbey» of Germany, and has been 14 years in building. The architecture corresponds nearly to the Italian Renaissance, and is the design of Prof. Raschdorff, who had visited all the principal cathedrals in Europe before completing it. The corner stone was laid in 1894. The cathedral consists of four principal parts — the church for divine worship the church for marriages and christenings, the immense crypts, and the long porch. It is constructed of yellow sandstone and the pillars of the porch are of vari-colored marbles — Brazilian anyx, black Silesian marble, and various beautiful specimens from Sienna. The building is 341 feet long; the cupola, with its lantern, rises 325 feet above the pavement, and the two bell towers each reach up to a height of 211 feet. The Prussian Diet contributed $2,500,000 toward its erection, but this sufficed only for the actual building the extensive decorations and mosaic work being hardly yet begun, and the entire building will probably cost more than $5,000,000. Emperor Frederick originally intended the memorial church in the crypt to be the resting place of the Hohenzollerns only, and already the remains of

87 have been placed there, but in future the church will be the burial place, beside the sovereigns, for the nation's celebrated dead. The organ, which is the largest in the world, except that at Riga, has 113 so-called voices and 7,000 tubes. It cost $37,500 and was the gift of Prince Henckel of Donnersmarck. The chancel is of marble and bronze and is the gift of Privy Councilor Paetel. Kaiser Wilhelm has taken great interest in the erection of the building, and by his direction an epitaph in memory of Bismarck will be placed over the entrance. The cathedral was dedicated 27 Feb. 1905.

Berlin Congress, a gathering at Berlin, Germany, where the European powers undertook the settlement of the questions growing out of the Russo-Turkish war of 1877–8. The Congress met 13 June 1878; and completed its labors with the signing of a treaty on 13 July following. The treaty of San Stefano (3 March 1878) between Russia and Turkey did not suit the other powers; and the congress, convened, at the suggestion of Germany, so modified the agreement between Russia and Turkey that the former lost nearly all the fruits of victory. By the new arrangement Bulgaria was divided into two parts, Bulgaria proper and eastern Rumelia. Parts of Armenia were given to Russia and Persia; the independence of Rumania, Servia, and Montenegro was guaranteed; Bosnia and Herzegovina were transferred to Austria; and Bessarabia restored to Russia. Greece was also to have an accession of territory. By a separate arrangement previously made between Great Britain and Turkey, the former got Cyprus to administer. Bismarck was the president of the congress. The more important members were: Prince Gortchakoff, Count Andrassy, Lord Beaconsfield, Lord Salisbury, M. Waddington, Count Corti, Karathéodori Pasha, Prince Hohenlohe, and Gen. von Bülow.

Berlin Decree, a decree issued by Napoleon, 21 Nov. 1806, which declared the British Islands in a state of blockade. It forbade commerce with them and trade in their merchandise, and declared all merchandise belonging to Englishmen, or transported from England, lawful prize. Its effect was to inflict great injury on the American carrying trade.

Berlin, University of, a celebrated institution of learning in Berlin, Germany. It is, with the exception of Bonn, the youngest of the German universities, but is probably the most famous of them all. It was founded in 1810, when the Napoleonic victories had left Prussia apparently crushed, and had even transferred her great University of Halle to the newly formed kingdom of Westphalia. Wilhelm von Humboldt was minister of education at the time, and Prussia's debt to him for organizing her national school system, with the University of Berlin at its head, during that period of national defeat and disaster, is certainly very great. It should be borne in mind, too, that Humboldt was ably seconded by Fichte and Schleiermacher. The first rector of the university was Schmalz; the first deans of its faculties were Schleiermacher, Biener, Hufeland, and Fichte; and before it was 10 years old it had for professors such men as Niebuhr, Wolff, Böckh, Bekker, and Hegel. In more recent years, Ranke, Mommsen, Helmholtz, Virchow, and other famous scholars have upheld the reputation which the university won for itself at the very start. There are four faculties, theology, medicine, jurisprudence, and philosophy, with a total of 377 professors and teachers. At the satisfactory completion of the course, the doctor's degree is conferred.

Berliner, Emile, bär-lē'nėr, ā'mēl, American inventor: b. Hanover, Germany, 20 May 1851. After graduating at Walfenbüttel in 1865, he came to America five years later, and in 1878 was appointed chief inspector of instruments by the Bell Telephone Company. He invented the loose contact telephone transmitter or microphone, known by his name, and the device called the gramophone. He has devoted his energies to perfecting the telephone, and has secured many patents for his inventions.

Berlioz, bär-lē-ōs, **Hector,** French composer: b. Côte St. Andre, near Grenoble, 11 Dec. 1803; d. Paris 9 March 1869. He forsook medicine to study music at the Paris Conservatoire, where he gained the first prize in 1830 with his cantata 'Sardanapalus,' enabling him to study at Rome. His chief literary works (besides his 'Memoirs') are the 'Traité d' Instrumentation' (1844); 'Voyage Musical' (1845); 'Les Soirées d'Orchestre' (1853); and 'A Travers Chants' (1862). His musical works, which display remarkable originality, belong to the Romantic school, and are especially noteworthy for the resource they display in orchestral coloring. His more important works are 'Episode de la Vie d'un Artiste'; 'Symphonie Fantastique' (1829); 'Lélio, ou Le Retour à la Vie' (1832); 'Harold en Italie' (1834); 'Romeo et Juliet' (1839); 'Damnation de Faust' (1846), one of the best-known and most admired of his works; the operas 'Benvenuto Cellini' (1838); 'Beatrice and Benedict' (1862); and 'Les Troyens' (1864); 'L'Enfance du Christ' (1854), the 'Te Deum,' and the 'Requiem.' After his death appeared 'Mémoires' (1803–65), written by himself (English translation, 2 vols. 1884).

Berm, or **Berme.** *In fortification,* a narrow, level space at the foot of the exterior slope of a parapet, to keep the crumbling materials of the parapet from falling into the ditch.

In engineering, a ledge or bench on the side or at the foot of a bank, parapet, or cutting, to catch earth that may roll down the slope, or to strengthen the bank.

Bermejo, bėr-mā'hō, a South American river rising in Bolivia, and flowing across Argentina to the Paraguay River, which it enters about 140 miles south of Ascension. It is navigable for about half of its length of 1,300 miles.

Bermuda, bėr-mū'da, or **Somers Islands,** a cluster of small islands in the Atlantic Ocean, belonging to Great Britain, and situated 580 miles southeast of Cape Hatteras. They are in number about 400, but for the most part so small and so barren that they have neither inhabitants nor name. They were first discovered by Juan Bermudez, a Spaniard, in 1522; in 1609 Sir George Somers, an Englishman, was wrecked here, and after his shipwreck, formed

1. Lust Garten, showing Statue of Frederick William III.
2. Brandenburg Gate.

the first settlement. The most considerable of these islands are St. George, Bermuda or Long Island (with the chief town, Hamilton, forming the seat of the governor), Somerset, St. David's, and Ireland. They are chiefly used as a naval and military station. The island of Ireland is occupied by a government dockyard and other naval establishments, while Boaz and Watford islands have the military depots. The military headquarters are at Prospect. An immense iron floating-dock was constructed at London for the Bermudas in 1868; it is capable of receiving a vessel of 3,000 tons. The climate is generally healthy and delightful, the air being mild and moist at all seasons. It is not adapted, however, for consumptive patients. The thermometer seldom falls below 40° F., and rarely rises above 85°. These islands have therefore become a popular holiday resort for Americans, and plentiful hotel accommodation is supplied at St. George's and Hamilton. The surface is rather irregular; the soil, though light and stony, is in general rich and fertile. The islands form a nearly continuous chain, and are connected almost uninterruptedly by roads, bridges, and causeways. The water is in general salt; there is but little fresh except rain-water, preserved in cisterns. The inhabitants export early potatoes, onions, lily bulbs, etc., nearly all of these products being shipped to New York. The value of the exports is from $585,000 to $635,000 annually; that of the imports is about $1,460,000 to $1,560,000. The revenue is about $166,000. Pop. (1897) 16,098.

Bermuda Grass (*Cynodon dactylon*), a grass cultivated in the West Indies and the United States, where it is of special value on the sandy soils of the southern States. It is a valuable fodder grass for warm climates. It will grow in any soil not too damp, but in America it matures only in the extreme south.

Bermuda Hundred, Va., a peninsula formed by the junction of the Appomattox and James rivers, occupied by Gen. B. F. Butler, who, in 1864, commanded the Army of the James, numbering about 25,000 Federals, where he might intrench himself and await Grant's arrival. In the vicinity of this position there was constant fighting between Butler's troops and those of the Confederates under Gen. Beauregard, whose forces were 20,000 strong. The fighting continued from 16 May to 30 May. On the 16th Heckman's brigade was destroyed by the Confederates, who were then pushing on to Bermuda Hundred, when Ames and Gillmore came up and Beauregard's plans miscarried. On the 19th the Confederates assaulted the Federal rifle pits under Ames and Terry, but without success. Skirmishing continued until the 30th, when the Confederates desisted. Bermuda Hundred was a valuable position, since it was very near both Richmond and Petersburg; but Butler was charged with military incapacity in having "corked himself up in a bottle."

Bermudez, Remigio, Morales, bār-moo'-dāth, rā-mē'jē-ō mō-rä'lĕz, Peruvian statesman: b. Tarapaca Province, 30 Sept. 1836; d. Lima, 31 March 1894. He began business in the nitrate trade in his native province. In 1854, as a lieutenant, he joined the revolutionary army which finally overthrew Gen. Echinique's government. In 1864 he joined the revolution against President Castilla. In the war with Chile he led the force that marched to Arica. When Caceres was elected president in 1886, Bermudez was chosen vice-president, and was elected president in 1890.

Bermudez, bĕr-mū'dāth, Venezuela, a northeastern state situated between the Orinoco and the Caribbean Sea, formed in 1881 from the former states and present sections of Barcelona, Cumana, and Maturin. Area, 32,243 square miles; Pop. about 325,000.

Bern, bārn, or bĕrn, Switzerland, the chief canton of the confederacy, situated in the western half and surrounded by the cantons of Neufchâtel, Freiburg, Vaud, Valais, Uri, Unterwalden, Lucerne, and Solothurn, being partly bounded also by France and Alsace; area, 2,657 square miles. The more northern portion of the canton has beautiful plains and valleys, and a fertile and highly cultivated soil, producing corn, wine, and fruits; the Emmenthal, one of the richest and most fertile valleys in Switzerland, raises the finest cattle, and produces a celebrated cheese. The southern portion of the canton, the Bernese Oberland, begins at the foot of the high mountain chain between this canton and that of the Valais, and extends to its summit. The lower valleys produce good fruits, and are fertile and agreeable: higher up are excellent Alpine pastures; then succeed bare rocks, extensive glaciers (the source of magnificent streams and waterfalls), and some of the highest mountains of Switzerland, as the Finsteraarhorn, the Schreckhorn, and Wetterhorn, the Eiger, the Jungfrau. The chief trade of the canton is in linen and woolen manufactures, and cattle-raising. Pop. (1897) 548,061.

After belonging to the Franks and Burgundians the Bernese territory became part of the German empire. In the long wars with Austria, Milan, Burgundy, and Savoy, the Confederacy came off victorious, and Bern conquered Aargau. In 1528 the citizens of Berne embraced the cause of the Reformation. In the subsequent war with the Duke of Savoy they conquered the Pays de Vaud. From that time till 1798 the prosperity and wealth of Bern constantly increased, so that the canton then contained above 5,000 square miles and about 380,000 inhabitants. On 5 March 1798, 30,000 French troops marched against Bern and conquered it, the result being that it now lost about half of its possessions; the northern part was united with the present canton of Aargau, and out of the southwestern (Pays de Vaud) the present canton of Vaud was formed. By the decrees of the Congress at Vienna, however, the greater part of the bishopric of Basel was joined to the canton. The present constitution dates from 1893 and is purely democratic. The legislative power is vested in a Great Council elected by the people voting in 62 electoral districts, there being one member for every 3,000 inhabitants. The executive is vested in a governing council of nine members elected by the Great Council, both being chosen for four years. The referendum is in force, and all laws may be submitted to popular vote before they become valid. The "initiative," or right to propose new measures, may be exercised by 12,000 voters acting together, but a demand for revision of the constitution must be supported by 15,000 voters.

Bern, Switzerland, the capital of the canton of the same name (see above) and of the whole confederation; situated on an elevated rocky peninsula, washed on three sides by the Aar, which is crossed by several bridges, including the handsome Nydeck Bridge, the huge iron Kirchenfeld Bridge, and the Kornhaus Bridge (opened in 1898), with a roadway 160 feet above the Aar, and a principal arch of 380 feet span. The streets are, for the greater part, straight, wide, and well paved; and the houses, partly provided with piazzas, are substantially built of stone. The streets are purified by rills of water and adorned with fountains. Among the public buildings are the great Gothic cathedral 1421–1573; the Church of the Holy Spirit; the University; the hall of the Swiss Federal Council; the art museum, containing the municipal picture-gallery; a hospital; the town-house, a Gothic edifice of the 15th century, restored 1868; the mint, corn hall, historical and archæological museum; the natural history museum; observatory; deaf-and-dumb institution; infirmary; orphan and lunatic asylums. The public library possesses great treasures of printed books and manuscripts. Trade and commerce are lively; the manufactures consist of woolens, cottons, silks, machinery, chocolate, etc. The city was founded in 1191, and in 1218 the German emperor Frederick II. declared it a free city of the empire and confirmed its privileges by a charter, which is still preserved. In 1353 it entered into the Helvetic Confederacy. In 1405 the greater part of the city was destroyed by fire, but it was afterward regularly rebuilt. The bear, as the heraldic emblem of Bern, figures frequently in a sculptured form; and a number of these animals in the flesh are kept at the cost of the municipality. There is a curious clock-tower containing mechanism by which the striking of the hours is heralded by the crowing of a cock and a procession of bears. Pop. (1897) 49,030.

Bern, University of, a state educational institution having its origin in a minor school which in the early part of the 16th century was much enlarged by the demand for accommodations for theological students. About 200 years later it expanded by the institution of departments of law, science, and medicine, and about 1830 was formally reorganized as a State university. It has a library of about 40,000 volumes and manuscripts, and educates about 1,300 students.

Ber'nacle Goose, a large goose of northern Europe and Greenland, allied to the brant, and named *Bernicla cucopsis,* a name identified with strange old fables. It differs from the brant mainly in its white cheeks, as the lavender-gray of the mantle. This goose is a common winter visitor to western Europe, retiring in summer to Arctic regions to breed, but the region and the character of its nesting remain undiscovered. Up to comparatively recent times it was the belief of the European peasants that this goose was born from the stalked barnacles which adhere to driftwood, and sometimes to the branches of trees that reach down into the sea at high tide. Circumstantial accounts were given of the birth of the young, whose tiny wings (the waving filaments of the feeding cirripeds) could be seen sticking out of the shells from which they were supposed to escape. So firmly was this fixed in the minds of the people that it is given and illustrated with much detail as truth in many books of the time; and the Roman Church permitted these geese to be eaten on holy days because they were sea-born, and therefore "fish"! What is less generally known is that the cirripeds were named after the bird, as their supposed parent; and not the bird after the crustacean. Bernicle, like "brant," refers to the "burnt" black color of the birds, as explained in the 'English Dictionary' and by other authorities. The name has been adopted as generic for a large group of the geese usually distinguished by sportsmen as "brants" (q.v.).

Bernadotte, Jean Baptiste Jules, bär-nä-dŏt', zhŏñ bäp-tēst zhool, king of Sweden: b. Pau, 26 Jan. 1764; d. 8 March 1844. He was the son of an advocate of Pau, and enlisted in a French regiment of marines at the age of 17. He was made a subaltern in 1790, and thereafter his promotion was rapid. In 1794 he was appointed general of division, and distinguished himself greatly in the campaign in Germany and on the Rhine. After the battle of Neuwied he was introduced for the first time to Bonaparte, who conceived the highest opinion of his abilities, though a constant suspicion of Napoleon seems always to have been present in the mind of Bernadotte. In 1798 he married Mademoiselle Clary, sister-in-law of Joseph Bonaparte. The following year he became minister of war, but was shortly obliged to resign. On the establishment of the empire Bernadotte was created Marshal of France and Prince of Ponte-Corvo. At the head of an army of observation stationed in the north of Germany, he fixed his headquarters at Hamburg. At this time Gustavus IV. had been driven from the throne of Sweden. The Duke of Sudermania assumed the crown under the name of Charles XIII.; and as he was far advanced in years the diet had nominated, as his successor, the Prince of Holstein-Augustenburg, when the latter died in a mysterious manner. The heir-apparency to the Swedish crown was then offered to the Prince of Ponte-Corvo. This offer was accepted by Bernadotte with the consent of the emperor; and in October 1810 he arrived in Sweden, where, having previously abjured the Roman Catholic religion, he was proclaimed heir-apparent to the throne under the title of Prince Charles John. He had not long been established in this dignity before serious disagreements took place between him and Bonaparte, whose blockade of the Continental ports was very detrimental to the commercial interests of Sweden. The result was a complete rupture, and the accession of Sweden in 1812 to the coalition of sovereigns formed against Napoleon. At the battle of Leipsic Prince Charles John contributed effectually to the victory of the allies. On the general re-establishment of the European dynasties at the termination of the war, strenuous but unsuccessful attempts were made by the emperor of Austria and other sovereigns to restore the family of Gustavus IV. to the crown; and Bernadotte, retaining his position as crown-prince, became king of Sweden on the death of Charles XIII. in 1818, under the title of Charles XIV. During his reign agriculture and commerce made great advances, and many important public works were completed; among others, the Götha Canal.

He was succeeded by his son Oscar, father of the present sovereign, Oscar II.

Ber'nadou, John Baptiste, American naval officer: b. Pennsylvania, 1858. Educated at the Naval Academy in Annapolis, he entered the navy and in the Spanish-American war commanded the torpedo boat Winslow and was wounded in a naval engagement off Cardenas in May 1898. He has written 'The Development of the Resources of the United States for the Production of War Material'; 'The Development of Smokeless Powder'; 'A Trip Through Northern Korea in 1883–4.'

Bernard, bėr'nard, bėr-närd', or (Fr.) bär-när, **Saint** (OF CLAIRVAUX), French ecclesiastic: b. Fontaine, Burgundy, 1091; d. 1153. In 1113 he became a monk at Citeaux; in 1115 first abbot of Clairvaux, near Langres. An austere manner of living, solitary studies, an inspiring eloquence, boldness of language, and the reputation of a prophet, rendered him an oracle to all Christian Europe. He promoted the crusade of 1146, and quieted the fermentation caused at that time by a party of monks against the Jews in Germany. He declined all promotion, and in the rank of abbot of his "beloved Jerusalem" (as he used to call Clairvaux) he continued with all humility, but with great boldness, his censures of the clergy and his counsels to the Popes. Innocent II. owed to him the possession of the right of investiture in Germany, and Eugenius III. his education. He was, at the same time, the umpire of princes and bishops, and his voice in the synods was regarded as divine. By his rigid orthodoxy and his remarkable eloquence, which were always directed to the promotion of practical Christianity, he did much to confirm the power and influence of the Church in the Middle Ages. He was a strong opponent of Abelard and Gilbert of Porée in their philosophical teachings. He was canonized by Alexander III. in 1174. The best edition of his works is that of Mabillon (Paris 1690, 2 vols.; reprinted, Paris 1839-40).

Bernard, Saint, of Mentone: b. Mentone, Savoy, 923; d. Novara, May 1007. Very little is known of his life except that he was at one time archdeacon of the city of Aosta, and that he later entered upon a monastic life and founded the hospices on the Great and Little Mount Saint Bernard, about 962 A.D.

Bernard, bä-när', **Charles de,** properly **Bernard du Grail de la Villette,** French novelist: b. Besançon, 25 Feb. 1804; d. Neuilly, 6 March 1850. He was a disciple of Balzac, whom he resembles in his power of realistic description and psychological analysis; but he possesses a purer and more nervous style, and above all is content with a less minute elaboration of story and characters. His first piece, 'The Gerfalcon,' made a hit with its clever description of the literary cliques. Everywhere he evinces clear insight into the foibles of society. Of his novels, the following may be named as only second in rank to his masterpiece, 'The Gerfalcon'; 'A Magistrate's Adventure'; 'The Gordian Knot'; 'Wings of Icarus'; 'The Lion's Skin'; 'The Country Gentleman.'

Bernard, Claude, French physiologist: b. Saint-Julien, department of the Rhône, 12 July 1813; d. Paris, 10 Feb. 1878. Educated at Villefranche and Lyons, he went to Paris in order to devote himself to a literary career, but soon turned to medicine. In 1839 he became assistant to Magendie, who directed his attention to experimental physiology. He became professor at the Collège de France in 1855, and about the same time he was appointed to the chair of experimental physiology at the Sorbonne. In 1868 he resigned the latter chair in order to take up a similar one in the Museum of Natural History, and in that year also he was elected to Flourens' place in the Academy. He was one of the foremost physiologists of his age, and several important discoveries are associated with his name. Among his published works are 'Experimental Physiology Applied to Medicine' (1854–5); 'Physiology and the Pathology of the Nervous System' (1858); 'Physiological Properties and Pathological Alterations of the Liquids of the Organism' (1859); 'Properties of Living Tissues' (1866); 'Experimental Pathology' (1871); 'General Physiology' (1872); 'Animal Heat' (1876); 'Phenomena of Life Common to Animals and Vegetables' (1878–9); 'Experimental Science' (1878); etc. He was accorded a national funeral.

Bernard, bėr'nard, **Sir Francis,** English administrator: b. Nettleham, England, 1714; d. Aylesbury, England, 16 June 1779. He was governor of New Jersey 1758–60, and of Massachusetts Bay 1760–9. He did a great deal toward precipitating the Revolution by his aggressive attempts to strengthen the royal authority. He was finally recalled on account of the unpopularity resultant on his bringing troops into Boston.

Bernard, Jacques, French Protestant clergyman and author: b. Nions, in Dauphiné, 1 Sept. 1658; d. 27 April 1718. When the Edict of Nantes was revoked, Bernard went to Holland, and while there founded a school of philosophy and belle-lettres at The Hague. He became editor of the 'Bibliothèque Universelle,' and later editor of the 'République des Lettres.' He wrote and published: 'Recueil de traites de paix, de trêves, de neutralitè . . . et d' autres actes publics faits en Europe' (1700); 'Actes et mémoires des négociations de la paix de Ryswick' (1725); etc.

Bernard, Montague, English lawyer: b. Gloucestershire, 28 Jan. 1820; d. Overross, 2 Sept. 1882. He was professor of international law at Oxford 1859–74. In 1871 he was one of the high commissioners who signed the Treaty of Washington, and on his return home was made a privy councilor. In 1872 he assisted Sir Roundell Palmer in preparing the British case for the Geneva Arbitration Tribunal.

Bernard, Pierre Joseph, bär-när, pē-är zhō-sĕf, or **Gentil** (zhŏn-tēl) **Bernard,** French poet: b. Grenoble, 1710; d. 1775. At an early age he showed a great taste for poesy, and was at first only an attorney's clerk, but afterward became secretary to Marshal de Coigny, who had command of the army of Italy. After the marshal's death he obtained a lucrative appointment, and was then able to indulge his poetic faculties. He wrote an opera, 'Castor and Pollux,' which met with great success; the 'Art of Loving,' and a number of odes, songs, etc. His works were collected and reprinted in 1803.

Bernard, Simon, bär-när, sē-mŏn, French engineer: b. Dole, 28 April 1779; d. 5 Nov. 1839. He served as aide-de-camp to Napoleon; was wounded at the battle of Leipsic; superintended the defense of Torgau, and was present at Waterloo. In 1816 he came to the United States; was commissioned brigadier-general of engineers; and planned an elaborate system of seacoast defences, the most important of the works built by him being Fortress Monroe. In 1831 he returned to France; was made aide-de-camp to Louis Philippe, and designed the fortifications of Paris. In 1834 he was appointed minister of war.

Bernard, bėr-nard, **William Bayle,** Anglo-American dramatist: b. Boston, Mass., 27 Nov. 1807; d. 5 Aug. 1875. His first work was a nautical drama called 'The Pilot.' This proved successful and encouraged him to pursue a literary career. He wrote in all 114 plays, of which the best known are 'Rip Van Winkle'; 'The Man About Town'; 'Marie Ducange'; and 'The Boarding School.'

Bernard de Chartres, bär-när dė shärtr (surnamed Sylvestris), a writer of the 12th century, who has been lauded as the ablest Platonic of his time, and wrote two works, now lost, in one of which he endeavored to reconcile Plato and Aristotle, and in the other maintained the doctrine of a Providence, and proved that all material beings, possessing a nature subject to change, must necessarily perish. Another work under the name of Bernard Sylvestris still exists, and is composed of two parts, distinguished by the names of 'Megacosmus' and 'Microcosmus,' or the 'Great World' and the 'Little World.' He reduces all things to two elements — matter and ideas. Matter is in itself devoid of form, but susceptible of receiving it; ideas reside in the divine intellect, and are the models of life, and from their union with matter all things result. M. Cousin has published extracts from these works.

Bernard of Cluny, Benedictine monk: b. at Morlaix, about 1100; d. 1156. He was a member of the Benedictine monastery at Cluny under Peter the Venerable, and is best known as the author of three hymns included in almost every English collection: "Jerusalem the Golden"; "For Thee, O Dear, Dear Country"; and "The World is Very Evil." These are a part of his 3,000-line poem 'De Contemptu Mundi,' translated by J. M. Neale.

Bernard (bėr'nard) **of Treviso** (trĕ-vē'zō), Italian alchemist: b. Padua, 1406; d. 1490. His most important work was 'Treatise on the Most Secret Chemical Labor of the Philosophers.'

Bernard de Ventadour, bär-när de vŏn-tä-dôr, French troubadour: b. about 1125; d. Dalon, about 1197. Love songs 'To Eleonore,' and various amatory lays to courtly dames, form the riches of his delicate verse.

Bernard, bėr'nard, **Great St.,** a celebrated pass of the Pennine Alps, Switzerland, in the canton Valais, on the mountain-road leading from Martigny to Aosta in Piedmont. On the east side of the pass is Mount Velan, and on the west the Pointe de Dronaz; there is no mountain known by the name of St. Bernard. Almost on the very crest of the pass is the famous hospice, among the highest permanently inhabited spots in Europe, 8,200 feet above the level of the sea. There is a massive stone building capable of accommodating 70 or 80 travelers with beds, and of sheltering 300. As many as 500 or 600 have received assistance in one day. It is situated on the highest point of the pass, exposed to tremendous storms from the northeast and southwest, and is tenanted by 10 or 12 brethren of the order of St. Augustine, who have devoted themselves by vow to the aid of travelers crossing the mountains. The climate of this high region is necessarily rigorous. There is a lake on the summit, at a short distance from the hospice, on which ice has frequently remained throughout the whole year. The severest cold recorded is —29° F., but it has often been —18° and —20° F.; the greatest summer heat recorded is 68° F. From the difficulty of respiration in so elevated a locality, and the severity of the climate, few of the monks survive the time of their vow, 15 years from the age of 18, when they are devoted to this service. The dogs kept at St. Bernard to assist the brethren in their humane labors are well known. In the midst of tempests and snowstorms the monks, accompanied by some of these dogs, set out for the purpose of tracking those who have lost their way. If they find the body of a traveler who has perished they carry it into the vault of the dead, where it is wrapped in linen and remains lying on a table till another victim occupies the place. It is then set up against the wall among the other dead bodies, which, on account of the cold, decay so slowly that they are often recognized by their friends after the lapse of years. Adjoining this vault is a kind of burying-ground, where the bones are deposited when they accumulate too much in the vault. It is impossible to bury them, because there is nothing around the hospice but naked rocks. The institution is supported partly by its own revenues, partly by subscriptions and donations. The pass appears to have been known at a very early period; and a Roman road led down the Piedmontese side of the mountains. The remains of a massive pavement are still visible; and the cabinet of the hospice contains votive tablets, bronze figures, and other antiquities found in the vicinity. The hospice was founded in 962 by St. Bernard of Menthon, an Italian ecclesiastic, for the benefit of those who performed pilgrimages to Rome. In May, 1800, Napoleon led an army of 30,000 men, with its artillery and cavalry, into Italy by this pass.

Bernard, Little St., a mountain of Italy, belonging to what are called the Graian Alps, about 10 miles south of Mont Blanc. It stands between Savoy and Piedmont, having the valley of the Isère, in the former, on the west, and that of the Doire, in the latter, on the east. The pass across it is one of the easiest in the Alps, and is supposed by many to be that which Hannibal used. The hospice, at the summit of the pass, has an elevation of 7,192 feet.

Bernardakis, Demetrios, bėr-när'dä-kĭs, dā-mā'trē-ōs, Greek poet and dramatist: b. Santa Marina, Lesbos, 2 Dec. 1834. After a course of study at Athens and in German universities he was (with one considerable intermission) professor of history and philology in the University of Athens, 1861–82, when he went back to Lesbos. He is author of a spirited Pindaric ode for a jubilee occasion, of several dramas, and of a satire, 'The Battle of Cranes and Mice'; he

has also written a 'Universal History'; a 'Church History'; and a spirited tractate, 'Confutation of a False Atticism,' directed against the would-be Attic purists.

Bernardes, Diego, bėr-när'dĕs, dē-ā'gō, Portuguese poet: b. Ponte de Lima about 1530; d. 1605. He was called "the Sweet Singer of the Lima," a streamlet immortalized in his verse. He left his native valley in 1550 and attached himself to the master-singer, Sá de Miranda, who lived retired on his estate, Quinta da Tapada, a devotee of the Muses. Here Bernardes composed verses of all kinds — elegies, sonnets, odes, and songs, full of tender sympathies and perfect melody. Here he wrote 'The Lima'; 'Various Rimes — Flowers from Lima's Banks'; 'Various Rimes to the Good Jesu,' and other poems.

Bernardin of Sienna, Italian ecclesiastic: b. Massa, Italy, 8 Sept. 1380; d. Aquila, Abruzzo, 20 May 1444. He became a Franciscan friar in a monastery near Sienna in 1404, but, desiring to make a pilgrimage to the Holy Land, was appointed a commissary of that country, and was thus enabled to gratify his wish. After his return he acquired a great reputation as a preacher, and three cities were rival suitors for the honor of having him as bishop. Bernardin, however, was unwilling to accept the distinction, and was made vicar-general of the friars of the Observantine order in Italy. He is said to have founded more than 300 monasteries. In 1450 he was canonized by Pope Nicholas V. His works appeared at Venice in 1591 in 4 volumes quarto, and at Paris in 1636 in 2 volumes folio. They consist of essays on religious subjects, sermons, and a commentary on the book of Revelation. A biography by J. P. Toussaint was published (Regensburg 1873), and one by L. Bianchi (Sienna 1888).

Bernardines, bėr'när-dēnz. See CISTERCIANS.

Bernardo del Carpio, bėr-när'dō dĕl kär'pē-ō, Spanish knight-errant (the fruit of a secret marriage between Chimena, the sister of Alphonso the Chaste, and of Don Sancho, lord of Saldagua): b. in the 9th century. Alphonso, irritated at the marriage, put out the eyes of Don Sancho and imprisoned him in a castle, but spared Bernardo and brought him up carefully at his court. In course of time Don Bernardo grew up to be a warrior, and distinguished himself in the Moorish wars, in the hope that the king would be bent to pity and set his father at liberty. Alphonso was inflexible, and Bernardo withdrew to his paternal domains; and, leaguing with other lords opposed to the court, set him at defiance.

On the accession of Alphonso the Great, Bernardo returned to court, and again performed many exploits against the Moors, hoping to be rewarded with his father's freedom. He was once more denied the boon, and withdrew as before, not only leaguing with his friends, but making alliance with the Moors. Alphonso agreed at length to give up his father on receiving the surrender of the castle of Carpio. Bernardo, true to his word, performed his part of the stipulation, and then learned with indignation that Alphonso had practised an infamous deception upon him, as his father had been for some time dead. He disdained any longer to tread the Spanish soil, and removed to France, where he spent the remainder of his life as a knight-errant. Many fabulous exploits have been attributed to him, both in Spanish romances and in more reliable histories.

Bernauer, Agnes, Bavarian lady celebrated for her beauty and her unfortunate fate; d. 2 Oct. 1435. She was the daughter of a poor citizen, said to be a barber of Augsburg. Duke Albert of Bavaria, only son of the reigning prince, met Agnes at a tournament given in his honor by the grandees of Augsburg, became enamored of her, and, as he could not prevail on her to be his mistress, secretly married her. He conducted her to his own castle of Vohburg, and for a time succeeded in concealing the alliance he had contracted; but his father wishing to marry him to Anne, daughter of the Duke of Brunswick, he was compelled to acknowledge his marriage with Agnes. His father refused to credit it, and having caused the Duke to be denied admission to a tournament on the plea that he was living unlawfully with a woman, Albert openly proclaimed his marriage and caused Agnes to be recognized as Duchess of Bavaria, giving her for residence the castle of Straubing on the Danube. The Duke of Bavaria, incensed at this open avowal of a misalliance, caused Agnes to be seized in her castle during the absence of his son, brought her before a tribunal specially constituted, where she was accused of magic, and being condemned, had her hands tied together and was thrown into the river. Albert in revenge took arms against his father, but the Emperor Sigismund finally reconciled them. The Duke Ernest raised a chapel to the memory of Agnes, and Albert married the princess of Brunswick. Her story, though well authenticated, has become legendary from the interest attached to it, and is a favorite theme with the Bavarian poets.

Bernay, bār-nā, France, a town in the department of Eure, 25 miles west-northwest of Evreux, on the right bank of the Charentonne. It has two fine old churches, a communal college, a hospital, a court of first resort, a board of manufactures, an agricultural society, and a savings bank. It has important manufactures of cloth and flannel, tape, linen, and cotton goods; and spins a good deal of cotton, thread, and worsted. It has also bleachfields, dyeworks, tanneries, etc. Its trade is principally in grain, cider, cloth, iron, paper, leather, linen, horses, and cattle. The horse-fair, held in Lent, is one of the greatest in France, and is attended by purchasers from all parts of the country. Pop. (1891) 5,788.

Bernburg, bėrn-burH, Germany, a town in the duchy of Anhalt, capital of the former duchy of Anhalt-Bernburg; on both sides of the Saale, northwest from Leipsic, with which, as well as with Berlin and Magdeburg, it is connected by railway. It is divided into the old, the new, and the high town; the first two surrounded by walls, and communicating by a bridge 173 feet long. Bernburg is well built, and contains several well-paved and well-lighted streets. The principal building is the palace, situated, with a garden, on the highest part of the high town. It is very ancient, but has received numerous modern additions, and contains a picture-gallery, theatre, and church. Besides an oil-mill, and several breweries and distilleries, there are manufactories of paper and

earthenware, copper and tin wares, etc. Pop. (1895) 32,374.

Berne-Bellecour Étienne Prosper, bărn-bĕl-koor, ā-tē-ĕn prŏs-pĕr, French painter: b. Boulogne, 29 July 1838. After some years of study under Barras and Picot, he made a reputation by his spirited representations of episodes in the Franco-Prussian war of 1870. He received a first-class medal in the Paris Salon of 1872; the Legion of Honor in 1878; and a second-class medal at the Paris Exposition of 1889. His best known works are: 'Cannon Shot'; 'In the Trenches'; 'Attack on the Château'; and 'To Arms!'

Ber'ners, John Bourchier, boor'shē-ā, **Lord,** English baron, a descendant of the Duke of Gloucester, youngest son of Edward III.: b. 1474; d. 1532. He was member of Parliament, 1495–1529; aided in suppressing the Cornish insurrection, 1497; chancellor of the exchequer, 1515; ambassador to Spain, 1518; and for many years governor of Calais. He translated 'Froissart's Chronicles' (1523–5) and other works, his translation of the former being a sort of English classic.

Ber'ners, or **Barnes, Juliana,** English prioress and author: fl. 15th century. She was the daughter of Sir James Berners, who was beheaded in the reign of Richard II. Little more is known than that she was prioress of the nunnery of Sopewell, near St. Alban's, and has her name prefixed as writer or compiler to one of the earliest and most curious productions of the English press. The first edition, entitled 'The Treatyses Pertynynge to Hawkynge, Huntynge, and Fysshynge with an Angle' (of which only three perfect copies are known), printed in the abbey of St. Alban's in 1486, treats of hawking, hunting, and heraldry. A second edition was printed by Wynkyn de Worde in 1496. This work, under the title of the 'Book of St. Alban's,' became a popular manual of sporting science, and was many times reprinted in the 16th century. It has latterly been issued in facsimile of the original print.

Bernhard, bèrn'härt, (Duke of Weimar), Dutch soldier (fourth son of Duke John of Saxe-Weimar): b. 6 Aug. 1604; d. 8 July 1639. He entered first the service of Holland, and afterward the Danish army employed in Holstein against the troops of the emperor, and commanded by the margrave of Baden-Durlach, and was present at the Conference of Lubeck, 1629, for negotiating peace. When Gustavus Adolphus entered Germany, Bernhard joined him, and was present at the attack upon Wallenstein's camp in the neighborhood of Nuremberg, 24 Aug. 1632. In the battle of Lützen, 6 Oct. 1632, he commanded the left wing of the Swedish army, avenged the death of Gustavus Adolphus, and although himself severely wounded, put the right wing of the imperial troops to flight. In 1633 he took Bamberg, Cronach, Höchstädt, and Aichstädt; but his attempt upon Ingolstadt miscarried. He also brought the cities of Ratisbon and Straubing into his power, and frustrated Wallenstein's intentions. The king of Sweden made him Duke of Franconia. His impetuosity caused the defeat at Nördlingen (q.v.), 24 Aug. 1634. He himself narrowly escaped being made prisoner. The prudence of Oxenstiern and the valor of Bernhard soon made amends for this fault. France, now entering into a closer alliance with Sweden, concluded a separate treaty with Bernhard, who went to Paris, 16 Oct. 1634. Bernhard promised for 4,000,000 livres to raise an army of 18,000 men on the Rhine to act against Austria. He now carried on the war in the country adjacent to the Rhine, took the fortress of Zabern in Alsace, spread his army over Lorraine and Burgundy, and vanquished the forces of the emperor in several battles. At the commencement of the year 1638 he laid siege to Rheinfelden, not far from Basel. Here he was unexpectedly attacked in his camp, 18 February, by an Austrian army. Bernhard was obliged to retreat before superior numbers; but, having soon collected his forces, he surprised the Austrians, 21 February, and obtained a complete victory. Several Austrian generals were made prisoners, and the fortress of Rheinfelden was obliged to surrender, 13 May. He then undertook the siege of Breisach, the possession of which was necessary for maintaining himself in Alsace. An imperial army, under General Goetze, was defeated with great loss by Bernhard, 30 July. Bernhard captured several places of inferior importance during the siege of Breisach, which, however, did not surrender until he had repeatedly defeated the Austrians, and then upon very moderate conditions, which Bernhard signed in his own name without mentioning France. The possession of Alsace, which he had before ceded to France under certain conditions, was now secured; but he also demanded Breisach as an appurtenance to Alsace. He garrisoned all the conquered places with German troops, and ordered money to be coined with the Saxon coat of arms and that of Breisach. In vain were the efforts of France to deprive the duke of the possession of Breisach by proposing to place a French garrison in the fortress; the Duke declined not only this proposal, but also an invitation to Paris and the offer of a marriage with the Duchesse d'Aiguillon, niece of Cardinal Richelieu. Instead of that match he proposed one with the princess of Rohan, to which, however, the French court would not accede, lest the party of the Huguenots should be strengthened. It is probable that Richelieu had recourse to poison in order to rid France of the Duke, who was becoming formidable by his growing power. Immediately after his death several French commissioners appeared, who enlisted his troops into the French army; the command of them was committed to Marshal Guébriant. With Bernhard fell one of the chief supports of the Protestants. His successors, Banér and Torstenson, pursued his victorious course, and France seriously exerted herself in the war which continued for the benefit of the Protestants. In Bernhard a graceful person, intelligence, and valor were united with a magnanimity which could not be shaken by adverse events; his only fault was too great impetuosity.

Bernhardi, August Friedrich, bèrn-här'dē, ow'goost frē'drĭH, German scholar: b. Berlin, 1768; d. there, 1820. In his youth his attention was directed to universal language (that is, to language as far as it is common to all rational beings), to the mystery of its construction — the mathematics, as it were, of language. Bernhardi, considering all different languages as a whole, endeavored to discover a universal grammar common to them all. The result of his researches appears in his works:

'Abstract Grammar' (2 vols. 1801); 'Grammar in Its Application' (1803); and 'Elements of the Science of Language,' in which many philosophical principles of language are laid down. Bernhardi was a man of cultivated mind and extensive knowledge. He was also a professor and director of a classical school in Berlin.

Bernhardi, Theodor von, tā'o-dôr fŏn, German historian and diplomat: b. Berlin, 6 Nov. 1802; d. Kunersdorf, Silesia, 12 Feb. 1887. His diplomatic career was important, and afforded him special facilities for compiling a 'History of Russia and of European Politics During the Years 1814–31' (1863–77); 'Frederick the Great as a Military Commander' (1881); and similar works, all of value.

Bernhardt, Rosine, bărn-härt, rō-zēn, better known as SARAH, French actress: b. Paris, 22 Oct. 1844. Of Jewish descent, her father French, her mother Dutch, her early life was spent largely in Amsterdam. In 1858 she entered the Paris Conservatoire and gained prizes for tragedy and comedy in 1861 and 1862; but her début at the Théâtre Français in 'Iphigénie' and Scribe's 'Valérie' was not a success. After a brief retirement she reappeared at the Gymnase and the Porte Saint-Martin in burlesque, and in 1867 at the Odéon in higher drama. Her success in Hugo's 'Ruy Blas' in 1872 led to her being recalled to the Théâtre Français, since which she has abundantly proved her dramatic genius. In 1879 she visited London, and again in 1880, about which time she severed connection with the Comédie Français under heavy penalty. In 1880, 1887, 1891, 1896, and 1900 she made successful appearances in the United States, and between and after these dates visited Switzerland, Holland, South America, Italy, Algeria, Australia, etc. In 1899 she appeared in a new rendering of 'Hamlet' in Paris, and scored a most flattering triumph. Among her most successful impersonations are 'Théodora,' 'Fédora,' 'La Tosca,' and 'Cléopâtre' in the plays bearing those titles. In 1882 she married M. Damala, a Greek, whom she divorced not long afterward. She is also known as a sculptor, painter, and playwright.

Bernhardy, Gottfried, bèrn'här-dē, gŏt'frēd, German classical philologist: b. Landsberg-on-the-Warthe, 20 March 1800; d. Halle, 14 May 1875. He lectured very brilliantly at the leading universities, his principal works being 'Greek Syntax Scientifically Considered' (1829), a historical study of the subject; 'Outlines of Roman Literature' (5th ed. 1872); 'Outlines of Greek Literature' (Part I. 5th ed. 1892; Part II. 2d–3d ed. 1876–80; Part III. wanting), and a supplement to the first-named treatise, entitled 'Paralipomena [Omission] in [the Work on] Greek Syntax' (1854–62); although he has written many other important books.

Berni, Berna, or **Bernia, Francesco,** bèr'nē, bèr'nä, or bèr'nē-a, frän-ches'kō, Italian poet: b. Lamporecchio, Tuscany, toward the close of the 15th century; d. 26 July 1536. His family was noble, but poor, and young Berni went to Florence, and at the age of 19 to Rome, where he lived under the care of his relation, Cardinal Bibiena. At length he entered the service of Ghiberti, bishop of Verona, datary of the papal chancery, as secretary. In the hope of promotion he took orders; but sought recreation in amusements which displeased the prelate. A society had been established at Rome, consisting of young ecclesiastics of a jovial temper like Berni, and of a poetical vein, who, in order to denote their love for wine and their careless gaiety, called themselves *i vignajuoli* (vine-dressers). They laughed at everything, and made sport in verse of the most serious, nay, the most tragic matters. Berni's verses were the most successful, and were written in so peculiar a style that his name has been given to it (*maniera Bernesca* or *Berniesca*). When Rome was sacked by the troops of the Constable Bourbon, 1527, Berni lost all that he possessed. He afterward made several journeys, with his patron Ghiberti, to Verona, Venice, and Padua. At length, wearied with serving, and satisfied with a canonship in the cathedral at Florence, he retired to that place. The favor of the great, however, which he was weak enough to court, brought him into difficulties. He was required to commit a crime, and his refusal cost him his life. Alessandro de' Medici, at that time Duke of Florence, lived in open enmity with the young Cardinal Ippolito de' Medici. Berni was so intimate with both that it is doubtful which first made him the proposal to poison the other. Certain it is that the cardinal died by poison in 1535, and it is probable that Alessandro caused Berni's death.

In the burlesque style of poetry, Berni is still considered the best model. His satire is often very bitter, and frequently unites the good humor of Horace with the causticity of Juvenal. The extreme licentiousness of his writings is his greatest fault. Berni also wrote Latin verses very correctly, and was well acquainted with Greek. His 'Burlesque Verses' have great merit; so also has his rifacimento of Bojardo's 'Orlando Innamorato.'

Bernicia, bèr-nĭsh'yą, a Latinized form of the English word Brynelch, used to indicate the north part of what became the kingdom of Northumbria, the part north of the river Tees. The Anglian kingdom of Bernicia is said to have been founded by Ida, who made his capital at Bamborough about 550 A.D.

Bernier, bèr-nyā, **Camille,** French painter: b. 1823. He did not exhibit until 1863, but in a few years became one of the leading landscape artists of France, a position he has held for 40 years. His best-known works are: 'The Abandoned Lane'; 'Evening'; 'A Farm in Brittany'; and 'Landes, Near Bannalec.'

Bernier, François, French physician and traveler: b. Angers, about 1625; d. Paris, 1688. He set out on his travels in 1654, and after visiting Egypt and Palestine, went into India, where his skill in medicine brought him into notice; and he remained for 12 years, residing chiefly at Delhi, as physician to the Great Mogul Emperor Aurungzebe. On one occasion he accompanied the prime minister on his march, at the head of an immense army, to the conquest of Cashmere, and in his travels, recording all that he saw, has given accounts full of interest, and recognized by subsequent travelers as remarkable for their fidelity. After his return to France he not only compiled his 'Travels' and several volumes of history relating to the empire of the Great Mogul, but turned his attention to philosophical subjects, and published

an abridgment of the philosophy of Gassendi. He also wrote a treatise, entitled 'Traité du Libre et du Volontaire.'

Bernina, bĕr-nē'na, a mountain of the Rhætian Alps, 13,290 feet high, in the Swiss canton of Grisons, with remarkable and extensive glaciers. Its summit was first attained in 1850. The Bernina Pass, which attains an elevation of 7,642 feet, and over which a carriage road was completed in 1864, leads from Pontresina to Poschiavo.

Bernini, Giovanni Lorenzo, bĕr-nē'nę, jō-vän'nę lō-rĕn'zō, called Il Cavaliere Bernini, Italian sculptor and architect: b. Naples, 7 Dec. 1598; d. Rome, 28 Nov. 1680. Richly endowed by nature and favored by circumstances, he rose superior to the rules of art, creating for himself an easy manner, the faults of which he knew how to disguise by its brilliancy. From his early youth he manifested a great power to excel in the arts of design, and one of his first works was the marble bust of the prelate Montajo. He was not yet 18 when he produced the 'Apollo and Daphne,' in marble, a masterpiece of grace and execution. Looking at this group near the close of his life, he declared that he had made very little progress since the time when that was produced. Without forsaking sculpture, Bernini's genius embraced architecture, and he furnished the design for the canopy and the pulpit of St. Peter's, as well as for the circular place before the church. Among his numerous works were the palace Barberini, the belfry of St. Peter's, the model of the monument of the Countess Matilda, and the monument of Urban VIII., his benefactor. Urban had scarcely closed his eyes, and Innocent X. ascended the papal throne, when the envy engendered by the merits of the artist and the favor bestowed on him broke forth. His enemies triumphed; but he regained the favor of the Pope by a model for a fountain. About the same time he erected the palace of Monte Citorio. Alexander VII., the successor of Innocent X., required of him a plan for the embellishment of the Piazza di San Pietro. The admirable colonnade, so beautifully proportioned to the Basilica, was built under the direction of Bernini. We may also mention the palace Odescalchi, the Rotunda della Riccia, and the house for novices, belonging to the Jesuits, on Monte Cavallo. Louis XIV. having invited him to Paris, he set out from Rome, in 1665, accompanied by one of his sons and a numerous retinue. Never did an artist travel with so great pomp and under such flattering circumstances. The reception which he met with in Paris was highly honorable. He was first occupied in preparing plans for the restoration of the Louvre, which, however, were never executed. Cardinal Rospigliosi having become Pope, Bernini was admitted to an intimate intercourse with him, and charged with several works; among others, with the decoration of the bridge of St. Angelo. In his 70th year this indefatigable artist executed one of his most beautiful works, the tomb of Alexander VII. He was buried with great magnificence in the church of St. Maria Maggiore. To his children he left a fortune amounting to about 3,300,000 francs. Bernini's favorite maxim was, *Chi non esce talvolta della regola, non passa mai.* Thus he was of opinion that, in order to excel in the arts, one must rise above all rules, and create a manner peculiar to one's self.

Bernis, François Joachim de Pierres de, bār-nes, frŏñ-swä jō-ā-kēm dĕ pē-ār dĕ, French cardinal and minister of Louis XV.: b. St. Marcel, de l'Ardèche, 1715; d. Rome, 2 Nov. 1794. Madame de Pompadour presented him to Louis XV., who, being pleased with him, assigned to him an apartment in the Tuileries, with a pension of 1,500 livres. He went as ambassador to Venice, and after his return enjoyed the highest favor at court, and soon became minister of foreign affairs. The political system of Europe was changed at that time. France and Austria, hitherto enemies, united in an offensive and defensive alliance, which was succeeded by the Seven Years' war, so unfortunate for France. Bernis has been designated by several writers as the chief author of this alliance. Duclos, however, asserts that it was the intention of Bernis to maintain the old system, which, since the time of Henry IV., and especially since the time of Richelieu, had made France the protectress of the less powerful states of Germany, and the rival of Austria. Oppressed by the misfortunes of his country, which, in part at least, were ascribed to him, Bernis surrendered his post, and was soon after banished from court. His disgrace lasted till the year 1764, when the king appointed him Archbishop of Albi, and, five years later, ambassador to Rome. Here he remained till his death. In the name of his court, and against his own opinion, he labored to effect the abolition of the order of the Jesuits. When the aunts of Louis XVI. left France in 1791 they fled to him for refuge, and lived in his house. The Revolution deprived him of his fortune, and the means of indulging his generous disposition. The easy poetry of youth had procured him a place in the French Academy, but he himself is its severest critic. Voltaire had a great esteem for his talents, his judgment, his criticisms, and his character, as is evident from their correspondence, which, in every other respect, is very honorable to Bernis. A collection of Bernis' works was published in 1797 by Didot, and another in 1825.

Bernissar'tia, an extinct genus of primitive crocodiles (*Mesosuchia*) of lower Cretaceous (Wealden) age. It resembles the modern crocodiles in the arrangement of the bony plates on the back more nearly than do other contemporary species, but was of quite small size, only three or four feet in length. A complete skeleton was found at Bernissart, in Belgium, and is now mounted in the Brussels Museum.

Bernouilli, bār-noo-ye, or **Bernoulli,** a family which has produced eight distinguished men, who have all cultivated the mathematical sciences with success. The family, emigrated from Antwerp on account of religious persecutions, under the administration of the Duke of Alva, fled first to Frankfort, and afterward removed to Bâle, where it was elevated to the highest dignities of the republic.

Bernouilli, Daniel, Swiss philosopher: b. Groningen, 9 Feb. 1700. He studied medicine, in which he took the doctor's degree, and at the age of 24 was offered the presidency of an academy about to be established at Genoa, but in the following year accepted an invitation to St. Petersburg. Accompanied by his younger brother

John, he returned to Bâle in 1733; became there professor of anatomy and botany; in 1750 professor of natural philosophy; resigned this place, because of his advanced age, to his brother's son, the younger Daniel Bernouilli, in 1777, and died in 1782. He was one of the greatest natural philosophers as well as mathematicians of his time. At 10 different times he received a prize from the Academy of Paris. In 1734 he shared with his father a double prize, given by this academy for their joint essay on the causes of the different inclinations of the planetary orbits. Most of his writings are contained in the Transactions of the St. Petersburg, Paris, and Berlin academies, of which he was a member.

Bernouilli, Jakob, or **James,** Swiss mathematician: b. Bâle, 1654; d. 1705. The differential calculus discovered by Leibnitz and Newton was applied by him to the most difficult questions of geometry and mechanics; he calculated the loxodromic and catenary curve, the logarithmic spirals, the evolutes of several curved lines, and discovered the "numbers of Bernouilli," as they are called.

Bernouilli, Johann, Swiss mathematician: b. Bâle, 1667; d. 1 Jan. 1748. He was one of the greatest mathematicians of his time, and the worthy rival of Newton and Leibnitz. He was destined for commerce, but his inclination led him to the sciences, and from the year 1683 he principally devoted himself to medicine and mathematics. To him and his brother James we are indebted for an excellent treatise on the differential calculus. He also developed the method of proceeding from infinitely small numbers to the finite, of which the former are the elements or differences, and called this method the *integral calculus.* In 1690–2, he made a journey to France, where he instructed the Marquis de l'Hôpital in mathematics. At this time he discovered the exponential calculus, before Leibnitz had made any communications respecting it, and made it known in 1697. In 1694 he became doctor of medicine at Bâle, and in 1695 went, as professor of mathematics, to Groningen, where he discovered the mercurial phosphorus or luminous barometer, for which he received, from King Frederick I. of Prussia, a gold medal, and was made a member of the academy in Berlin, afterward of that in Paris. After the death of his brother in 1705, he received the professorship of mathematics at Bâle, which he held until his death.

Bernouilli, Nicolas, nephew of Johann Bernouilli, Swiss mathematician: b. Bâle, 1687; d. 1759. He studied law, but more particularly devoted himself to mathematics; in 1705 went to Groningen to Johann Bernouilli; returned however with him to Bâle toward the close of the year, and became there professor of mathematics. He traveled through Switzerland, France, Holland, and England, and in 1713 became a member of the Academies of Science in London and Berlin. On the recommendation of Leibnitz he went as professor of mathematics to Padua in 1716, but returned to his native city in 1722 as professor of logic. In 1731 he became professor of the Roman and feudal law in that place.

Bernouilli, Nicolas, Swiss jurist, son of Johann Bernouilli: b. Basel, 1695; d. St. Petersburg, 1726. He was professor of jurisprudence at Bern and subsequently professor of mathematics at St. Petersburg.

Bernstein, bĕrn'stīn, **Aaron,** German publicist and novelist: b. Dantzic, 1812; d. 1884. He was in politics a Radical, and in religion a reformer, and his life was a continued battle against obscurantism and conservatism. Yet he wrote some charming stories of life among the Jews, among them 'Mendel Gibbor' (1860). He wrote also some notable historical sketches, as 'The People's Years' and 'The Years of Reaction.'

Bernstein, Eduard, leader of the German social democracy: b. Berlin, 6 Jan. 1850. As a young man he edited socialistic newspapers in Berlin until the vehemence of his opposition to the government of Bismarck made it desirable for him to leave Germany. Returning in 1901, he became editor of *Vorwärts.* He contends that every movement for the advancement of the people should be encouraged and taken advantage of by the common people, whom he urges to take an active part in politics. Besides his newspaper work, he has published several volumes of discussions on politico-economical subjects, such as 'Zur Geschichte und Theorie des Sozial is mus' (1900).

Bernstorff, Andreas Peter, bĕrn'stôrf, ändrā-as pā'tĕr (Count), Danish statesman: b. 1735; d. 1797. He was appointed prime minister in 1769, when he ceded to Russia the Gottorp part of Holstein in exchange for Oldenburg and Delmenhorst. He introduced a new system of finance, and prepared the abolition of villanage in Schleswig and Holstein. He was a pronounced Liberal, and contended for the freedom of the press.

Bernstorff, Johann Hartwig Ernst (Count), Danish statesman in the service of the king of Denmark: b. Hanover, 1712; d. 1772. He was employed in divers embassies, and afterward held the office of foreign minister to Frederick V. for about 20 years, resigning in 1770. He was called by Frederick the Great "the oracle of Denmark."

Beroaldo, bā-rō-äl'dō, **Filippo,** Italian scholar: b. Bologna, 1453; d. 1505. He early gave proofs of great abilities and a prodigous memory, and after completing his education opened a school, successively at Bologna, Parma, and Milan, and taught with great success. He afterward went to Paris, and gave lectures which greatly extended his fame. His townsmen now became desirous to possess him, and he returned to Bologna, where he spent the remainder of his life as professor of belles-lettres. He is now chiefly known as the editor of some good editions of the classics, and the author of a curious tract entitled 'Declamatio Ebriosi, Scortatoris et Aleatoris,' in which the drunkard, rake, and gambler, represented as three brothers, debate which of them, as being the most vicious, should be excluded from sharing in his father's inheritance.

Bero'e, daughter of Oceanus; also the name of several women connected with Thrace, Illyria, etc.; also a genus of animals, the typical one of the family *Beroidæ.* The beroes are oval or globular-ribbed animals, transparent and gelatinous, with cirri from pole to pole, and two long tentacles fringed with cirri, which aid them in breathing and in locomotion. They have a

mouth, a stomach, and an anal aperture. They are free swimming organisms inhabiting the sea, sometimes rotating, and at night phosphorescent.

Bero'sus, according to some a Chaldæan by birth, and a priest of the temple at Belus at Babylon, and according to others a contemporary of Alexander the Great, is celebrated both as a historian and an astronomer, though it has been alleged that his name merely has been used for the purpose of giving a reputation to what others had written. His history, giving an account of the Babylonian Chaldæans and their kings, consisted of two books written in Greek, and professed to be founded on the ancient archives of the temple of Belus. It exists only in fragments, contained in the writings of Josephus, Eusebius, and others, and given in a collected form by Richter (1825). According to Pliny the astronomical observations contained in the works of Berosus extended over a period of 480 years.

Berquin, Arnaud, bĕr-kăń, är-nō, French writer: b. Bordeaux, 1749; d. 1791. He first attracted notice by some poems which he entitled 'Idylles,' and by several translations from the English under the name of 'Tableaux Anglais,' but is best known by his work entitled 'Ami des Enfans,' for which he received the prize of the French Academy in 1789, as the most useful work which made its appearance during that year. It has been translated into most European languages, and still continues a standard work for the amusement and instruction of young people. It cannot, however, lay claim to the merit of originality, as both the title and much of the substance are derived from a work in German by Weiss, entitled 'Kinderfreund.' Berquin, though specially devoted to the instruction of youth, was not incapable of excelling in graver literature, and was for some time the editor of the *Moniteur.*

Berquin, ber-kań', **Louis de,** the first Protestant martyr in France: b. 1490; d. Paris, 17 April 1529. He was a gentleman of Artois, a friend of Badius, the savant. When, in 1523, the police began to seize Luther's works, with a view to suppressing Protestantism, they found among Berquin's books some manuscripts of his own writing that were pronounced heretical. As he refused to retract, he was thrown into prison. Francis I., whose counselor he was, obtained for him his freedom; and Erasmus, always his friend, tried in vain to prevent him from exposing his life in a useless struggle. His fixed opinions and intrepid nature, however, having thrown him into prison three times, caused him to be condemned to death, and he was burned alive.

Berredo e Castro, bār-rā'dō ē käsh'trō, Portuguese soldier and historian: b. Serpa, about 1680; d. Lisbon, 13 March 1748. Having entered the army he fought at the battle of Saragossa (1710), so distinguishing himself on that occasion that he was made governor-general of the province of Maranhão, Brazil, and in 1718 he became captain-general of Mazagao. The rest of his life was spent upon his history which is of great value as an original source of information for the period of which it treats. It is entitled 'Annals Historicos, do estado do Maranhão' (1749).

Berret'ta. See Biretta.

Ber'rian, William, American Episcopal clergyman and writer: b. New York, 1787; d. 7 Nov. 1862. He was rector of Trinity Church, New York, 1830–62. Besides various religious works, he wrote 'Travels in France and Italy' and a 'Historical Sketch of Trinity Church.'

Ber'rien, John Macpherson, American lawyer and politician: b. New Jersey, 23 Aug. 1781; d. Savannah, Ga., 1 Jan. 1856. He was the son of an officer in the war of the American Revolution, graduated at Princeton in 1796, was admitted to the bar of Georgia at the age of 18, and gradually rose in reputation till he was elected, in 1809, solicitor of the eastern district of Georgia. He became judge of the same district the next year, retaining the latter office till 1822, when he entered the Georgia Senate, from which he was transferred, in 1824, to the Senate of the United States. He established in that body a high reputation as an orator and statesman, was appointed attorney-general of the United States in 1829, resigned this office in 1831 when Gen. Jackson's cabinet became inharmonious, resumed the practice of his profession in Savannah till 1840, when he was elected again to the national Senate, and was re-elected in 1846.

Berro, Bernardo Prudencio, bār'rō, bĕr-när'dō prū-dĕn'cē-o, Uruguayan statesman: b. Montevideo, about 1800; d. April 1868. In 1852 he was vice-president and president of the senate. Under Giro he was minister of government till the revolution of 1853; again president of the Senate in 1858, and president of the republic in 1860–4. The revolution of Flores was successful soon after the expiration of his term. In 1868 he stirred up a revolt against Flores, was imprisoned, and soon afterward shot through a window in his cell.

Berruguete, bĕr-roo-gā'te, **Alonzo,** Spanish painter, architect, and sculptor: b. Paredez de Nava, Spain, 1480; d. Toledo, 1561. He went in early life to Italy, studied in the school of Michael Angelo, and became intimate with Andrea del Sarto, Baccio Bandinelli, and other celebrated artists. On his return he was appointed painter to Charles V. His principal architectural works are the royal palace at Granada, and the town-house of Seville; his skill as a sculptor is seen to great advantage in the choir of the cathedral of Toledo, and the tomb of the vice-chancellor of Aragon at Saragossa. His best paintings are at Valladolid, Toledo, and Salamanca.

Berry, bă-re, **Carolina Ferdinanda Louisa, Duchesse de,** widow of the second son of Charles X. of France; daughter of Ferdinand I. of the Two Sicilies: b. 5 Nov. 1798; d. 17 April 1870. Her futile attempt at insurrection in 1832, to place her son on the French throne, caused her imprisonment and subsequent withdrawal to Sicily.

Berry, Charles Ferdinand, Duc de, second son of the Count d'Artois (afterward Charles X.) and Maria Theresa of Savoy: b. Versailles, 24 Jan. 1778; d. 14 Feb. 1820. He was educated along with his elder brother, the Duke of Angoulême. In 1792 he fled with his father to Turin, served under him and Condé on the Rhine, and early learned the art of winning the love of the soldiers. Subsequently he lived alternately in London and Scotland, continually occupied with plans for the restoration of the

Bourbons. Landing at Cherbourg, 13 April 1814, he passed through the cities of Bayeux, Caen, Rouen, etc., gaining over the soldiers to the cause of the Bourbons, distributing alms, and delivering prisoners. When Napoleon landed from Elba, the king committed to Berry the chief command of all the troops in and around Paris. All his efforts to secure their fidelity proving ineffectual, he was obliged to retreat on the night of 19 March, with the troops of the household to Ghent and Alost, where the king then was. The battle of Waterloo enabled him to return to Paris, where he arrived 8 July, and surrendered his command over the troops of the household into the hands of the king. At the opening of the chambers in Paris he took the oath to maintain the constitution, and was appointed president of the fourth bureau; but soon retired from public life. He died of a blow inflicted by a political fanatic named Louvel (see Louvel). The duke left a daughter, Louise Marie Thérèse, afterward Duchess of Parma; and a posthumous son, subsequently known as Count de Chambord.

Ber'ry, Hiram George, American soldier: b. Rockland, Me., 27 Aug. 1824; d. Chancellorsville 2 May 1863. He entered the Union army as colonel of the 4th Maine infantry, and was present at the battle of Bull Run, the siege of Yorktown, took a conspicuous part in the battles of Williamsburg, Fair Oaks, Chantilly, and the second Bull Run campaign. President Lincoln nominated him a major-general of volunteers, January 1863, and he succeeded Gen. Sickles in command of the 2d division of the 3d army corp. At a critical point in the battle of Chancellorsville, 1 May 1863, Hooker ordered Gen. Berry to charge with the bayonet the advancing enemy. He did so, and for three hours his division, almost alone withstood the enemy's assault, and regained for the Federal forces a portion of their lost ground. He was killed at the head of a successful bayonet charge, upon the renewal of the battle the following day.

Berry, Mary, English author: b. Kirkbridge, Yorkshire, 16 March 1763; d. London, 20 Nov. 1852. She and her sister Agnes were intimate friends of Horace Walpole. In 1798 she edited the 'Works of Horace Walpole.' Her most ambitious work was her 'Social Life in England and France' (1844).

Ber'ry, or **Berri,** a former province and dukedom of France, of which Bourges was the capital. With the exception of the arrondissement St. Amand, which belonged to the Bourbonnais, it now forms the departments Indre and Cher. At several periods it gave a title to French princes, the younger son of Charles X. being the last to assume it.

Berry, Canal de, one of the most important canals in France as regards the amount of its traffic. It begins at Montluçon on the Cher, the chief trading centre of the coal fields of the Allier; descends the Cher valley to St. Amand, and ultimately enters the Cher itself near St. Aignan, below which point the canalized Cher continues the line of navigation to Tours. Length of navigation 200 miles, of which 36½ miles belong to the canalized Cher. Constructed 1807–41.

Berry, a succulent fruit in which the seeds are immersed in a pulpy mass enclosed in a thin skin; for example, grape, gooseberry, tomato. Popularly the term is applied to fruits not strictly berries; for example, strawberry, raspberry, etc., which bear external seeds on a pulpy receptacle.

Berryer, bār-yā, **Antoine Pierre,** French advocate and orator: b. Paris, 4 Jan. 1790; d. 29 Nov. 1868. In 1814 he proclaimed at Rennes the deposition of Napoleon, and remained till his death an avowed Legitimist. He assisted his father in the defense of Ney, secured the acquittal of Gen. Cambronne, and defended Lamennais from a charge of atheism. His eloquence was compared with that of Mirabeau, and after the dethronement of Charles X. (1830) he remained in the chamber as the sole Legitimist orator. In 1840 he was one of the counsel for the defense of Louis Napoleon after the Boulogne fiasco. In 1843 he did homage to the Count de Chambord in London, adhering to him through the revolution of 1848, and voting for the deposition of the prince-president the morning after the *coup d'état.* He gained additional reputation in 1858 by his defense of Montalembert, and was counsel for the Patterson-Bonapartes in the suit for the recognition of the Baltimore marriage. In 1863 he was re-elected to the chamber with Thiers, and in 1864 received a flattering reception in England.

Bersaglieri, bĕr-sạ-lyā'rẹ, a corps of riflemen or sharpshooters, introduced into the Sardinian army by Gen. Della Marmora, about 1849. They took part in the Russian war and also assisted at the battle of the Tchernaya, 16 Aug. 1855. They were likewise employed in the Italian wars of 1859 and 1866. In 1901 they comprised 12 regiments, each regiment composed of three battalions of four companies each.

Ber'serker, a descendant of the eight-handed Starkader and the beautiful Alfhilde, and according to the Scandinavian mythology, a famous warrior. He disdained the protection of armor, whence he received his name, which signifies, according to Ihre, armorless. He raged like a madman in battle. He killed King Swafurlam, and married his daughter, by whom he had 12 sons as untamable as himself. They were also called Berserker, and after their time the name was given to wild and fierce Scandinavian warriors.

Bersezio, ber-sets'yō, **Vittorio,** Italian novelist and playwright: b. Peveragno, Piedmont, 1830. Both as a writer of tales and of comedies he is conspicuous for vivid and faithful delineation of Piedmontese life; especially in his dialect comedies, among which 'The Misfortunes of Monssù Travett' is considered to be his masterpiece. He also wrote an excellent historical work, 'The Reign of Victor Emmanuel II.' (1878–93).

Bersier, bār-syā, **Eugène Arthur François,** a French Protestant pulpit orator of note: b. Morges, near Geneva, 1831; d. Paris, 19 Nov. 1889. He became in 1855 a preacher in Paris where he was much admired and his sermons were translated into several languages. Among his writings are 'Coligny avant les guerres de religion' (1884); 'Histoire d'une petite fille heuveuse' (1890); in English, 'Sermons' (1881–1901). See Tinling, 'An Analysis of the Published Sermons of Pastor Eugène Bersier' (1901).

Bert, bār, **Paul,** French statesman and physiologist: b. Auxerre, 17 Oct. 1833; d. Ketcho, Tonquin, 11 Nov. 1886. He studied both law and medicine, became assistant to Claude Bernard at the College of France, and successively occupied the chairs of physiology at Bordeaux and Paris. Entering political life in 1870, on the proclamation of the republic, he was four time re-elected to the chamber. He brought forward laws removing primary instruction from the control of the religious orders, and making it compulsory. During the premiership of Gambetta he held the post of minister of public instruction and worship. While engaged in public life, M. Bert still pursued with ardor his scientific investigations, attracting world-wide attention by his experiments in vivisection. The anti-religious views of M. Bert excited much controversy. He was also the author of several works on anatomy and physiology, and of numerous educational and political writings. He rendered a service to natural science by the clear and simple style of his text-books.

Berthelot, bār-tlō, **Pierre Eugene Marcellin,** French chemist: b. Paris, 25 Oct. 1827; d. there 18 March 1907. He early studied chemistry, and in 1859 was appointed professor of organic chemistry in the Superior School of Pharmacy. In 1865 a new chair of organic chemistry was organized for him in the College of France. In 1870 he was elected president of the scientific committee of defense, and during the siege of Paris was entrusted with the manufacture of ammunition and guns, and especially dynamite and nitro-glycerine. In 1878 he became president of the committee on explosives, which introduced smokeless powder. His labors also led to the discovery of dyes extracted from coal tar. He received the decoration of the Legion of Honor in 1861; was made commander in 1879, and grand officer in 1886. In 1889 he was elected permanent secretary of the Academy of Sciences. He has contributed to the knowledge of synthetical processes and to the relations between the phenomena of heat and of chemistry. His works include: 'Chimie organique fondée sur la synthèse' (1860); 'Leçons sur les principes sucres' (1862); Leçons sur l'Isomerie' (1865); 'Traite elementire de chimie organique' and 'Sur la force de la poudre et das matieres explosives' (1872 and 1889); 'Verifications de l'areometre de Baume' (1873); 'Les Origines de l'alchimie' (1885); 'Collection des anciens alchimistes grecs' (1888); 'Chimie des anciens' (1889); 'Traité partique de calorimetrie chimique' (1893).

Berthier, bār-tyā, **Louis Alexandre,** marshal of France, prince and duke of Neufchâtel and Valengin, prince of Wagram: b. Versailles, 20 Nov. 1753; d. Bamberg, 1 June 1815. In the American war of independence he served under Lafayette. In 1789, Louis XVI. appointed him major-general of the national guard of Versailles, and on 5 and 6 Oct. 1790, as well as 19 Feb. 1791, he did good service to the royal family. During the reign of terror he avoided suspicion by exhibiting zeal in the Vendean war. After the 9th Thermidor, he was appointed chief of the general staff of Kellermann, and by causing the French army to take up the lines of Borghetto, contributed to arrest the advance of the enemy. Thus his reputation as a chief of the general staff was established before Bonaparte singled him out for that post. In October 1797 Gen. Bonaparte sent him to Paris to deliver to the directory the treaty of Campo-Formio. In 1798 he received the chief command of the army of Italy, and in the beginning of February made his entrance into Rome, abolished the papal government, and established a consular one. After the 18th Brumaire, Bonaparte appointed him minister of war. He afterward became general-in-chief of the army of reserve, accompanied Bonaparte to Italy in 1800, and contributed to the passage of St. Bernard and the victory of Marengo. He signed the armistice of Alessandria, formed the provisional government of Piedmont, and went on an extraordinary mission to Spain. He then received again the department of war, which, in the meantime, had been in the hands of Carnot. He accompanied Napoleon to Milan, June 1805, to be present at his coronation, and in October was appointed chief of the general staff of the grand army in Germany. In the campaign against Austria in 1809, he distinguished himself at Wagram, and received the title of Prince of Wagram. In 1810, as proxy of Napoleon, he received the hand of Maria Louisa, daughter of the Emperor Francis I., and accompanied her to France. Somewhat later Napoleon made him colonel-general of the Swiss troops. In 1812 he was with the army in Russia, as chief of the general staff, which post he also held in 1813. After Napoleon's abdication he lost his principality of Neufchâtel, but retained his other honors, and possessed the favor and confidence of Louis XVIII. Snbsequently he retired to Bavaria, where, in a fit of insanity, he committed suicide. See 'Mémoires d'Alexandre Berthier, Pr. de Neufchâtel et de Wagram' (1826).

Berthold, bĕr'tōlt, **Franz,** pseudonym of **Adelheid Reinbold,** German novelist: b. 1802; d. 1839. She was warmly appreciated and furthered by Ludwig Tieck. Her story 'Fred of the Will-o'-the-Wisp' (1830), met with great favor; after her death appeared 'King Sebastian' (1839), a historical romance, and 'Collected Tales' (1842).

Berthold von Regensburg, bĕr'tōlt fŏn rā'gĕns-boorg, German Franciscan preacher: b. about 1220; d. 13 Dec. 1272, and buried in the Franciscan convent at Ratisbon, of which he was a member. From 1250 to the close of his life, he preached to immense congregations in Switzerland, Hungary, Austria, Moravia, Bohemia, Saxony, Swabia, etc., speaking to them from the summits of mountains or from the tops of trees. In the Heidelberg university library some MSS. of his sermons are preserved. The eloquent manner with which he exposed the iniquities of his times seems to have produced an electric effect upon his hearers. Near Glatz, in Silesia, a tent under which he had preached was exhibited long after his death, and revived the feelings of affection and reverence in which his name is held by the people. See 'Life by Unkel' (1882).

Berthollet, bār-tō-lā, **Claude Louis** (COUNT), French chemist of distinction: b. Talloire, Savoy, 9 Dec. 1748; d. Paris, 7 Nov. 1822. He studied medicine at Turin; went to Paris, where he became connected with Lavoisier, was admitted in 1780 a member of the Academy of Sciences in that city; was made in 1794 professor in the normal school there, and was sent to

Italy in 1796, in order to select the plunder that was to be carried to Paris. He followed Bonaparte to Egypt, and returned with him in 1799. After the 18th Brumaire he was made a member of the *senat-conservateur;* afterward count and grand-officer of the Legion of Honor. In 1804 Napoleon appointed him senator for the district of Montpellier. In 1813 he received the grand cross of the Order of the Reunion. He voted, however, for the establishment of a provisional government and the dethronement of Napoleon. Louis XVIII. made him a peer; but Napoleon passed him by in 1815. After the restoration of Louis, he took his seat again in the chamber of peers. Among the inventions and new processes with which the sciences and the arts were enriched by him, the most important are those for the charring of vessels to preserve water in ships, for the stiffening and glazing of linen, for the artificial production of nitre, etc., but principally that for the bleaching of vegetable substances by means of chlorine, which, since 1786, has been in general use in France. Besides different essays in the collections of the Academy and the Institute, he has written several larger works, among which his 'Essai de Statique Chimique' (1803; translated into English, German, and Italian) must be considered as the most important. The complicated phenomena of chemistry were here treated as under the strict and simple laws of mechanics. He had also a large share in the reformation of the chemical nomenclature, as well as in the publication of the work that appeared on this subject in Paris, 1787 — 'Méthode de Nomenclature Chimique.'

Bertholletia, bėr-thŏl-lē'shĭ-a, the generic name of Brazil nut (q.v.).

Berthoud, băr-too, **Ferdinand,** Swiss mechanician, celebrated for his marine chronometers: b. Plancemont, Neufchâtel, 19 March 1727; d. 20 June 1807. His father caused him to be instructed in the art of watchmaking, and, to afford him an opportunity of perfecting his knowledge, sent him to Paris. He resided in this city from 1745, and there made his first marine chronometers, which have been used by French navigators on so many occasions for extending and correcting geographical knowledge. He left several works relating to his art. His nephew, Louis Berthoud, his pupil and the heir of his talents, extended his improvements still further. His chronometers came to be very widely used by French navigators, and were even more convenient than those of his uncle.

Bertie, Willoughby, fourth Earl of Abingdon, English politician: b. 16 Jan. 1740; d. 26 Sept. 1799. He was a vigorous opponent in the House of Lords of the policy of England toward the American colonies that culminated in the Revolution; wrote a famous and very popular tract called 'Thoughts on Mr. Burke's Letter on the Affairs of America,' was active in promoting favorable legislation for Ireland, and sympathized with the French Revolution.

Bertier, băr-tyā, **Francisque Edouard,** French painter, now living in London: b. Paris, 1841. He was a pupil of Bouguereau and Cabanel, and among his many portraits of notables are those of De Lesseps, Grand Duchess Olga, Countess of Warwick, Prince of Wales, and Max O'Rell. He has several times visited the United States in order to paint the portraits of prominent American society leaders.

Bertillon, băr-te-yôn, **Alphonse,** French anthropologist: b. Paris 1853. He is widely noted as the founder of a system of identification of criminals. In 1880, while chief of the bureau of identification in the prefecture of police, he established his system of measurements which has given results marvelous for their precision. The system has since been adopted by the police authorities of the large cities of Europe and the United States. He was one of the expert witnesses in handwriting in the trial of Capt. Dreyfus in 1899, and soon after its close was removed from his office. He is author of numerous works bearing upon his system, including 'Identification anthropometrique' (1893); 'La Comparison des ecritures et l'identification graphique' (1897). See BERTILLON SYSTEM.

Bertillon System, a plan of identifying suspected criminals, invented March 1879, and set forth in 1885 by Dr. Alphonse Bertillon of Paris. Properly speaking, it is not a single system, but a combination of one invented by himself with two others approved by use, or as many more as the officers choose to employ for security. The former is that of anthropometry, or exact measurements of certain dimensions of the human body and its members; the latter are those of description — as in passports, but more extended, more precise, and with a better terminology — and photography, with still others at will. The first-named is the heart of the system, the feature which makes it instantly available; its accuracy is great, but so is that of some others; this however is the only one which can be indexed and referred to as readily as the titles of books in a library catalogue. For this reason it is rapidly becoming the standard in all countries with civilized judicial systems. It rests on three principles: (1) Easy and exact measurement of the parts of the body in a living subject; (2) extreme diversity of such dimensions in different subjects, no two ever closely approximating each other; (3) almost absolute fixity of the skeleton after 20. The measurements are taken with compasses, and include: Height, standing and sitting, reach of outstretched arms; length and width of head; length and width of right ear; length of left foot, forearm, middle and little fingers. The descriptive elements are color of eyes (the most important detail of all, as it never changes and is impossible to disguise), hair, beard, and complexion; deformities and peculiarities of shape; marks on body, as moles, scars, the tattooings frequent among criminals, etc., carefully located — as "mole six centimetres to left of fifth vertebra," or "horizontal scar on back of second phalanx of right forefinger, three millimetres below middle." A photograph of full face and one of profile are taken when thought desirable, from a fixed chair and a fixed camera. The entire process, by a measurer and a secretary who writes from dictation, takes five to seven minutes, and the measurements are correct to one thirty second of an inch. Descriptions and photograph are put together on cards of uniform size, and in the great Paris collection of 120,000,— the model for all others,— are thus classified for reference. First, approximately 20,000 females and 10,000 minors

are separated for special classification. Second, the 90,000 remaining are divided into three equal sections according to length of head: short heads, of 187 millimetres and less; medium, 187 to 194; long, 194 and above. Experience proves that these make very closely equal numbers; and their cards are placed in three tiers of drawers, the short heads uppermost. Each of these is subdivided into three of 10,000 according to width of head, without further reference to length; each of these into three of about 3,300, according to length of middle finger; each of these into three of 1,100, by length of foot; these are subdivided successively by length of forearm, full height, length of little finger, and color of eyes. These last groups contain from 12 to 14, and are classed by length of ear. The women and children are similarly classified. Thus any new measurement can be compared with its duplicate, in this enormous mass, or the absence of such record shown, with marvelous celerity and almost infallible accuracy. Its index value alone is of the first order. Under the old systems, the entire mass of descriptions and photographs had to be searched and compared with any given arrested person, and with the immense number accumulating in great cities it became physically impossible to apply it with any certainty, the senses grew so jaded and resemblances were so many; not only did the guilty escape,— it was estimated that more than half the habitual criminals remained undetected,— but the innocent were often mistaken for them. International criminals, like bank robbers and pickpockets, traveled from one city and country to another under assumed names and disguises; sometimes, when wanted for grave crimes, they committed trivial misdemeanors to be arrested and imprisoned under false names. This is now rendered futile by the combination of anthropometry with the descriptive features; and with regard to the confusion of identity, the laws of probability render it practically impossible. The system is also of great value in distinguishing new criminals from old offenders: it not merely registers identity, but the fact of a first offense. It has strengthened even the old descriptive system, by giving it a more precise vocabulary and training the officers of the law in physiognomy. It has already done admirable work, as in the discovery of King Humbert's murderer; but to make it more efficient, the local records should be gathered into national and even international bureaus. With a proper enforcement of habitual-criminals' acts, a great step would be taken toward suppressing the class of professional felons. This has been mooted in our own country, where it was introduced in 1887 by Maj. R. W. McClaughry; that it has not been fully adopted here is one reason for the infesting of the country by professionals driven out of Europe by the system. Bertillon has fully described his system in his 'Identification Anthropométrique' (1893); and Maj. McClaughry has edited 'The Bertillon System of Identification' (1896).

Bertin, bär-tăń, **Antoine,** French poet: b. Isle of Bourbon, 1752; d. San Domingo, 1790. He was much admired by his contemporaries, who, somewhat extravagantly, styled him the French Propertius. He was a friend of Parny, and like him excelled in elegiac and epistolary verse. His principal works are 'Voyage in Burgundy' (1777); and 'The Loves' (1780).

Bertin, Louise Angelique, French musician and composer: b. Les Roches, near Bievres, 15 Jan. 1805; d. Paris, 26 April 1877. She was a daughter of L. F. Bertin (q.v.), and composed 'Faust,' 'Esmeralda,' 'Guy Mannering,' and other operas. Her volume of verse, 'Les Glanes' (1842), received the prize of the Academy.

Bertin, Louis François (called BERTIN L'AINE), French journalist; b. Paris, 14 Dec. 1766; d. 13 Sept. 1841. The Revolution made him a journalist, and in 1799 he started the famous *Journal des Débats.* His royalist principles offered Napoleon, and cost him imprisonment and banishment to Elba; thence, however, he escaped to Rome, where he formed a friendship with Châteaubriand. In 1805 he returned to Paris, and resumed the editorship of the *Débats,* but was much hampered by Napoleon. The second restoration of the Bourbons restored once more to Bertin the free control of his journal, and henceforward he gave almost constant support to the ministerial party. He supported the July monarchy, and edited the *Débats* till his death.

Bertin, Nicolas, French artist: b. Paris, 1668; d. 1736. His picture, 'The Building of the Ark,' obtained the grand prize, in 1685, and 'Prometheus Liberated by Hercules' brought him, in 1705, membership in the Academy, where he became professor in 1715. His paintings will be found in the galleries of Dresden, Stockholm, St. Petersburg, Antwerp, Amsterdam, Orleans, and Toulouse.

Bertini, Giuseppe, bĕr-tē'nę, gwē'sĕp, Italian painter: b. Milan, 1825; d. 1898. The Milan Academy awarded him the prize for the best historical picture in 1845, and his painting on glass of 'Dante and the Divine Comedy,' exhibited in London in 1853, has been greatly admired. He became professor of painting at the Academy in 1860. Among notable pictures by him are: 'The Vision of Saint Francis of Assisi'; 'Death of Saint Joseph'; 'Tasso Introduced to the Duke of Ferrara.'

Bertrand, Henri Gratien, bărträn, ŏn-rę gra-tyăn (COUNT), French military officer: b. Châteauroux, 1773; d. there, 31 Jan. 1844. He distinguished himself at Austerlitz and became Napoleon's adjutant; and, after the battle of Aspern, in 1809, for his share in saving the French army by bridges, was created count and governor of Illyria. After serving with credit in the subsequent campaigns, he retired with the emperor to Elba, was his confidant in carrying out his return to France, and finally shared his banishment to St. Helena. On Napoleon's death, Bertrand returned to France, where, though sentence of death had been pronounced upon him, a sentence which Louis XVIII. had wisely recalled, he was restored to all his dignities, and, in 1830, appointed commandant of the Polytechnic School. In 1840, he formed part of the expedition which brought back the remains of Napoleon to France.

Bertrand, James, French historical painter: b. Lyons, 1825; d. 1887. He studied in Rome, and his 'Saint Benedict Taking Communion,' exhibited at the Salon in 1859, was highly approved. He worked in the classical style, and his paintings are as notable for their careful finish as for their religious tone. They have

been frequently engraved. Among them are 'Death of Virginia' (1869); 'Charlotte Corday's Last Day' (1883); 'Calvary' (1884).

Bertrand, Joseph Louis François, bär-trän, jō-sĕf loo-e frŏn-swä, French mathematician: b. Paris, 1822; d. 1900. He taught at the Polytechnic and Normal schools, and the College de France, and in 1884 became a member of the French Academy. He wrote treatises on arithmetic, algebra, calculus, thermodynamics, and probabilities, and in 1881 was appointed commander of the Legion of Honor.

Bérulle, bā-rül, Pierre de, French cardinal: b. near Troyes, 4 Feb. 1575; d. Paris, 2 Oct. 1629. He early showed remarkable mental acuteness and knowledge, and became distinguished for skill in controversy. He instituted, and was the first superior of, the order of Carmelites in France, and also founded the congregation of the Oratory notwithstanding the opposition of the Jesuits. He was a statesman as well as priest, and took a leading part in politics. He was often opposed to Richelieu, whose jealousy he excited, and who could not conceal his satisfaction at the news of his death. He accompanied the Princess Henrietta to England, on her marriage with the Prince of Wales. He shunned elevated positions, and was very unwillingly obliged to accept the hat of a cardinal. This elevation made no difference, however, in his humble way of life, and did not prevent him from sometimes taking part, as he had always done, in the servile work of the religious community to which he belonged. He was also a man of letters, and was the first to appreciate and encourage the genius of Descartes urging him, by his sense of obligation to his Creator, to make known to the world his discoveries. The most noted of his writings is 'Les Grandeurs de Jésus.'

Bervic, bār-vĕk, Charles Clement, French engraver: b. Paris, 1756; d. 1822. The works of Bervic are among the best of the French school, but are not numerous. The most celebrated of them is the full-length figure of Louis XVI., after a picture of Callot. The copies are very rare and dear, because the plate was broken to pieces in the revolutionary tumults of 1793. The exactness of his drawing, the firmness and brilliancy of his touch, the purity and correctness of his design, and the happiness with which he transferred to his plate the beauties of the original, gave a high character to his productions.

Berwick, James Fitz-James (Duke of), French marshal: b. Moulins, 1670; d. 1734. He was the natural son of the Duke of York, afterward King James II., and Arabella Churchill, sister of the Duke of Marlborough; and first went by the name of Fitz-James. He received his education in France, and served his first campaigns in Hungary under Charles, Duke of Lorraine, general of Leopold I. He returned to England at the age of 17, and received from his father the title of Duke. On the landing of the Prince of Orange in 1688 he went to France with his father, whom he afterward accompanied on the Irish expedition. He fought bravely and was wounded at the battle of the Boyne, 1 July 1690. He afterward served under Luxembourg in Flanders; in 1702 and 1703 under the Duke of Burgundy; then under Marshal Villeroi, and was naturalized in France. In 1706 he was made marshal of France, and sent to Spain, where he gained the battle of Almanza, which rendered King Philip V. again master of Valencia. In 1709 he went to take the command in Dauphiné, and the measures which he took to cover this and the neighboring provinces against the superior forces of the Duke of Savoy gained him a great reputation. In 1718 and 1719 he was obliged to serve against Philip V., who from gratitude to the marshal had taken a son of his into his service. On his entrance into the Spanish dominions he wrote to his son, the Duke of Liria, admonishing him to do his duty to his sovereign. At the siege of Philipsburg, on the Rhine, his life was terminated by a cannon-ball. His memoirs were published originally in French, and have gone through two or three editions in English. Consult Wilson, 'Duke of Berwick, Marshal of France' (1883).

Berwick-on-Tweed, England, a seaport town, once forming a county of itself, but now incorporated in Northumberland, on the north or Scottish side of the Tweed, within half a mile of its mouth. It is surrounded by walls which are well preserved, and along which is an agreeable promenade. The streets are for the most part narrow, steep, straggling, and irregular, though some of the principal ones are wide and open. The Tweed is crossed at the town by an old bridge of 15 arches, 1,164 feet long and only 17 wide, and by a magnificent railway viaduct of stone, 667 yards long and 184 feet in extreme height, with 28 semicircular arches. The chief industries are iron-founding, the manufacture of engines and boilers, agricultural implements, feeding-cake, manures of various kinds, ropes, twine, etc. The chief exports are grain, artificial manures, and herrings. A dock affording accommodation for large vessels was opened in 1876. In the beginning of the 12th century, during the reign of Alexander I., Berwick was part of his realm of Scotland, and the capital of the district called Lothian. Soon after this date it became populous and wealthy, was the chief seaport of Scotland, contained a strong castle, with churches, hospitals, and monastic buildings, and was created one of the four royal burghs of Scotland. In 1216 the town and castle were stormed and taken by King John. During the competition between Baliol and Bruce for the Scottish throne the English Parliament sat in Berwick; and in the hall of the castle Edward I. pronounced judgment in favor of Baliol. Bruce retook the town and castle in 1318; but, after undergoing various sieges and vicissitudes, both were surrendered to Edward IV. in 1482, and have ever since remained in possession of England. Pop. (1901) 13,437.

Ber'wickshire, a maritime county of Scotland, nominally divided into the three districts of Lauderdale, Lammermoor, and the Merse or March. The principal rivers of the county are the Tweed, the Leader, the Eye, the Whiteadder, and the Blackadder; and all except the last contain salmon, of which great quantities are shipped from Berwick for London. Vast quantities of agricultural produce are shipped from the ports of Berwick and Eyemouth, and much is also sent to Edinburgh, Dalkeith, Haddington, and Dunbar. Very few manufactures are established in this county, the principal one

which it supplies beyond domestic consumption being that of paper. The North Sea fisheries are of great importance. Berwick formerly abounded in strong castles and fortified places, traces of which are to be found everywhere. The county town is Greenlaw. Other small towns are Duns and Eyemouth. Pop. (1901) 30,816.

Ber'yl, a native silicate of aluminum and the rare metallic element glucinum (or "beryllium"), having the formula $3GlO.Al_2O_3.6SiO_2$, and crystallizing in the hexagonal system. It commonly has a specific gravity of 2.70, and a hardness of from 7.5 to 8. A portion of the glucinum is sometimes replaced by lithium, sodium or cæsium, and chemically combined water is also occasionally present. In the latter case the formula of the mineral appears to be $H_2Gl_6Al_4SI_{12}O_{37}$. Beryl is usually transparent or translucent, and in color may be green, blue, yellow, white, or light red. A variety which is transparent, and bright green from the presence of oxide of chromium, is known as "emerald," and is highly esteemed as a gem (see GEMS); the "Oriental emerald" (see SAPPHIRE), however, is not a variety of beryl), but a green variety of sapphire. A bluish-green variety of the common beryl, known as "aquamarine," is also used as a gem. Beryl occurs in all parts of the world, being commonly associated with granite. Its crystals are sometimes enormous in size, and two specimens from Grafton, N. H., are known, which weigh 2,900 pounds and 2½ tons, respectively. The finest emeralds (q.v.) are from Bogota; aquamarines (q.v.), from Siberia, Brazil, Maine, North Carolina and Colorado; golden beryls, from Connecticut and North Carolina.

Beryl'lium, a rare metallic element, called "beryllium" from the fact that it was first found in the beryl. Its salts have a sweetish taste, and from this circumstance the element itself has received the name glucinum (q.v.).

Beryx, bĕr'ĭks, the designation of a genus of deep sea fishes in tropical waters belonging to the group *Berycoidei* and family *Berycidæ. B. splendens,* deep red with bright streaks, is one of the most beautiful of the Cuban fishes.

Berzelius, ber-tsā'lĭ-ŭs, **Jöns Jakob** (BARON), Swedish chemist of distinction: b. Westerlösa, East Gothland, Sweden, 29 Aug. 1779; d. Stockholm, 7 Aug. 1848. The first fruit of his studies, and of a year's residence as assistant to a physician at the famous watering-place of Medewi, was the 'Nova Analysis Aquarum Medeviensium' (1800). After publishing a tract entitled 'De Electricitatis Galvanicæ in Corpora Organica Effectis' (1802), and taking his doctor's degree, he was appointed by the board of health in 1802 adjunct of medicine and pharmacy in Stockholm. In 1807 he became professor of medicine and pharmacy in Stockholm. Here, along with other medical practitioners, he instituted the Swedish Medical Society. In 1808 he was admitted a member of the Academy of Sciences at Stockholm, in 1810 one of its directors, and in 1818 its perpetual secretary. This office he continued to hold during the remainder of his life. In 1818 the king, while allowing him to retain his own name, made him a noble; and in 1835, on the occasion of his marriage with a daughter of Poppius, a councilor of state, he was named a baron. The existing state of chemistry is founded in a great measure on his discoveries and views, though, by the rapid development of the science, the edifice which he erected has undergone many alterations, and several defects have been discovered in it. Hence his views in regard to atomic weights, his electro-chemical theory, and his mode of procedure in organic chemistry, have met with many opponents. He discovered selenium and thorium, first exhibited calcium, barium, strontium, tantalum, silicium, and zirconium in the elemental state, and investigated whole classes of compounds, as those of fluoric acid, the metals in the ores of platinum, tantalum, molybdenum, vanadium, sulphur salts, etc. He introduced a new, or at least a wholly altered nomenclature and classification of chemical compounds. In short, there is no branch of chemistry to which he has not rendered essential service; and his labors are so numerous that, when the accuracy with which they have been executed is kept in view, it becomes almost incomprehensible how one man should have been able to perform them. It ought to be especially mentioned that he never rested satisfied with the bare investigation of isolated facts, but always extended his investigations over a wide field, so as to contribute to the advancement of chemistry as a whole. In addition to his numerous communications to the journals and periodicals of the period, may be mentioned, among his separate works, his 'View of the Composition of Animal Fluids,' 'New System of Mineralogy,' 'Essay on the Theory of Chemical Proportions,' and above all his 'Text-book of Chemistry,' which has been translated into most European languages. As secretary of the Academy of Sciences, he published an annual account of the progress of chemistry and mineralogy, which, having been continued during 27 years, extends to as many volumes. See Söderbaum, 'Berzelius, Werden und Wachsen' (1899).

Berzsenyi, bĕr'zhā-nyĭ, **Daniel,** Hungarian poet: b. Heyte, 1776; d. 1836. An authorized version of his 'Versei' appeared in 1813 and in 1816 was reprinted with his consent and speedily became classic in Hungarian literature.

Bes, an Egyptian god, represented clad in a lion's skin, with the head and skull of the animal concealing his features, and with a dwarfish and altogether grotesque appearance. He was supposed to preside over art, music, the dance, and childbirth.

Besançon, bĕ-zăń-sôń, France, a fortified town, capital of the department Doubs, 206 miles southeast of Paris. The town is surrounded by hills, covered with vineyards. The isthmus or peninsula on which it is built is composed of a mass of rocks crowned by the citadel, which commands the country toward the north, but the citadel itself is commanded by several eminences in the neighborhood, on which forts have been erected for the purpose of securing the approaches. Besançon is one of the strongest towns in France, and also one of the best built. The streets are spacious and well laid out, and the squares are adorned with fountains. The citadel is one of Vauban's finest works. There are here a theatre, a large and valuable public library, a museum, a botanic garden, school of artillery, lyceum, etc. The trade and manufactures are extensive. The latter comprise linen, cotton, woolen, and silk goods, ironmon-

gery, etc.; but the principal industry is watch-making. It employs about 15,000 workmen who make as many as 400,000 watches yearly. There are also extensive foundries, breweries, saw-mills, and tanneries. Besançon is the ancient Vesontio, Besontium, or Bisontium, which is mentioned by Cæsar, who drove the Sequani from it in 58 B.C., as a place of great extent and natural strength. Several of the streets and places still bear their old Roman names, and there are numerous Roman remains, especially a triumphal arch of the Emperor Aurelian, an aqueduct, an amphitheatre, and a large theatre. Pop. (1903) about 59,000.

Besant, bĕs-ănt, **Annie,** English theosophist and author: b. London, 1 Oct. 1847. She was married in 1867 to the Rev. Frank Besant, brother of Sir Walter Besant, but was legally separated from him in 1873. She manifested an earnest interest in social and political topics, and, in 1874, became connected with the National Secular Society. Owing to the publication of 'Fruits of Philosophy,' Mrs. Besant was prosecuted, in connection with Charles Bradlaugh (June 1877), but the prosecution failed. Mrs. Besant has since stated her disagreement with the sentiments expressed in this book. In 1883 she announced her adhesion to Socialism. For three years she was a member of the school board of London. She has been prominently connected with various socialistic movements, and a frequent speaker at meetings for workingmen, and in 1899 joined the Theosophical Society, and has since been active in theosophical propaganda in Great Britain and the United States. She visited the United States in 1891 and 1892–3 and lectured on Madame Blavatsky and reincarnation, and on theosophy and occultism. Among her numerous publications are 'Reincarnation'; 'Seven Principles of Man'; 'Autobiography'; 'Death and After'; 'Building of the Kosmos'; 'In the Outer Court'; 'Karma'; 'The Self and Its Sheaths'; 'Path of Discipleship'; 'Man and His Bodies'; 'Four Great Religions'; 'The Ancient Wisdom'; 'Three Paths to Union with God'; 'Evolution of Life and Form'; 'Dharma'; 'Avataras'; 'Ancient Ideals in Modern Life'; 'Esoteric Christianity'; 'Thought-Power'; 'The Religious Problem in India'; and in connection with G. R. S. Mead, translations of tracts and reviews.

Besant, bĕ-zănt', **Sir Walter,** English novelist: b. Portsmouth, England, 14 Aug. 1836; d. London, 9 June 1901. He was educated in London and at Christ's College, Cambridge, where he graduated with mathematical honors. He was for a time professor in the Royal College, Mauritius. His first work, 'Studies in Early French Poetry,' appeared in 1868, and to the field of French literature also belong his 'French Humorists' (1873), and his 'Rabelais' (1877 for the 'Foreign Classics' series). He was for years secretary to the Palestine Exploration Fund, and published a 'History of Jerusalem' (1871) in conjunction with Prof. Palmer, a life of whom he also wrote. The 'Survey of Western Palestine' was edited by him. He is best known by his novels, a number of which were written in partnership with the late James Rice, including 'Ready-Money Mortiboy' (1872); 'This Son of Vulcan'; 'The Case of Mr. Lucraft'; 'The Golden Butterfly' (1876); 'The Monks of Thelema'; etc. After Mr. Rice's death (1882) Sir Walter wrote: 'All Sorts and Conditions of Men' (1882), which led to the establishment of the People's Palace in London; 'All in a Garden Fair' (1883); 'Dorothy Foster' (1884); 'The World Went Very Well Then' (1887); 'The Ivory Gate' (1892); 'The Rebel Queen' (1893); 'Beyond the Dreams of Avarice' (1895); 'The Orange Girl' (1899); 'The Alabaster Box' (1900); 'The Story of King Alfred' (1901), etc. Among his other works are 'The Eulogy of Richard Jeffries' (1888). He labored for many years to promote the interests of all members of the literary profession, more especially in his capacity as editor of the monthly paper, 'The Author.' On 24 May 1895, he was knighted.

Be'show, the Alaskan pollack. See POLLACK.

Beside the Bonnie Brier Bush, a novel by Ian Maclaren (the Rev. Dr. John Watson), delineating Scottish character and life among the lowly. It consists of short sketches with no attempt at plot, but interest attaches to the well-drawn characters. It is one of the best examples of what has been styled the "kail-yard" school of fiction, whose principal exponents are Crockett, Barrie, and Watson.

Bes'ika Bay, an inlet of the Ægean Sea on the northwest coast of Asia Minor, opposite Tenedos, to the south of the entrance of the Dardanelles. The English fleet was stationed here during crises in the Eastern question in 1853–4 and 1877–8.

Beskow, bĕs'kŏv, **Bernhard,** Swedish dramatist: b. Stockholm, 19 April 1796; d. 17 Oct. 1868. He was ennobled in 1826 and appointed marshal of the royal household in 1833. He officiated for some time as director of the royal theatre, and is the author of several excellent tragedies, which were translated into Danish and German by Oehlenschläger, and of which 'Torkel Knutsson' is considered the best acting play on the Swedish stage. He wrote an opera, 'Trubaduren,' for which Oscar, the present king of Sweden, composed the music. His literary reputation was increased by his books of travel, by his poetical works, and by his contributions to the press. The great prize of the academy was awarded in 1824 to his poem 'Sveriges anor.'

Bessara'bia, a province in European Turkey since the Peace of Bucharest, in 1812, between Turkey and Russia. It extends in a northwesterly direction from the Black Sea, between the Pruth and the Dniester; area, 17,619 square miles. A portion of it at the southeast extremity was ceded to Turkey in 1856, but was restored in 1878. Agriculture is chiefly developed in the north, pasturage is most largely carried on the south, in the middle portion are extensive forests. It is watered by the Dniester, the Pruth, and the Danube. The inhabitants include Russians, Poles, Rumanians, Bulgarians, Germans, Armenians, Jews, etc. The capital is Kishenef. The products are salt, wool, tallow, leather, soap, etc. Pop. 1,782,900.

Bessa'rion, Johannes, or **Basilius,** Greek monk: b. Trebizond, 1389; d. Ravenna, 19 Nov. 1472. He was titular patriarch of Constantino-

ple, archbishop of Nicæa, afterward cardinal and legate to France, in the time of Louis XI. After having spent 21 years in a monastery of Greece, devoted to theology and literature, he left it to follow the Emperor John Palæologus to Italy, with the intention of being present at the Council of Ferrara, in the hope of uniting the Greek and Latin churches. They were accompanied by many Greeks, distinguished by their talents and dignity. Bessarion seconded with so much zeal the projects of Palæologus that he became odious to the Greek Church, while Pope Eugenius IV. rewarded him for his devotion to that of Rome, by the dignity of cardinal-priest. He was sent to France by Sixtus IV., to reconcile Louis XI. with the Duke of Burgundy, and obtain aid against the Turks. He did not succeed, and it is pretended that he received a personal insult from the king, which humiliation some suppose to have been the cause of his death.

Bes'sel, Friedrich Wilhelm, German astronomer: b. Minden, Prussia, 22 July 1784; d. 17 March 1846. An astronomical tract which he had drawn up brought him into communication with Olbers, who encouraged him in his labors, and procured for him the appointment of inspector of astronomical instruments to the University of Göttingen. In 1810 he removed to Königsberg, and in 1812–13 superintended the construction of the observatory of this town. From 1824 to 1833 he completed a series of 75,011 observations on the celestial zone contained between 15° N. and 15° S. declination. These observations included all the stars in the zone as far as the ninth magnitude. A dissertation which he published in 1844 contains important investigations on the variability of the movements of the fixed stars. An important share in the discovery of the new planet Neptune belongs to him, as in a paper read in 1840 he called attention to the existence of a planetary mass beyond Uranus, founding on considerations which were afterward happily proved to be correct. His principal works are an 'Essay on the Path Traversed by the Comet of 1807'; 'Astronomical Observations' during various years; 'Determination of the Length of the Pendulum Which Beats Seconds at Berlin'; 'Investigations and Measurements made with a View to Establish a Metrical Unit for Prussia'; 'Measure of the Distance of the Sixty-first Star of the Constellation of the Swan'; and 'Popular Lectures on Scientific Questions.' These last, consisting of papers which Bessel had read before the Physico-economical Society of Königsberg from 1832–44, were published in 1848.

Bes'sels, Emil, German naturalist: b. Heidelberg, 2 June 1847; d. Stuttgart, 30 March 1888. He was educated in the University of Heidelberg, and while an assistant at the Royal Museum in Stuttgart became interested in the subject of Arctic research. In 1869 he was a member of Petermann's expedition that sailed into the sea between Spitzbergen and Nova Zembla. In 1871 he came to the United States and was appointed both naturalist and surgeon to the expedition under Capt. Charles F. Hall, United States navy. Most of the scientific results of this expedition were gathered by his personal efforts, and published under the title of 'Report on the Scientific Results of the Polaris Expedition' (1876). In 1879 he published a German narrative of the expedition, illustrated with his own sketches. Later he returned to Germany, where he devoted himself to literary pursuits, art and geographical instruction.

Bes'semer, Sir Henry, English inventor of distinction: b. Charlton, Hertfordshire, 19 Jan. 1813; d. London, 15 March, 1898. He received mechanical training at an early age in the type-foundry of his father, a French artist, and going to London at 18 began his career as a modeler and designer. His earliest invention was an improved method of stamping deeds which the revenue office straightway adopted without giving him any compensation therefor. Late in life he brought the matter to the attention of the government and was then knighted (1879) in acknowledgment of his services in this particular. His inventive ability was next turned to the production of a new method of making bronze-powder or "gold" paint, as it was called, which proved a commercial success, and subsequent inventions of his were machines for making Utrecht velvet and improvements in type-casting machinery. At the time of the war in the Crimea he designed a projectile intended to revolve in its flight, but as the cannon of that day were not strong enough to permit of its use, he went on experimenting in Paris under the patronage of Louis Napoleon till he had secured a much improved kind of cast iron. This, however, did not fully satisfy him and he continued at work refining the iron until steel was produced. He took out patents for this invention in 1855, but persevered in experiments till at his London bronze factory steel ingots had been manufactured which could be rolled into rails without hammering. When this process had become fully developed the Bessemer Steel Works were built in Sheffield, where, besides employing a large number of workmen in steel manufacture, many others were trained for similar work in factories all over the world. On 13 Aug. 1856, he read before the British Association at Cheltenham a paper dealing with the invention which has made his name famous, "The Manufacture of Malleable Iron and Steel without Fuel." This was a new and cheap process of rapidly making steel from pig-iron by blowing a blast of air through it when in a state of fusion, so as to clear it of all carbon, and then adding just the requisite quantity of carbon to produce steel — a process which has introduced a revolution in the steel-making trade, cheap steel being now made in vast quantities and used for many purposes in which its price formerly prohibited its application. At the Birmingham meeting in 1865 he read a second paper "On the Manufacture of Cast Steel, Its Progress and Employment as a Substitute for Wrought Iron." The Bessemer process has not only stimulated the growth of the steel industry but greatly reduced the cost of manufacture and rendered steel available for rails and general engineering work. Since 1858, when the Sheffield works, the principal ones in England, produced less than 50,000 tons the amount manufactured has increased until in 1896 Great Britain produced 1,815,842 tons of Bessemer steel and the United States 3,019,906. In the past 50 years the Bessemer process has seen but few improvements of any importance.

SIR HENRY BESSEMER.

Beside his great invention, that of the Bessemer process, with others previously named, Bessemer was also the originator of a method still in use for compressing into a solid block the graphite employed in the manufacture of lead pencils; of a system of rollers for embossing and printing paper; of improvements in telephones; and of a ship with a stationary cabin, the latter the only failure of note in the long series of his inventions. In 1859 he received the Telford Medal of the Institute of Civil Engineers; and in 1872 the Albert Medal of the Society of Arts. He was president of the Iron and Steel Institute of Great Britain, 1871–3, and in 1879 became a Fellow of the Royal Society. Engineers have sometimes felt that Bessemer did not receive from his own government the honors that his distinguished services to British industrial development merited and that he was in effect more highly esteemed in the United States where eight localities and one railway bear his name. Bessemer was an honorary member of many foreign scientific and engineering societies, among which was the American Society of Mechanical Engineers. Before the latter, in December 1896, he presented a paper entitled "The Origin of the Bessemer Process," printed in its 'Transactions' (Vol. XVII. 1890). See STEEL MANUFACTURE.

Bessemer, Ala., a city in Jefferson County, on several trunk railroads; 12 miles southwest of Birmingham, the county-seat. It was founded in 1887 as a manufacturing place because of the valuable iron and coal mines in its immediate vicinity. It contains iron foundries, coke ovens, a number of blast furnaces, machine shops, planing mills, iron pipe works, fire brick works, and other works connected with the iron and steel industry. It has four banks, several weekly newspapers, electric lights, waterworks, and a property valuation of $3,000,000. It is governed by a mayor elected biennially and a city council. Pop. (1900) 6,358 within incorporated limits.

Bessemer, Mich., city and county-seat of Gogebic County, on the Chicago & N. W. and several other railroads; 40 miles east of Ashland, Wis. It is in an important iron mining and lumbering region; was founded in 1884, and has become important by reason of its mining and manufacturing and its trade relations with the surrounding territory. It has a good school system and a notably fine high school building, city-hall, stone court-house, a national bank, churches of all denominations, and weekly newspapers. Pop. (1904) 3,111.

Bessemer Steel Process. See BESSEMER, SIR HENRY; STEEL MANUFACTURER.

Bessey, Charles Edwin, American botanist; b. Wilton, Ohio, 21 May 1845. He was professor of botany in the Iowa Agricultural College in 1870–84; and has been professor of botany in the University of Nebraska since 1884. He was also president of the Society for the Promotion of Agricultural Science in 1883–5; president of the Nebraska Academy of Sciences in 1891; acting chancellor of University of Nebraska 1888–91 and 1899–1900; Fellow of the American Association for the Advancement of Science. His publications include: 'Reports on Insects' (1873–4); 'Geography of Iowa' (1876); 'The Erysiphei of North America' (1877); 'Botany for High Schools and Colleges' (1880); 'Essentials of Botany' (1884); 'Reports of the State Botanist of Nebraska' (1887 to 1892); 'Elementary Botany' (1904); 'Plant Migration Studies' (1905). He was editor of the department of botany of 'Johnson's Universal Cyclopædia,' in 1892–5; and is one of the editors of 'Science.'

Bessières, bĕs-yār, **Jean Baptiste** (DUKE OF ISTRIA), French marshal: b. Preissac, 6 Aug. 1768; d. Lutzen, 1 May 1813. Entering the army in 1792 as a private soldier, in less than two years he had attained the rank of captain. After making the Spanish campaign, he passed into the army of Italy, and soon attracted the notice of Napoleon, who took him to Egypt in 1798, where his conduct at St. Jean d'Acre and Aboukir covered him with glory. At the accession of Napoleon to the throne, he became marshal of France. He showed his usual conspicuous courage at Austerlitz, Jena, Eylau, and Friedland, and, raised to the rank of Duke of Istria, commanded in Spain in 1808–9. In the Russian campaign he led the cavalry of the Guard, and did much by his sleepless courage and presence of mind to save the wreck of the army in the disastrous retreat from Moscow. On the morning of the battle of Lützen he fell mortally wounded by a cannon ball.

Best, William Thomas, English musician: b. Carlisle, 13 Aug. 1826; d. Liverpool, 10 May 1897. In 1848 he was appointed organist of the Philharmonic Society in Liverpool; in 1852 he went to London and became organist of the Panopticon of Science and Art, and also of the Church of St. Martin-in-the-Fields; in 1854 was organist of Lincoln's Inn Chapel; in 1855 returned to Liverpool, and became organist of St. George's Hall; in 1868 was organist of the Liverpool Musical Society; and in 1872 was again engaged by the Philharmonic Society. He was the author of 'The Modern School for the Organ' (1853); 'The Art of Organ Playing' (1870); 'Arrangements from the Scores of the Great Masters' (1873); 'The Organ Student'; 'Organ Concertos'; 'Opera and Oratorio Songs,' etc.

Bes'tiaries, the name given to certain extremely popular books of the Middle Ages. In the written volumes, sometimes with copious illustrations, were given descriptions of animals, real and imaginary, which was which being left to the discretion or knowledge of the readers. They were composed in verse or prose or a mixture of both, and were designed not only as hand-books of zoology, but as teachers of morals as well. It was the fashion to attach spiritual meanings to the animals or their actions, until every quality of good or evil in the soul of man had its type in the beast world. It is to the bestiaries that we must look for explanation of the strange, grotesque creatures which are found sculptured on the churches and other buildings of the Middle Ages. The oldest Latin bestiaries had an early Greek original, the well-known 'Physiologus,' under which name about 50 such allegories were grouped. The Greek text of this famous work is found only in manuscript. There are old Syriac, Armenian, Ethiopic, Arabic, Icelandic, and numerous Latin versions. Editions of the Latin have been issued — Mai, Heider, and Cahier. An Old High German version was made earlier than the 11th century; in the 12th century, ver-

sions in French were made by Philippe de Thaun and Guillaume, a priest of Normandy. The 'Bestiary of Love' of Richard de Fournival was rather a parody upon the earlier form of such books. The following is a characteristic extract from the 'Divine Bestiary': "The unicorn has but one horn in the middle of its forehead. It is the only animal that ventures to attack the elephant; and so sharp is the nail of its foot, that with one blow it rips up the belly of that most terrible of all beasts. The hunters can catch the unicorn only by placing a young virgin in the forest which it haunts. No sooner does this marvelous animal descry the damsel than it runs toward her, lies down at her feet, and so suffers itself to be taken by the hunters. The unicorn represents our Lord Jesus Christ, who, taking our humanity upon him in the Virgin's womb, was betrayed by the wicked Jews, and delivered into the hands of Pilate. Its one horn signifies the Gospel truth, that Christ is one with the Father," etc.

Bestuzheff, bĕ-stoo'zhĕf, **Alexander Alexandrovitch,** Russian novelist and soldier: b. St. Petersburg, 3 Nov. 1797; d. 19 July 1837. Of his numerous novels, the most celebrated are 'Ammalat-Beg'; 'The Nadeshda Frigate'; 'The Terrible Prophecy.' His 'Private Correspondence' is highly prized. He was killed in battle in the Caucasus.

Bestuzheff-Ryumin, bĕ-stoo'zhef ryoo'men, **Count** (Michel Alexei Petrovitch), Russian statesman: b. Moscow, 1693, of a family of English origin, and of the second class of nobles in Russia; d. St. Petersburg, 24 April 1766. He entered the civil service under Peter the Great, and became a diplomatist. Under the Empress Anne he was made a member of the cabinet, and the Empress Elizabeth, whose fullest confidence he possessed, created him count, great chancellor of the empire, and his influence in the government was almost boundless. He was strongly opposed to the Prussian and French diplomatic influence, and was disliked on this account by Peter III., nephew and presumptive heir of Elizabeth. He concluded several treaties with England, Sweden, and Denmark, favorable to English policy. By a treaty concluded in 1747, he paved the way for the union of Schleswig and Holstein with the kingdom of Denmark. By his influence, the Russian troops supported Austria against Frederic the Great in the Seven Years' war. But their commander, Apraxin, retired to Russia, and this occasioned the fall of Bestuzheff. He was imprisoned and degraded, but Catharine II., in 1762, restored him to liberty and to his previous social position. He is regarded as the inventor of a chemical preparation known in medicine under the name of *tinctura tonica Bestucheffi.*

Be'tain, or **Be'taine,** an organic base, having the chemical composition $C_5H_{11}NO_2$, obtained from the juice of the common beet, or from beet-root molasses. It is not present in the beet-root in nature, but is obtained from it by the action of baryta or hydrochloric acid. The hydrochloride is one of its most important salts, and numerous others are also known.

Betanzos, bă-tän'thōs, **Juan Jose de,** Spanish adventurer of the 16th century. He settled at Cuzco, Peru, where he married a daughter of the inca and at the command of Mendoza, the viceroy, wrote an account of the conquest of Peru by Pizarro. It remained in manuscript till 1880, when it was published with the title, 'Suma y Narracion de los Incas.'

Be'tel, Betle, Pawn, or **Pinang,** popular Oriental names for various species of Piper, especially *P. betle,* and *P. siriboa,* climbing shrubs cultivated in the East for their leathery leaves which are used to a prodigious extent with bits of areca-nut and shell lime for chewing, particularly by the Malay races. The plants are trained upon trellises, poles, etc., in shady but hot and moist places, which in northern India are secured by means of sheds. Europeans do not take readily to the habit because the mixture is hot, acrid, astringent, abraids the mouth, temporarily destroys the sense of taste, reddens the lips as if they were covered with blood and blackens the teeth, which are sooner or later destroyed. At 25 years of age, habitués are often toothless. Among East Indian races the habit dates back more than 2,400 years and at the present time is as general as was the habit of using snuff among Europeans; the betel box is carried by old and young, men and women, and presented upon all occasions. Opinions differ as to the utility or perniciousness of this habit, some writers claiming advantages which in the face of the above-mentioned facts seem as far-fetched as like arguments in defense of the similar use of tobacco.

Betelgeuse, bĕt-ĕl-gẽrz', the star Alpha Orionis, the bright, reddish star in one of the shoulders of Orion. It varies somewhat in brightness, but in no regular period.

Beth Peor, bĕth pē'ôr (Hebrew, house of Peor), a city where the Israelites are said to have received the laws of Deuteronomy, and the supposed locality of Moses' burial. The precise locality of Beth Peor is undetermined, however, and various points have been suggested as probable sites, but the only theory which seems reasonably sure is that it stood somewhere among the Nebo-Visgah Mountains.

Beth'am-Edwards, Matilda, English author: b. Suffolk, 1836. She was privately educated, and has published numerous works in poetry, fiction, and on French rural life. She was made an officer of public instruction in France in 1891. Among her works are 'The White House by the Sea'; 'Kitty'; 'The Dream Charlotte'; 'France of To-day'; 'A Romance of Dijon'; 'The Lord of the Harvest,' a volume of poems, and an edition of Arthur Young's 'Travels in France.'

Beth'any, a village of Palestine, at the foot of Mount Olivet, on the eastern side, about two miles east of Jerusalem, where Lazarus dwelt and was raised from the dead, and where the ascension of Christ is related to have taken place. The house and grave of Lazarus, and the house of Mary Magdalene, are still shown to travelers.

Bethany College, a co-educational institution in Linsborg, Kan.; organized in 1881 under the auspices of the Lutheran Church; reported at the end of 1905: Professors and instructors, 60; students, 959; volumes in the library, 10,000; grounds and buildings valued at $120,000; income, $72,700; number of graduates, 809; president, Rev. E. F. Pihlblad, A.M.

Bethany College, a co-educational institution in Bethany, W. Va.; organized in 1841 under the auspices of the Church of the Disciples; reported at the end of 1905: Professors and instructors, 18; students, 265; volumes in the library, 67,000; grounds and buildings valued at $200,000; income, $9,000; president, T. E. Cramblet, A.M. LL.D.

Beth'el, a town of Palestine, about 10 miles from Jerusalem, now called Beitin, or Beiteen. The patriarch Jacob here had a vision of angels, in commemoration of which he built an altar. Interesting ruins abound in the vicinity.

Bethel College, an educational institution in Russellville, Ky.; organized in 1854 under the auspices of the Baptist Church; reported at the end of 1905: Professors and instructors, 8; students, 129; volumes in the library, 6,500; grounds and buildings valued at $62,500; productive funds, $125,000; income, $16,500; number of graduates, 275; president, Wm. H. Harrison, M.A.

Bethencourt, Jean de, bā-tŏn-koor, zhŏn dė, king of the Canary Islands: d. 1425. He was chamberlain to Charles VI. of France, but being ruined in the war with England, he sought to repair his fortunes in foreign countries, and made a descent from Spain on the Canary Islands in 1402. Not having sufficient force, however, he returned, and obtained reinforcements from Henry III. of Castile, with which he was successful, and was crowned king in 1404, under the title of Louis. He converted the greater portion of the Canaries to Christianity, and in 1405 received from the Pope the appointment of bishop to the islands. The following year he went to Normandy, where he passed the remainder of his days.

Bethesda, bė-thĕz'dą, a pool in Jerusalem, the name of which signifies "house of mercy." In the five halls or porticos near it many patients lay waiting, according to the account of John (ch.v.), for the moving of the waters, to bathe in. According to the belief of the Jews, an angel descended, at a certain time, into the pool and troubled the water, and whoever first entered the water after this agitation was cured. In 1888 a rock-hewn basin or reservoir was discovered, with five chambers adjoining, which is supposed to be identical with the pool of Bethesda.

Bethlehem, bĕth-lē-ĕm, or -hĕm, Palestine; a village five miles from Jerusalem, at the foot of a hill covered with vines and olive-trees; the birthplace of Jesus Christ. An aqueduct conveys water from the hill to the village. Its inhabitants are chiefly Christians, and make rosaries, crucifixes, etc., for pilgrims. There are three convents here, for Roman Catholics, Greeks, and Armenians, surrounding a stately church said to have been erected by the Empress Helena in 327, over the place where Christ was born. It is built in the form of a cross, and separate portions of it are allotted to the Latins, Greeks, and Armenians, respectively. On either side of the nave are two rows of beautiful columns, marking off two corresponding aisles. The top commands a fine view over the surrounding country. In a rich grotto, furnished with silver, and crystal lamps, under the choir of this church, a trough of marble is shown, and is said to be the manger in which Jesus was laid after his birth. Several other spots of interest are shown here. Bethlehem is also famous as the birthplace of King David. It was laid waste by Hadrian in 132 and since then has never been a place of great importance. Since the building of the church Bethlehem has been one of the great pilgrim shrines of Palestine. Pop. about 7,000, chiefly Christains, the Mussulman quarters having been destroyed in 1834.

Bethlehem, Pa., a borough in Northampton County; on the Lehigh River and canal, and the Lehigh V., the New Jersey C., and other R.R.'s; 57 miles north of Philadelphia. It was founded in 1741 by Moravians under Count Zinzendorf, and is the chief centre of that sect in the United States. It contains a Moravian theological seminary, a Moravian seminary for young ladies, more than a dozen churches, and two national banks. On the opposite side of the river, here spanned by two bridges, is South Bethlehem, the seat of Lehigh University (q.v.), the main offices of the Lehigh Valley Railroad Company, and a number of important manufacturing establishments, including silk mills, rolling mills, foundaries and machine shops, brass works, zinc oxid and spelter works, etc. Monocacy Creek separates Bethlehem from West Bethlehem, formerly a separate borough but now consolidated with Bethlehem borough. Bethlehem is attaining a conspicuous position in the musical world from the institution of an annual festival which has developed from the great love of the Moravians (q.v.) for music in their religious services, and especially for the compositions of John Sebastian Bach. The first organized festival was held in 1901. For musical and other ceremonies of the Moravian church see Moravian Church. Pop. (1907) Bethlehem, 17,000; South Bethlehem, 19,000.

Bethlehemites, an order of monks somewhat like the Dominicans, who settled in England in 1257. They were so named because they wore on the breast a five-pointed star in commemmoration of the star that appeared at the birth of Jesus. The order was comparatively insignificant and had only one convent in England (at Cambridge). An order of American Bethlehemites, sanctioned by Innocent XI. in 1687, was established in the city of Guatemala by a Franciscan monk named Bethencourt, a native of the island of Teneriffe, about 1655. A female order of Bethlehemites also was founded by Maria Anna del Galdo, who belonged to the Tertiaries of St. Francis. Twenty years later the privileges of the order were enlarged to an equality with those of the Augustinians, Dominicans, and Franciscans. The followers of Huss are sometimes called Bethlehemites, from the church in Prague in which Huss preached.

Bethlen-Gabor, bĕt-lĕm gä'bôr, or **Gabriel Bethlen,** Prince of Transylvania: b. 1580; d. 1629. He was of humble origin, but at the age of 17 he entered the service of Gabriel Bathori, prince of Transylvania, fought under his orders, and then repaired to Constantinople, where his courage gained him the esteem of the Turks. Prompted by ambition, he became ungrateful to his first benefactor; and after bringing Bathori into bad odor with both the Transylvanians and the Turks, managed to make the latter declare war, and actually headed a Turkish army against him. His treachery was suc-

cessful and in 1613 he was proclaimed prince of Transylvania. Shortly after, having succeeded in stirring up the Hungarians against the Emperor Frederick II., he took several towns, and in 1618 assumed the title of king of Hungary. Thereafter, supported by Turks and Tartars, he entered Austrian territory, laid waste Moravia, hemmed in the imperial army, and was on the eve of gaining a complete victory when the refusal of the Turks to undergo a winter campaign defeated all his hopes. The approach of Tilly compelled him to withdraw, and he was glad to conclude a peace which deprived him of his Hungarian title, but left him in possession of his conquests. While preparing for a new war against the imperialists he died of dropsy. He is said to have participated in 42 battles.

Beth'nal Green, England, an eastern suburban district and parish of London, in Middlesex County, now forming a parliamentary borough, having two divisions with two members. In 1872 a branch of the South Kensington Museum was opened in the district. Pop. (1891) 129,134.

Bethphage, bĕth'fāj (Hebrew, house of figs), a place of Scriptural interest, of which no trace is left. Its name was significant of its general location, but not of the particular site. "The place of figs," it must have been situated somewhere on the eastern slope of that range of hills extending north and south between Jerusalem and Bethany, at the foot of which in the western valley flowed the Kedron. The principal points of this range are the Mount of Offence and the Mount of Olives. The fig-tree still abounds both on the eastern and western slopes of the range, and even beyond Bethany toward Jericho. Some travelers have been disposed to place Bethphage on the site of the modern village of Abu Dis, lying south, and a little to the east of Bethany. Robinson thought this could not have been its position, and gave little credit to the tradition of the monks of the country, who place it between Bethany and the summit of the Mount of Olives, since there is no trace that a village of any description ever existed there. Lightfoot thought it was a district extending from the Mount of Olives to Jerusalem, and embracing a village of the same name.

Bethsaida, bĕth-sā'ĭ-da, a village on the west shore of the Lake of Galilee, the birthplace of Peter and Andrew and Philip. Its site has been identified with a heap of grass-grown ruins. At the northeast extremity of the lake was another Bethsaida, a village, near which the 5,000 were fed. Philip the Tetrarch raised it to the dignity of a town, and renamed it Julias, in honor of the Emperor Augustus' daughter.

Bethshemesh, bĕth-shē'mĕsh (Hebrew, house of the sun), a city of ancient Palestine, which probably occupied the site of the modern village, Ain Shems, about 15 miles west-southwest of Jerusalem, where extensive ruins are still remaining. The exploits of Samson were mainly in the neighborhood of Bethshemesh.

Bethune, bĕ-thoon', **Charles James Stewart,** Canadian educator: b. West Flamboro, Ont., 11 Aug. 1838. He was graduated at Trinity College, Toronto, in 1859; ordained deacon in the Church of England in 1861, and priest in 1862. He became incumbent of the Credit Mission in 1866, and in 1870 was appointed to the head mastership of Trinity College School, in Port Hope. He is well known as a writer on scientific subjects. He was the first editor of 'The Canadian Entomologist,' a monthly magazine. Resigning this place, he edited for a considerable time the entomological department of the *Canadian Farmer* and the *Weekly Globe.* In 1886 he again became editor of the 'Canadian Entomologist.' In 1892 he was elected a Fellow of the Royal Society of Canada.

Bethune, George Washington, American Dutch Reformed clergyman and poet: b. New York, 18 March 1805; d. Florence, Italy, 27 April 1862; was noted as an orator and a wit. He had charges at Rhinebeck, and Utica, N. Y., Philadelphia, Brooklyn, and New York city. Besides religious works, he wrote 'British Female Poets,' 'Lays of Love and Faith' (1847); several of the hymns in which are widely used. He also published an edition of Izaak Walton's 'Complete Angler' (1846); etc. See Life, by Van Nest (1867).

Bethune, bā-tün, France, a town in the department of Pas de Calais, 19 miles north-northwest of Arras. It stands on a rock washed by the Brette, and is a place of considerable strength. The appearance of the town is not prepossessing. There is, however, one fine square, the centre of which is occupied by an ancient belfry of remarkable construction, while the hotel-de-ville, among the best edifices in the town, forms one of its sides. The chief manufactures are oil, soap, and cloth. There are also distilleries, tanneries, and salt and sugar refineries. The trade is greatly favored by the canals of Lawe and Bassée, which meet here. The family of the lords of Bethune is very celebrated, and a branch of it was established in Scotland about the end of the 12th century. To this branch the celebrated Cardinal Beaton belonged. Pop. (1896) 11,627.

Betlis, or **Bitlis,** a town of Turkish Armenia, about 20 miles west from Lake Van. It is one of the most ancient cities of Kurdistan, situated in a wide ravine, traversed by a stream, on whose steep banks the town is built. The houses are of red stone, generally two stories in height, with grated windows to the streets. In the centre, on a high rock, is an ancient castle, formerly the residence of the khans of Betlis. The country around is fertile, well cultivated, and produces excellent crops of grain, cotton, hemp, rice, olives, tobacco of the best description, and excellent fruits and vegetables. The principal manufactures of the town are coarse cotton cloth and tobacco. Pop. about 30,000.

Betrothed, The. (1) A famous romance by Alessandro Manzoni — 'I Promessi Sposi.' It was its author's only romance, but it sufficed to place him at the head of the romantic school of literature in Europe. The scene of the story is laid within the country around Milan, and the plot concerns only the troubled and impeded but at last happily liberated course of true love between the humble peasant Renzo and his already betrothed Lucia. The religious motive of the book is sincere but not exaggerated, and never runs to fanaticism. Its original publication was in three volumes, and occupied two years, 1825–6, during which time it awakened a wide interest in European circles; and having been soon translated into all modern languages, it has become

probably the best known of all Italian romances to foreign readers. (2) A novel by Sir Walter Scott (1825), the scene of which is laid in the reign of Henry II. (3) An opera by **Pelrella,** first sung in 1869, at Lecco.

Betrothment, or **Betrothal,** a mutual promise or compact between two parties, by which they bind themselves to marry. The word imports giving one's troth, that is, true faith or promise. Formal ceremonies of betrothment are not the custom in the United States and Great Britain, as on the Continent, where the betrothment is either solemn (made in the face of the church), or private (made before witnesses out of the church). As betrothments are contracts, they are subject to the same rules as other contracts; for instance, that they are valid only between persons whose capacity is recognized by law; and the use of fraud, violence, or intimidation vitiates the contract. The consent of both parties, of course, is required. This may be expressed either verbally, or by writing, or by action. In Germany, the consent of the parents is always necessary, if the parties are under age, not yet *sui juris.* But if the parents withhold their consent unreasonably, the permission of the judge is allowed to sanction the contract. If the opinions of the parents are diverse, the law gives effect to that of the father. Betrothments contracted thus, according to law, are called *sponsalia publica;* others are called *sponsalia clandestina.* The latter are, in some places, utterly invalid; in others, only punishable. By the common German law, however, they are valid in every case in which consummation or consecration by the priest has taken place. The parents, in these cases, are not allowed to apply for a dissolution of the contract, nor can they refuse their consent, except for highly important reasons. Public betrothment induces the obligation to marry. In case of refusal to complete the contract by marriage, the injured party is allowed an action at law to compel its performance; but, since unhappy marriages are among the greatest misfortunes, the means of compulsion applied by the law are never great, amounting only to a small fine, or a short imprisonment. If circumstances take place which, if happening before the betrothment, would have necessarily prevented it, the party affected by them is allowed to recede from the engagement, and modern laws allow only an action for damages. In Germany, betrothment generally takes place in a small company of relations and friends. In Russia, it was once binding and indissoluble, like marriage, but is now a mere form accompanying the marriage ceremony. The contract is called by the Jews *thenaim rischonim.* In the laws of Moses there are certain provisions respecting the state of the virgin who is betrothed. Selden's 'Uxor Hebraica' gives the schedule of Hebrew contracts of betrothment. With the Jews, a young woman is rarely allowed to enter into an engagement without the cognizance of her relatives, who, in fact, in most cases, arrange matters for her, and generally avail themselves of the services of marriage brokers, who receive a percentage upon the amount of the dowry, beside a gratuity. In the continental cities these Jew marriage brokers have matches always on hand, with dowries varying from $5,000 to $200,000, and as soon as the betrothment has taken place they look upon the bargain as concluded; but cases frequently occur, in which on the day of the wedding the bridegroom breaks the match because the Austrian metalliques or Spanish Ardoins, tendered in payment for the dowry, have fallen in value, and reduced the dowry perhaps to the extent of 20 or 25 per cent. Among the ancient Greeks, the father made a selection for his daughter. The young couple kissed each other for the first time in the presence of their friends, and it was customary for the bridegroom to bring flowers daily, until the wedding day, to the house of his bride. The Arab sends a relative to negotiate about his intended bride, and the price at which she is to be had. The bridegroom of Kamchatka has to serve in the house of his prospective father-in-law before an engagement is allowed to take place. With the Letts and Esthonians no engagement is considered valid until the parent and relatives of the bride have tasted of the brandy which the bridegroom presents. Among the Hottentots, the would-be bridegroom is not allowed to propose without being accompanied by his father. Father and son walk arm in arm, with pipes in their mouths, to the house of the bride, where the engagement takes place. Among some of the indigenous tribes of America it was customary to keep the betrothed lady in durance for 40 days, as the superstition prevailed that she would exert an occult influence upon any thing she touched or anybody with whom she came into contact. During these 40 days the lady was kept on starvation fare, so that when the day of the wedding came she looked more like a skeleton than like a bride. See Pollock and Maitland, 'History of English Law' (2d ed. 1899).

Betsy and I Are Out, the title of a popular American poem by Will Carleton (q.v.), first printed in the Toledo *Blade* in 1872.

Betteloni, bĕt-tę-lō'nę, **Vittorio,** Italian poet: b. Verona, 1840. He was educated in Pisa, and became professor of Italian literature and history in the Female College in Verona. His verse proves him an adherent of that Italian classical school which dates from 1869, and includes 'In the Springtime' (1869); 'New Stanzas' (1880); and a translation of Goethe's 'Herman and Dorothea.'

Betterton, Thomas, English actor: b. August 1635; d. London, 28 April 1710. He was the son of an under-cook in the service of Charles I., and was apprenticed to a bookseller in London. His master, Mr. Rhodes, obtained a license for a company of players in 1659, and with him Betterton commenced his career. He was engaged by Davenant in 1662. His position was soon pre-eminent, and he became an established favorite. He seems to have had no personal graces from nature to second his rare talents, if the following account be true: "Mr. Betterton, though a superlatively good actor, labored under an ill figure, being clumsily made, having a great head, a short, thick neck, stooped in the shoulders, and had fat, short arms, which he rarely lifted higher than his stomach. His left hand frequently lodged in his breast between his coat and waistcoat; while with his right he prepared his speech; his actions were few but just; he had little eyes and a broad face, a little pockfretten; a corpulent body, and thick legs, with large feet; he was better to meet than to follow, for his aspect was serious, venerable, and majestic. In his latter time, a little para-

lytic; his voice was low and grumbling, yet he could tune it by an artful climax which enforced universal attention even from the fops and orange girls. He was incapable of dancing even in a country dance, as was Mr. Barry, but their good qualities were more than equal to their deficiencies.» Betterton had the rare faculty of identifying himself with his part. He married Mrs. Sanderson, an actress of almost equal merit with himself, whose Lady Macbeth was reckoned a perfect piece of acting. He was prudent and saving, but he lost his small means in a commercial speculation, and a theatre which he afterward opened was not successful. After his retirement from the stage, he reappeared in his old age a few times to take a benefit, his last appearance being 13 April 1710. He was buried in Westminster Abbey. See Howe, 'Thomas Betterton' (1891).

Bettinelli, bĕt-tē-nĕl'lē, **Saverio,** Italian author: b. Mantua, 1718; d. 1808. He studied under the Jesuits; entered, in 1736, the novitiate of this order, and taught from 1739 to 1744, belles-lettres at Brescia, where he made himself known by some poems composed for the use of schools. In Bologna, where he studied theology, he continued to cultivate his poetical talents, and wrote for the theatre of the college his tragedy of Jonathan. In 1751 he was intrusted with the direction of the college of nobles at Parma. After the suppression of the Jesuits in 1773 he returned to his native city, where he resumed his literary labors. His chief work is his 'Risorgimento negli Studj, nelle Arti e ne' Costumi dopo il Mille' (1775). The 'Lettere dieci di Virgilio agli Arcadi' attracted great attention, and its criticism of the older poets, particularly Dante, involved him in many contests. The best of his poems are his 'Versi Sciolti,' which though they do not show any great poetical power, are always elegant and ingenious.

Betting, the staking or pledging of money or property upon a contingency or issue. The processes of betting may be best illustrated in connection with horse-racing, which furnishes the members of the betting fraternity with their best markets. Bettors are divided into two classes — the backers of horses, and the book-makers, or professional bettors, who form the betting ring, and make a living by betting against horses according to a methodical plan. By the method adopted by the professional bettor the element of chance is as far as possible removed from his transactions, so that he can calculate, with a reasonable prospect of having his calculations verified, on making more or less profit as the result of a season's engagements. Instead of backing any particular horse, the professional bettor lays the same sum against every horse that takes the field, or a certain number of them, and in doing so has usually to give odds, which are greater or less according to the estimate formed of the chance of success which each of the horses has on which the odds are given. In this way, while in the event of the race being won (as is usually the case) by any of the horses entered in the betting-book of a professional bettor, the latter has always a certain fixed sum (say $1,000) to pay, he receives from the backers of the losers sums which vary in proportion to the odds given. Thus, if a book-maker is making a $1,000 book, and the odds against some horse is four to one, he will, if that horse wins, have to pay $1,000, while, if it loses, he will receive $250. It usually depends upon which horse it is that wins a race whether the book-maker gains or loses. If the first favorite wins it is evidently the worst thing that could happen for the book-maker, for as he is bound to receive the sum of the amounts to which all the horses except one have been backed, the largest deduction must be made from his total receipts on account of the first favorite. Very frequently the receipts of the book-maker are augmented by sums paid on account of horses which have been backed and never run at all. Sometimes, although not often, the odds are given upon and not against a particular horse. Books may also be made up on the principle of betting against any particular horse getting a place among the first three. The odds in this case are usually one fourth of the odds given against the same horse winning. Another mode of betting is that called a sweepstake, in which a number of persons join in contributing a certain stake, after which each of those taking part in the sweepstake has a horse assigned to him (usually by lot), which he backs, and the backer of the winning horse gains the whole stakes. If there are more persons taking part in the sweepstake than there are horses running some of them must draw blanks, in which case of course their stakes are at once lost.

At common law, wagers are not *per se,* void, but statutes prohibiting betting have been passed by many of the States. When one who loses a wager gets another to pay the money for him, an action lies for the recovery of the money. Wagers on the event of an election laid before the poll is open, or after it is closed, are illegal. In horse-racing, simple bets upon a race are unlawful both in England and the United States. In the case even of a legal wager, the authority of a stakeholder, like that of an arbitrator, may be rescinded by either party before the event happens. See Wager.

Betts, Craven Langstroth, American poet and story writer: b. New Brunswick, 23 April 1853. Besides translating 'Songs from Béranger' in the original metres, he has written 'The Perfume Holder, a Persian Love Poem'; with A. W. H. Eaton, 'Tales of a Garrison Town'; and 'A Garland of Sonnets.'

Betts, Samuel Rossiter, American jurist: b. Richmond, Mass., 8 June 1787; d. New Haven, Conn., 2 Nov. 1868. He practised law in Sullivan County, N. Y.; served in the War of 1812 and first became prominent when appointed judge advocate. He was a member of Congress 1815–17; circuit court judge, 1823–6; and United States district judge, 1827–67. As codifier of the maritime laws of the United States he exercised a clarifying influence upon such questions as salvage, wages, charters, insurance, seamen's wages, etc., and the formulation of the neutrality and patent laws. He published 'Admiralty Practice' (1838).

Betty, William Henry West, English actor, better known as the Young Roscius: b. Shrewsbury, 1791; d. London, 24 Aug. 1874. His first appearance was in Belfast, at the age of 11, when he assumed the role of Osman in 'Zara,' and achieved an immediate success. For almost five years after this he played the most

important parts before crowded and enthusiastic audiences, Pitt adjourning the House of Commons in 1805 on one occasion in order to permit members to witness the boy's Hamlet. He quitted the stage in 1808, but after studying for a while at Cambridge, returned to it in 1812, but failed to repeat his early triumphs. He retired finally in 1824, and lived for 50 years in the enjoyment of the fortune he had so early amassed.

Bet'ula, the generic name of birch (q.v.).

Bet'wa, a river in Hindustan, which takes its rise in the Vindhyan Mountains, near Bhopal, and flowing nearly 340 miles in a northeasterly direction through the provinces of Malwa and Allahabad, finally joins the Jumna below Kalpee. Near Erech a slight fall occurs. The country through which it flows is highly cultivated. The river at times is said to rise to a great height and in a portion of its course flows through beds of iron ore.

Beulah, bū'la, a region described in Bunyan's 'Pilgrim's Progress,' where there is nothing to annoy and all sounds are agreeable.

Beurnonville, bėr-nŏn-vēl, **Marquis de** (Pierre de Ruel, pē-ār de rü-ĕl), marshal of France: b. Champignolle, Burgundy, 10 May 1752; d. 23 April 1821. Originally intended for the Church, he chose the profession of arms and served in the East until 1789, when he was sent home by the governor of the Isle of Bourbon, his temper being quarrelsome. Arriving in Paris at the commencement of the Revolution, he identified himself at once with it, and in 1792 was appointed aide-de-camp to Marshal Luckner, and was soon after named general-in-chief of the army of the Moselle; in 1793 he became minister of war. Sent in 1793 to arrest Dumouriez, he was himself arrested by Dumouriez, and confined at Ehrenbreitstein, Eger, and Olmütz, until 1795, when he was exchanged, and became successively general-in-chief of the army of the north, inspector-general of infantry, ambassador to Berlin in 1800, to Madrid in 1802, and count of the empire. In 1814 he was commissioned by Napoleon to organize means of defense upon the frontier, and on the emperor's abdication was named minister of state and peer of France by Louis XVIII. On the return of Napoleon to Elba, he was proscribed by a special decree, and retired again, but was reinstated in all his dignities by Louis XVIII. after the battle of Waterloo. He became marshal of France in 1816, and marquis in 1817.

Beust, Friedrich Ferdinand, boist, frē-drih fêr'dē-nänd (Count von), Saxon and Austrian statesman: b. Dresden, 1809; d. 1886. He adopted the career of diplomacy, and as member of embassies or ambassador for Saxony resided at Berlin, Paris, Munich, and London. He was successively minister of foreign affairs and of the interior for Saxony. At the London conference regarding the Schleswig-Holstein difficulty he represented the German Bund. He lent his influence on the side of Austria against Prussia before the war of 1866, after which, finding his position in Saxony difficult, he entered the service of Austria as minister of foreign affairs, became president of the ministry, imperial chancellor, and in 1868 was created count. In 1871–8 he was ambassador in London, in 1878–82 in Paris.

Beutenmüller, boi'tĕn-mül-lėr, **William,** American entomologist: b. Hoboken, N. J., 31 March 1864. Educated in the public schools, he became in 1889 curator of the department of entomology in the American Museum of Natural History. He has written a useful work on butterflies and moths, and contributed to scientific and popular magazines over 100 articles on entomology. He has been president of the New York Entomological Society, and is editor of its 'Journal.'

Beuthen, boi'tĕn, Prussia, a town, province of Silesia, government of Oppeln, about two and a half miles from the Polish frontier. It has steam and electric tramways, and among buildings of note are the Roman Catholic Church of St. Mary (13th century), Protestant parish church (15th century), synagogue, royal Catholic gymnasium, higher girls' school, etc. It is an important centre of mining and metallurgy, having iron-works, zinc-works, lead-works, coal-mines, and various industrial establishments. Pop. (1895) 42,343.

Bevedero, bā-vā-dā'rō, Argentina, a lake in the province of Mendoza, consisting of two distinct bodies of water, called the Greater and Lesser Bevedero, connected by a river about eight miles long. Greater Bevedero is 40 miles in length from north to south, and from 3 to 25 miles in width. Lesser Bevedero measures about 22 miles by 15. The lake lies between 32° 45′ and 34° 17′ S. lat. and 66° and 66° 32′ W. lon.

Beveland, bā've-lănt, **North** and **South,** Netherlands, two islands in the province of Zealand, and formed by the mouths of the Scheldt. North Beveland lies east of the island of Walcheren, and is separated from South Beveland by the island of Wolfersdyke. South Beveland, the larger and more fertile, contains Goes, the capital, and several forts and villages. The united area of the islands is 120 square miles.

Beverages. Beverages are those drinks to which mankind resorts in order that he may relieve the pangs of thirst or supply some other demand of the system. In the beginning man's life was marked by its simplicity. Our first parents were content to eat the fruits that they found so convenient for their needs and it is doubtful if they knew any other beverage than the pure water coursing through the streams that irrigated the ground. It was not until they began to eat the flesh of beasts and searched the soil for delicacies to gratify their newly awakened appetite for a variety in foods that they felt the craving of unnatural thirst. But the eating of strong meats required the drinking of stronger drinks than water and in this fact we find the origin of the history of beverages.

It would be intensely interesting if we could know in just what way prehistoric man first satisfied his unnatural thirst for drink. It is, of course, more than probable that the second beverage discovered by man was the milk of the animals he slaughtered to gratify his taste for meat. From a temperate and hygienic point of view it was not a long stride from the waters of the brooks to the milk of cows and asses and yet it stands out as a landmark in the development of the demand for variety, the demand which may be regarded as the first tendency toward civilization. It is also quite probable that,

in the beginning, man drank his milk soon after it was drawn or while it was still fresh, but finally there came a day when some prehistoric investigator was bold enough to take a drink of the milk of mares that had been set aside, and from this fermented liquid learned the sensations of intoxication, for kumyss, still the favorite tipple of the Tartar, is unquestionably the most ancient of all intoxicating beverages.

To mankind, next to water, milk is still a favorite beverage, for it possesses the double advantage of being both food and drink. To the civilized taste the milk of cows is the most desirable but more barbaric taste calls for a stronger beverage and is best gratified by the milk of mares, asses, camels, or even reindeers.

It is undoubtedly true that if we ate only wholesome foods in such quantities only as our system requires; performed our work with regularity; enjoyed, at proper intervals, requisite rest and recreation, and avoided all such deleterious distractions as excitement and worry, water would be the only beverage that nature would demand. Of course, it is unnecessary to state that such an ideal condition could scarcely obtain in these days of modern civilization, and, as the result, it is just as impossible to deny the fact that man sometimes demands a drink that will have a tendency to stimulate or refresh the jaded system.

While it is the primary object of all beverages to relieve thirst nearly all of them also possess other properties that exercise more or less effect upon the body. For example, those drinks which contain the largest quantities of water pass most rapidly into the circulation, increasing the volume of blood. Diluting the food, they not only assist digestion but also aid in eliminating waste matter from the body through the ordinary channels. There are beverages that soothe and beverages that irritate, but all have their purpose. The former find their scope of usefulness in times of fever and cold, while the latter are stimulating irritants of great medicinal value.

Among the most useful beverages are those that best relieve the cravings of thirst, the sour liquids prepared from the lemon, or other fruit juices, which, while perhaps not acid in themselves, have been rendered acidulous by charges of carbon dioxide. While the carbonated and mineral waters have the greatest effect in eliminating waste matter from the system they are not so useful in this regard as the hot drinks, like tea, coffee, or even hot water, for they not only play their part in the elimination of waste but also cool the body by increasing the perspiration.

Particularly soothing are such mucilaginous or gelatinous liquids as barley water, flaxseed tea, and Irish moss. The mineral waters, malt liquors and light wines act with a tonic effect; the more common beverages, like tea and coffee and the milder alcoholic liquors are stimulating to the nerves, while tea and coffee, if milk and sugar are added, as well as chocolate, cocoa and the malt liquors may be classified as the nutritious drinks.

Next in popularity to milk are those unfermented beverages which are made from products of the vegetable world such as tea, coffee, cocoa, and chocolate. Although cocoa is by far the most ancient of these drinks, having been in use long before the stimulating qualities of either tea or coffee were discovered, coffee has long been in greatest demand. In fact, it has been estimated that about 500,000,000 people drink coffee daily, as against the 100,000,000 who drink tea, and the 60,000,000 who partake of chocolate and cocoa. In the United States alone some 500,000,000 pounds of coffee are consumed annually, as against 90,000,000 pounds of tea, and some 20,000,000 pounds of the various preparations of cocoa and chocolate.

There are several points of resemblance between all these table drinks, dissimilar as they are in appearance and flavor. In each case they exercise a stimulating effect, the caffeine of coffee and theine of tea being almost identical, while the theolronsine of chocolate and cocoa is but a slightly different principle. Each also contains the same bitter principle, tannin, and each owes its characteristic odor and flavor to an essential oil.

Coffee, which must be considered first, because of its great popularity, is the berry from the several species of the genus *Coffea*, of which *C. arabica* is the most important. First used in Abyssinia during the 9th century, it was later introduced into Arabia, and from there to Constantinople, where it had become popularized by the middle of the 16th century. It is supposed that it was Leonhard Rauwolf, a German physician, who introduced coffee into Europe in 1573. A few years later Prosper Alpinus brought some of the beans to Venice to use them as a drug, but it was many years before it was drank to any extent outside of Constantinople. In 1652, however, a coffee house was opened in London by the Greek servant of a merchant named Edwards, whose ships sailed to the Levant, and since that time the popularity of the beverage has never waned.

In its preparation as a drink coffee should not be boiled in water, but, instead, should be covered with water that has previously been boiled. Here it should be allowed to infuse for fully ten minutes, at a temperature little below the boiling point. As coffee does not contain as great a quantity of tannin as tea and does not yield it so readily, it may infuse longer without becoming bitter and indigestible, the effect which tannin exerts if it is boiled or left for too long a time over the fire.

Like many other beverages coffee exercises both good and evil effects upon the system. Stimulating the muscles, heart and nerves, its tendency is to overcome the ills of fatigue, while its strengthening effect upon the heart's action makes it a most valuable stimulant. At the same time its action upon the nervous system is so marked that over-indulgence in the drink is certain to be attended by such ill effects as insomnia, and nervous headaches, if not palpitation and general nervous disability.

Tea, which stands next to coffee as a table beverage, is a native of China where these shrubs of the *Camellia* family have been cultivated for more than a thousand years. It was once a general belief that there were many kinds of tea plants, but Robert Fortune, the botanist, exposed the myth by his thorough investigation of the various methods of cultivation and manufacture in use in the tea districts of China and India. It is now known, therefore, that while there are many variations in the tea plant, the varieties are all the same plant cultivated under

different conditions, while the two distinctive varieties, the green and the black tea, are the results of different methods of manufacture. Green tea, for example, is prepared by steaming the leaves before they have been rolled and dried, a method of procedure which produces a greater quantity of tannin.

As the flavor of tea as a beverage depends as much upon the quality of the water in which it is infused as upon the method of infusion, care should be taken to see that the water is neither too soft nor too hard, and that it has been well boiled before it is poured over the tea. The period of infusion, which is then continued at a lower temperature, should not last more than a few minutes, for the longer the infusion the greater the quantity of tannin that will be extracted.

Like coffee, tea has its good and evil effects. If infused too long it becomes bitter, unwholesome and indigestible. If drank too freely it not only induces insomnia and kindred nervous disorders but irritates the stomach, producing a serious kind of catarrh. At the same time it is a mild stimulant which refreshes the body and prepares the brain for intellectual energy. It is also beneficial in aiding one to withstand the ill effects of cold, fatigue and hunger. By producing perspiration it cools the body when heated, and, by means of its action upon the heart, it warms the body when cold.

While tea has been consumed in China and other parts of Asia since the latter part of the 6th century it was not introduced in European countries for more than one thousand years. Pepys mentions having tasted it for the first time in 1660, but the novel beverage must have met with almost instant recognition for, less than 18 years later, it was in general use in every part of England.

As both cocoa and chocolate contain starch and fat in considerable quantities they are among the most nutritious of the stimulating table beverages. Both are obtained from a small evergreen tree, native to tropical countries, for while the cocoa of commerce is prepared by grinding the seeds themselves, the commercial chocolate cakes contain the better parts of the berry, usually mixed with sugar and some distinctive flavoring. The preparation of the drink is a simple process, the cocoa or chocolate merely being dissolved in milk and boiling water.

Although by no means so popular as tea or coffee the drinking of mineral waters has become so general during the past century that they must now be regarded as among the most important temperance beverages. Early in the 16th century an attempt was made to produce artificial mineral waters, but it was not until the 18th century that chemistry had made sufficient progress to enable the experimenters to prove the elementary compounds of the waters both as to quality and quantity. In fact, the first unqualified success in this line of investigation was made by Dr. Frederick Adolphus Augustus Struve, a Dresden druggist, who celebrated his achievement by opening an artificial mineral water pavilion in that city, in 1820.

The alkaline and mineral waters which are so much in use to-day owe their distinctive characteristics to the preponderance of carbonate and bicarbonate of sodium as well as to the carbonate of potassium, lithium, calecum and magnesium which they contain, all of which tend to make them useful aids to the physician in the treatment of disease. The Vichy of France, for example, or the Ems of Germany, are extensively used in the dietetic treatments, correcting disorders of the stomach and acting as alkalinizers of the blood, bile and urine. In cases of gout, gall stones, rheumatism, dyspepsia, constipation, etc., they have proved of invaluable service and have also been used successfully in the treatment of obesity. In many instances their value as medicinal agents is enhanced by the addition of carbon dioxide, while, in other cases, they are made more palatable and easy of digestion by being served with milk. Among the natural mineral waters produced in this country are those of Saratoga, N. Y., Saint Louis, Mich., and Waukesha, Wis., all of which are well and favorably known to those who make use of such beverages.

Another class of drinks, the popularity of which is beyond question, are those beverages which contain alcohol as an active principle: beer, ale, wine, cider, and the many kinds of spirituous liquors that are now manufactured in almost every part of the world. In addition to the alcohol these beverages also contain such properties as tannin, sugar, carbon dioxide, or various acidulous substances, any or all of which exert an influence over the flavor of the liquid. As to alcohol itself it has so long been a bone of contention that it would be folly to attempt to review a century-long contest in a single article. Originally used exclusively as a medicine, and admittedly a valuable agent in the treatment of certain diseases it is to be doubted if even the moderate use of such liquors as beverages is not productive of far more evil than good, while the effect of immoderate indulgence in such liquid stimulants is too well known to require further discussion. In spite of all the warnings of science, however, man continues to gratify his craving for alcoholic preparations. Even in countries where the ordinary beverages of commerce are unknown, savage taste has learned to delight in the flavor of fermented liquors, and this desire even the most barbaric people have had ingenuity enough to gratify.

Beer, or lager, as it is more generally known in this country, is by no means a modern invention and no drink has continued to maintain a more steadfast hold upon the taste of man since the earliest days of civilization. The Egyptians manufactured beer from barley many hundred years before the Christian Era. Archilochus, 700 B.C., shows that the Greeks had learned the art of brewing, while we have such eminent authorities as Sophocles and Æschylus, Diodorus and Pliny to prove that the Greeks and Romans both made beer and loved it. Like the Gauls, the Romans called it Cerevisia, from Ceres, the goddess of field fruits, and there is ample history to prove that the art of making this beverage was known to man fully as early as the art of making wine from the grape. Prior to the invasion by the Romans the Britons were drinkers of milk and water although they occasionally drank mead, an intoxicating beverage made from honey. As Tacitus tells us that beer was the ordinary drink of the Romans, and beer and vinegar the favorite beverage of the soldiers of Julius Cæsar, it is not difficult to imagine why, so soon after his invasion, the Britons became a nation of beer-drinkers. Unlike the Romans,

however, they employed wheat instead of barley in their malting. In Germany, too, beer was introduced at a very early date. Charlemagne loved it dearly and not only compelled the best brewers in the land to become attachés of his court, but gave his personal attention to the subject so conscientiously that he was able to tell them how to improve their brew. As early as 1482 the monasteries of that country began to make beer and, by the 16th century, that beverage had become one of the chief exports of the country. In fact, the German brewer has always been recognized as one of the best beer makers of the world and it has only been within the past century that the success of their Austrian rivals has had a tendency to somewhat eclipse their glory. Centuries ago beverages known as beer were made in England by tapping such trees as the birch, maple, spruce, and ash for their juices, or by resorting to the properties contained in ginger and other roots, a practice which not only still prevails in that country, but that was brought to America by the first colonists, who loved these humble, harmless drinks too well to leave their recipes in the motherland.

Ale and porter, the heavier malted liquors which are so much used in England and the United States, cannot boast such ancient lineage as beer, but still there is reason to believe that it was a beverage like ale on which the Anglo-Saxons and the Danes loved to become drunken, and, fully as early as the reign of Henry II., the monks of England had become famous for their wondrous brews. In fact, it was due to the investigations of some of these fathers of the monasteries that the superior quality of the waters of Burton-on-Trent for brewing purposes was discovered, a discovery that has made the ales and porters of England world celebrated.

Wine, whose history is as old as that of civilization, is the most aristocratic of drinks. Ascribed to the gods by the ancients — to Dionysus by the Greeks, Bacchus by the Romans and Osiris by the Egyptians — there can be no question but that the use of the juice of the grape as a beverage was one of the first discoveries of civilized man. It is true that the very ancient Romans did not know it at the time when even the Israelites had learned the secret of its production, but, later, wine-making in Rome became such a general enterprise that Emperor Domitian ordered half of the vineyards destroyed that the more necessary wheat might be raised in the place of the grape.

According to the best authorities Asia was the country in which the vine first grew without the aid of man, while Armenia and Eastern Pontus were the lands in which the cultivation of the grape was first undertaken. From there the love of wine spread rapidly through all the lands of ancient civilization. Among the best known Asiatic wines was that of Chalybon, near Damascus, the beverages with which the tables of the Persian kings were constantly supplied, while the most famous Greek wines came from such places as Chios and Lesbos.

In ancient India and in Egypt priests were forbidden to drink, while the Jewish priests were only forbidden on days of religious services. In fact, the Hebrews were by no means as strict about the use of the wine cup as were some other nations and the fact that vine-culture was one of their favorite occupations is proved by history, both biblical and profane. Traditions state that it was the Phœnicians, the earliest of vine-growers, who carried the secret of wine making to Spain, Italy and France. They also established large vineyards on the islands of Chios, Mitylene and Tenedor.

As early as 550 B.C. the process of blending selected wines was known to the Carthaginians, while the ancient practice of adding turpentine to the wine for the purpose of preserving it was probably an invention of Italy. France, Spain, and Portugal are now the chief centres of vine-culture although the grape-growers in many parts of the United States, and particularly in the far Western States, have recently raised the making of wine to the dignity of a great American industry. Champagne, however, one of the most popular of wines, is a beverage of extremely modern invention when compared to other makes. Invented by Dom Perignon of Hautvillers about the beginning of the 18th century its use has become more and more general until it is now consumed by wine-lovers in all parts of the world. If wine is the most aristocratic, whiskey may be designated as the most democratic of drinks. Thoroughly cosmopolitan in character, in various countries it is distilled from various substances, but always, whether it is made from barley, corn, wheat, rye, or even from potatoes, it bears the same name and usually enjoys the same proportion of popularity. The word «whiskey» is a name that was bestowed upon this beverage by the Celts of Ireland and Scotland who began to make it about the middle of the 17th century. The word itself is a corruption of the Gaelic «uisge» (water), and closely interpreted means «strong water.» In the beginning this drink was used almost exclusively as medicine but as soon as it had become introduced as a beverage it became a favorite drink throughout Great Britain, and while the word «whiskey» once referred only to the Scotch and Irish drinks of that name, the rye and Bourbon whiskies of American manufacture are now consumed almost as generally as those made from recipes that have been handed down from the days of the ancient Celts.

Almost as strong as whiskey, brandy, the «brande-vin» or burnt wine, is a drink which is often used, both for medicinal purposes and as a beverage. Its name, as is indicated, was derived from the method of its manufacture, a formula for liquor making that has been followed for many generations and in many parts of the world. In Morocco the Jews use the refuse of the grape as well as such fruits as raisins, figs, dates and pears in its distillation, and they have become strongly attached to their strange drink because they believe that their freedom from that terrible disease, elephantiasis, always so common among the Mohammedans in that country, is due to the fact that they partake so freely of this unique spirit. Molière, in his travels, discovered a tribe on the Barbary coast which made excellent brandy from honey; in Persia it is the lees of the weaker sorts of wines that are distilled, and almost every country has its particular method of making this beverage. None of them, however, can compare in quality to the cognac of France, that rich distillation from wines which alone properly bears the name of «brandy.»

Gin is another distilled liquor. It is made

from rye, grain and malted barley, flavored with juniper-berries and sometimes with turpentine. It is also known as Hollands, and as Holland gin, these names being a relic of the days when the beverage was called Holland-Geneva, the word "gin" being a corruption of the word "Geneva." Although originally made in Holland it was soon introduced into England where it immediately became one of the most popular of drinks. Easily manufactured and always strong it could be sold so cheaply that it was finally found necessary to adopt strict legislative measures restricting its sale and consumption. Hogarth's horrible picture, 'Gin Lane,' which was one of the influences in bringing about the much needed reform, is said to have been but slightly an exaggeration of the actual conditions which existed in all the large English cities during the reign of gin.

Rum, formerly spelled as the French still spell it, "rhum," is a spirit which is distilled from the sugarcane juice, from the skimmings of the juice from the boiling house, or from the molasses mixed with the lees of former distillations. Although not so commonly used as some of the other strong liquors rum has been known both for its medicinal value and as a beverage ever since its introduction from the West Indies, more than a century ago.

The following are among the drinks which are not so generally known but which are in common use among the people of other countries:

Arrack, a drink manufactured widely in the East and West Indies, is much used by the natives. In making it it is sometimes distilled from the fermented juice of the palm tree, and sometimes from a combination of rice and molasses used in connection with the palm-tree juices.

Vodka, which is the chief source of intoxication in Russia, is a liquor which may be distilled either from rye or from potatoes.

In several parts of the world the sap of trees is called into requisition to satisfy the thirst for intoxicants. Pulque, for example, the beverage most commonly used in all Spanish-American countries, is made from the fermented sap of the aloe, while a somewhat different drink, called Tepache, is made by mixing sugar and water with this sap of the aloe, which afterward is allowed to ferment for a few hours only. In Tasmania the so-called "cider-tree" furnishes the bushmen with a means of intoxication. In this case the sap is of such a character that it may be drank as soon as it is drawn from the tree, in which state it is both refreshing and harmless, but when it is allowed to stand for some time it becomes an intoxicant of great potency.

The Soma of the Hindus is supposed by some to have been the original intoxicant of the human race. The Persians, who accept this tradition, revere the beverage as Haoma, while in India it is looked upon as the beverage of the mighty god, ever-giving new strength and new vigor. It is a milky fluid which is found in the climbing bindweed, and, when properly fermented, is extremely "heady."

Sake, the commonly used distilled liquor of Japan, is made entirely from rice, as also is Samshee, a drink used by the lower classes in China.

Kvass is the name of a sour beer much favored by the Russian peasantry. It is made from barley and rye, by a similar malting process as that applied to the manufacture of beer.

The natives of South America have a drink which they call Guarapo, which is made from the fermented juice of the sugarcane.

Chi-chi is the name of a peculiar kind of cider which is made by the natives of Patagonia. In brewing it, in the autumn when the apples are ripe, they dig large pits which they line and interline most carefully with hides in order that none of the juice may soak into the earth. Into these hides they throw the ripe apples which are left to decay and ferment until they are ready for use. It is then extremely intoxicating.

A drink called Kephir is drunk by the natives of the Caucasus. It is an effervescing milk-like liquid, the effervescence being caused by the introduction of horny, yellowish-brown masses called "Kephir-grains." Kern, who made a scientific examination of these grains, discovered that they were made of a rod-like bacterium and a yeast-like substance that was entirely unknown to him. Not unlike Kumyss in appearance and in taste, Kephir is far more intoxicating.

Kava, or ava, is a Polynesian drink which is made by macerating in water a portion of the root and stem of one of the piperaceæ.

There are several substitutes for tea in use in various parts of the world. In some of the Pacific Islands there are "tea-trees," while the natives of Tibet are very fond of their "brick tea," which is made from the offscourings and dust of the leaves and stems of the tea plants. It derives its name from the fact that the dust is pressed into hard, solid brick-shaped lumps, from which pieces are chipped off as they are to be used.

MILES BRADFORD,
Author of 'Carlotta and I.'

Beveridge, Albert Jeremiah, American lawyer: b. Highland County, Ohio, 6 Oct. 1862. He was brought up on a farm; graduated at De Pauw University; and engaged in law practice in Indianapolis. He entered political life in 1883, and soon won a reputation as an effective orator. On 17 Jan. 1899, he was elected United States senator for Indiana, as a Republican. Soon after his election he went to the Philippine Islands; made a thorough study of political and material conditions there; and, on the assembly of Congress in December following, delivered a thrilling speech in the Senate in support of the administration's policy concerning the new possessions in the East.

Beveridge, Kühne (COGHLAN), American sculptor: b. Springfield, Ill., 31 Oct. 1877. She studied under Rodin in Paris and O'Donovan in New York, and in 1893 married Charles Coghlan. Her works have been exhibited in New York, London, and Paris. She obtained honorable mention at the Paris Exposition of 1900.

Beveridge, William, English divine: b. Barrow, Leicestershire, 1637; d. Westminster, 1708. He studied at St. John's College, Cambridge, devoting his attention particularly to Oriental literature. In 1658 he published a work on Eastern tongues, especially Hebrew, Chaldee, Syriac, Arabic, and Samaritan, accom-

panied with a Syriac grammar. In 1660 he took orders, and obtained the vicarage of Ealing in Middlesex, where he wrote a useful 'Introduction to Chronology.' In 1672 he was appointed to the rectory of St. Peter, Cornhill, London, and the same year published his 'Synodicon' in two folio volumes, containing the Apostolic canons, decrees of the councils received by the Greek Church, and the canonical epistles of the early Fathers. This work called forth an opponent, to whom Beveridge replied in a 'Vindication.' In 1674 he obtained a prebend in St. Paul's, and in 1681 was appointed archdeacon of Colchester. In 1684 he became prebendary of Canterbury, and in 1688 was appointed chaplain to William and Mary. Shortly after, the see of Bath and Wells was offered him; but as it had become vacant by the conscientious refusal of Bishop Ken to take the new oaths, Beveridge, to his honor, declined to accept it. The episcopal dignity, however, was only delayed; in 1704 he became bishop of St. Asaph. Among his best-known works are 'The Church Catechism Explained'; 'Private Thoughts upon a Christian Life'; and 'The Great Necessity and Advantage of Public Prayer and Frequent Communion.' Collective editions of his works were published in 1824 and in 1842–6.

Beverley, Saint John of, English divine: b. about the middle of the 7th century at Harpham, Yorkshire; d. Beverley, 721. He was educated at Canterbury under Archbishop Theodore, and became a monk under Hilda in the monastery founded by her at Whitby. In 687 he was appointed to the see of Hexham, and in 705 was transferred to York. He founded a convent of nuns at Beverley, and built the choir of the church there. He resigned his bishopric and retired to Beverley in 718. Bede, who is said to have been his pupil, speaks of him with great veneration. He was canonized in 1037, and his remains were placed in a costly shrine, in Beverley minster. His fame was so widespread that when William the Conqueror led his army to the north and ravaged the country he saved the town of Beverley out of respect to the memory of the bishop. In 1416 Archbishop Chicheley ordered the anniversary of his death to be celebrated as one of the festivals of the Church, and special privileges were conferred on his church at Beverley by several English sovereigns. He is said to have written an 'Exposition of Luke' and 'Homilies on the Gospels.'

Beverley, Constance de, in Scott's poem 'Marmion,' a nun who for love of Marmion follows him in the disguise of a groom, and on being thrown over by Marmion is immured at Holy Isle for breach of her vow of chastity.

Beverley, Robert, American historian: b. Virginia, 1675; d. 1716. He was educated in England and about 1697 became clerk of the Council of Virginia and had charge of the records of the colony. He was the author of a 'History of the Present State of Virginia,' published in 1705, a most interesting account of the details of the daily life in colonial Virginia. A reprint was published in Richmond in 1855.

Beverley, England, a municipal borough and capital of the East Riding of Yorkshire, 29 miles east-southeast from York and a mile from the river Hull. It stands on the eastern edge of the Wolds, and on a branch of the Northeastern Railway, and consists of a principal street above a mile in length, and several minor streets, all spacious and tolerably well built. Its most remarkable edifice is the minster of St. John, in the Decorated and Perpendicular English styles, and one of the finest specimens of ecclesiastical architecture in the kingdom, its west front in the opinion of excellent authorities surpassing in magnificence that of York minster. Other churches are St. Mary's and St. Nicholas'. Among the other chief buildings are the guildhall and corn exchange. The chief manufactures are leather, iron castings, agricultural implements, whiting, linseed oil and cake, manures, wagons, cement, and ale. Its environs abound with beautiful walks. It sent two members to Parliament till disfranchised in 1870. Pop. (1901) 13,185. See Hiatt, 'Beverley Minster' (1900).

Beverly, Mass., a city in Essex County, on the Boston & M. R.R.; two miles north of Salem. It was founded 14 Oct. 1668; was incorporated as a city 23 March 1894; contains several villages; and is connected by trolley lines with Salem, Peabody, Gloucester, and Wenham. It is the seat of the New England Institute for the Deaf and Dumb; is principally engaged in the manufacture of women's boots and shoes, and leather; has considerable shipping and fishery interests; contains high and graded schools, a public library, a national bank, a number of handsome residences belonging to Boston business men; and has a property valuation exceeding $16,000,000. Pop. (1900) 13,884.

Beverly Farms, a name given to the eastern portion of the town of Beverly, Mass. It is a favorite summer residence for wealthy Bostonians and contains many beautiful mansions and park-like estates. In recent years it has endeavored to secure incorporation as a separate town.

Beverly's Ford, Va., scene of a sharp cavalry fight during the Civil War, between Buford, Pleasanton, and Gregg, commanding 9,000 Federals, and Stuart leading 12,000 Confederates. Hooker had sent Pleasanton to find Stuart, who was said to be near Beverly's Ford. Pleasanton planned to surprise the Confederates, but his plan miscarried. Stuart was fully prepared for him. Pleasanton was badly beaten. This action is also known as the battle of Brandy Station.

Be'vis of Hampton, Sir, a legendary English knight who has been made the hero of mediæval romances by both English and Continental writers. He was the son of Sir Guy, Earl of Hamtoun, who was treacherously murdered by Divoun, emperor of Almayne, he was given by his false mother to some heathen merchants to be sold for a slave among the Paynim. By them he was carried to Ermony, where he soon became dear to King Ermyn, and dearer still to his only daughter, the lovely Josian. His chief exploits were the overthrow of Brademond of Damascus, of a monstrous boar, of the giant Ascapard, whom he spared to become his squire, and of a dreadful dragon near Cologne. His famous sword "Morglay" he won in battle; his horse "Arundel" was the gift of Josian. Still more romantic episodes in his story are his carrying his own death-warrant in a sealed letter to the vassal Brademond; his escape from his noisome dungeon after seven years' imprisonment; and recovery of his wife,

who had preserved his love, though nominally the wife of King Ynor of Mombraunt. He next returned to England to avenge his father's death, then sailed for Ermony and defeated Ynor in a desperate battle. His last great fight was in the streets of London, when he slaughtered 60,000 citizens and forced King Edgar to grant him terms. Thirty-three years he then spent in love and perfect happiness at Ermony, dying at the same moment as his wife, while his famous steed Arundel had died just before. The romance was edited by Dr. E. Kölbing for the Early English Text Society in 1885.

Bewick, bū'ĭk, **Thomas,** English wood-engraver: b. Cherryburn, Northumberland, 12 Aug. 1753; d. Gateshead, 8 Nov. 1828. He early showed a great talent for drawing, and was apprenticed to an engraver in Newcastle. The celebrated Dr. Hutton, of Woolwich, then a schoolmaster in Newcastle, was preparing his great work on mensuration, and having employed Bewick's master in getting up the woodcuts for illustrating it, the execution of these was entrusted to the young apprentice. Bewick performed the work so admirably that his master advised him to turn his attention to wood-engraving, and accordingly with this view he proceeded to London. He returned, however, to Newcastle after a short time, and established himself there in partnership with his former master. His turn of mind led him to the study of natural objects, more especially animals; and in 1790 appeared his 'History of Quadrupeds,' the beauty of the illustrations of which attracted universal attention, so superior were they to anything hitherto produced by the art of wood-engraving. In 1797 appeared the first, and in 1804 the second volume of his 'British Birds,' generally regarded as the finest of his works. Bewick has never been surpassed in his spirited delineations of animals, and the admirable naturalness with which the accessories and backgrounds of the drawings, such as foliage, grass, and other rural objects, are represented. The tail-pieces to chapters throughout his works are of the highest excellence, and often display a rich vein of humor. His illustrated edition of 'Æsop's Fables' appeared in 1818. See Clement, 'Painters, Sculptors, Architects, and Engravers' (Boston, 1899); Dobson, 'Thomas Bewick and His Pupils'; Tytler, 'Modern Painters.'

Bewley, Anthony, American abolitionist b. Tennessee, 22 May 1804; d. Fort Worth, Texas, 13 Sept. 1860. A Methodist clergyman opposed to slavery, in 1858 he was driven from Texas for preaching according to his convictions. Against the advice of friends he returned in 1860, but remained only a few weeks, being again obliged to flee for his life. A reward of $1,000 was offered for his apprehension; he was seized in Missouri, carried to Fort Worth, and there hung by the mob, the only reason for whose act was that he had maintained human slavery to be unjust.

Bey, bā, among the Turks, signifies a governor of a town, seaport, or small district. The Turks write the word beg (q.v.).

Beyer, bī-ẽr, **Samuel Walker,** American geologist: b. Clearfield, Pa., 15 May 1865. He graduated at Iowa State College, 1889, and at Johns Hopkins University 1895. He is professor of geology and mining engineering in Iowa State College. As special assistant on the Iowa Geological Survey he has prepared reports on the geology of Boone, Marshall, Story, and Hardin counties, and annual reports on the mineral productions of the State. In 1897 he was a delegate to the International Geologic Congress at St. Petersburg.

Beyle, Marie-Henri, bāl, mä-rē-ŏñ-re (pseudonym De Stendhal), French author: b. Grenoble, 23 Jan. 1783; d. 23 March 1842. He held civil and military appointments under the empire; took part in the Russian campaign of 1812; thence until 1821 lived at Milan, chiefly occupied with works on music and painting. After nine years' residence at Paris he became in 1830 consul at Trieste, and in 1833 at Civita Vecchia. In 1841 he returned to Paris, where he died. The distinguishing feature of his works was the application of acutely analytic faculties to sentiment in all its varieties, his best books being the treatise 'On Love' (1822); 'The Red and the Black' (1830); 'History of Painting in Italy' (1817); 'Racine and Shakespeare' (1827); and 'Life of Napoleon,' etc. A collective edition of his works appeared in 18 volumes in 1855–6, and his 'Correspondance Inédite' in two volumes in 1855.

Beyrout. See Beirut.

Beza, bē'zą, or **de Bèze,** dė bāz, **Theodore,** Calvinistic divine: b. of a noble family at Vezelay, in Burgundy, 24 June 1519; d. 13 Oct. 1605. He was educated in Orleans under Melchior Volmar, a German philologer devoted to the Reformation; and, early familiar with the ancient classical literature, he became known at the age of 20 years as a Latin poet, by his petulant and witty 'Juvenilia' (a collection of poems of which he was afterward ashamed). In 1539 he was made a licentiate of law, and went to Paris. He received from his uncle the reversion of his valuable abbey Froidmond, and lived on the income of two benefices and on property which he inherited from a brother. His habits were dissipated, but a clandestine marriage in 1543 recalled him from his excesses, and a dangerous illness confirming the intention which he had formed at Orléans of devoting himself to the service of the Reformed Church, he went to Geneva with his wife in 1547. Soon after he accepted a Greek professorship at Lausanne. During his 10 years in this office he wrote a tragi-comic drama in French,—'The Sacrifice of Abraham,'—which was received with much approbation; delivered lectures (which were numerously attended) on the Epistle to the Romans and the Epistles of Peter (which served as the basis of his Latin translation of the New Testament, of which he afterward published several editions); finished Marot's translation of the Psalms in French verse; and obtained to such a degree the confidence of the Swiss Calvinists that he was sent in 1558 on an embassy to the Protestant princes of Germany to obtain their intercession at the French court for the release of the Huguenots imprisoned in Paris. In the following year he went to Geneva as a preacher, and soon after became a professor of theology and the most active assistant of Calvin, to whom he had already recommended himself by several works, in which many of the views of that eminent theologian were advocated with great zeal and no small measure of ability, so that he was generally regarded as Calvin's ablest

coadjutor, and the person destined to be his successor. His talents for negotiation were now often put in requisition by the Calvinists. He was sent to the court of Anthony, king of Navarre, at Nerac, to obtain toleration for the French Huguenots; and at his desire he appeared, 1561, at the religious conference at Poissy, where he spoke in behalf of his party with a boldness, presence of mind, and energy which gained him the esteem of the French court. He often preached in Paris before the queen of Navarre and the Prince of Condé; also in the suburbs. At the conference of St. Germain, in 1562, he spoke strongly against the worship of images, and after the commencement of the civil war accompanied the Prince of Condé as chaplain, and on the capture of the prince joined Admiral Coligny. After the restoration of peace he returned to Geneva in 1563, where, besides discharging the duties of his offices, he continued to engage in theological controversies in support of the Calvinists; and after Calvin's death in 1564 became his successor, and was considered the first theologian of this Church. He presided in the synods of the French Calvinists at La Rochelle (1571) and at Nismes (1572), where he opposed Morel's proposal for the alteration of clerical discipline; was sent by Condé (1574) to the court of the Elector Palatine; and at the religious conference at Montpellier (1586) opposed the theologians at Würtemberg, particularly James Andreas. At the age of 69 years he married his second wife (1588), and still continued to repel, with the power of truth and wit, the attacks and calumnies which his enemies, apostatized Calvinists (such as Bolsec), Lutherans, and Jesuits, heaped upon him. They reported in 1597 that he had died, and returned before his death to the Roman Catholic faith. Beza, now 78 years old, met his assailants in a poem full of youthful enthusiasm, and resisted in the same year the attempts of St. Francis de Sales to convert him, and the alluring offers of the Pope. In 1600 he visited Henry IV. in the territory of Geneva, who presented him with 500 ducats. Among his many works, his exegetic writings, and the able and correct 'History of Calvinism in France from 1521 to 1563,' which is ascribed to him, are still much esteemed. Beza's name is associated with the Codex which he presented to the University of Cambridge, for an account of which see BIBLE.

Beza's Codex. See BIBLE.

Bez'ant, a round, flat piece of pure gold, without any impression, supposed to have been at one time the current coin of Byzantium. Bezants are frequently employed as one of the charges in heraldry, a custom supposed to have been introduced by the Crusaders. Its value was about $2.

Beziers, bā-zē-a, France, a town in the department of Hérault, 38 miles southwest of Montpellier; situated on a height above the Orb, and on the Canal du Midi, a few miles from the Mediterranean, to which there runs a tramway line. It is surrounded by old walls, and though its streets are narrow, it is tolerably well built. Its most conspicuous edifice is the cathedral, a Gothic structure, crowning the height on which the town stands, and possessing a fine semicircular choir surrounded by columns of red marble. The city has a communal college, a museum, a library, and a society of economics and archæology. Its manufactures consist chiefly of woolens, silks, hosiery, chemicals, spirits, etc. In 1209 it was the scene of a horrible massacre of the Albigenses by Simon de Montfort, in which 20,000 persons were killed. Pop. (1896) 48,012.

Bezique, a card game which crystallized into official form in 1887. Two packs of cards are used, two players participate and the cards rank, ace high, then ten, king, queen, knave, nine, eight, and seven. All cards below that are discarded from both packs. Eight cards are dealt to each player. Trumps may be determined either by turning up the first card of the stack or by the suit of the first marriage. The non-dealer leads for the first trick, and the winner of each trick has the succeeding lead. After each trick, each player draws one card from the top of the stack, the winner of the trick taking the top card. The playing is as in whist, the leader taking the trick unless his opponent plays a higher card of the same suit or a trump. It is not necesssary to follow suit until the stack is exhausted, when one must do so and take each trick, if possible. Counting is done by means of the values of the cards; each ace or ten-spot taken in a trick counts 10, the winner of the last trick of each hand scores 10, and if the trump is turned, both sevens count 10 for the turner, and if one exchanges from his hand a seven of trumps for another turned trump or if one declares the other seven of trumps 10 more is scored. The game is won by the player who first makes 1,000 points, and if his opponent has not made 500 the game counts double. There are certain combinations of cards other than the above, which, when declared, count as follows: Double bezique (both queens of spades and both knaves of diamonds) 500; sequence of five highest trumps, 250; and 4 aces, 100; any 4 kings, 80; any 4 queens, 60; any 4 knaves, 40; bezique (queen of spades and knave of diamonds), 40; royal marriage (king and queen of trumps), 40; marriage (king and queen of same suit), 20. A declaration is made by placing the declared cards face up on the table where they remain till played or the stack is exhausted, except in the case of the seven of trumps. To score, a declaration can only be made after winning a trick and before drawing, and but one declaration can be made at a time. After a card has been used in one combination it may be used to form another, excepting when used to form an equal or inferior combination in the same class as before. A player need not declare a combination which he holds and only before the stack has been exhausted can a declaration be made. Consult: A. Howard Cady's treatise, for details and rules.

Bezo'ar, concretions found in the fourth stomach of many of the *herbivora,* notably goats, at one time held in high repute because of fancied miraculous healing properties.

Bhadrinath, bhä-drī-näth', a town in northern Hindustan, on the Bishengunga, celebrated for its temple of Vishnu, with a hot mineral spring in whose waters both sexes bathe indiscriminately, to wash away their sins. Some 50,000 pilgrims visit the place annually. The temple has been frequently overthrown by earthquakes. The principal idol is a figure of black

marble, clothed in gold and silver brocade while the season of pilgrimage lasts, and then stripped and stowed away in a vault the rest of the year. The Hindus believe that in the neighboring mountains some holy anchorites have lived for several thousand years. Their place of habitation is a cavern perpetually choked with snow, which forbids the approach of the curious and the skeptical. The Bhadrinath peaks in the neighborhood are above 22,000 feet high.

Bhagalpur, b'hä-găl-poor', a city of Hindustan, in Bengal, capital of a district and division of the same name, situated on the Ganges, 113 miles northwest of Moorshedabad. In the town and neighborhood are some interesting Mohammedan shrines; and there are here also two monuments, one erected (in 1780) by natives, and the other erected by government in memory of Augustus Cleveland, the conciliator of the formerly turbulent and marauding hill tribes of Sonthals. There are several indigo works in the neighborhood. Pop. (1901) 75,275. The division of Bhagalpur lies between that of Rajshahi on the east and that of Patna on the west. It has an area of 20,511 square miles. Pop. (1901) 8,721,484. The district of Bhagalpur is fertile, well watered, and highly cultivated. It is divided into two unequal portions by the Ganges. Area, 4,226 square miles; pop. (1901) 2,088,560.

Bhagavadgita, bhä'gă-văd-gē'ta (Sanskrit, the Divine Song), the title of a religious-philosophical didactic poem interwoven as an episode in the great Indian epic of the Mahâbhârata (q.v.).

Bhamo, bha-mō', India, a town of Burma, on the Upper Irrawaddy, about 40 miles from the Chinese frontier, and 180 north-northwest of Mandalay, with which it has railway communication. About 20 miles above Bhamo the river suddenly narrows from 1,000 to 150 yards and flows through a rocky gorge subject to eddies and back-waters. Navigation is at that point very difficult, and at times impossible. Bhamo is the starting-point of caravans to Yunnan, and will become one of the great emporiums of the East in the event of a regular overland trade being established between India and Western China. Pop. (estimated) about 7,000.

Bhang, băng, an Eastern name for hemp (*Cannabis Indica*) (q.v.).

Bhartpur, bhĕrt-poor', or **Bhurtpore.** (1) A native state of India with an area of 1,961 square miles. The surface is generally low and the state is scantily supplied with water; soil generally light and sandy; chief productions, corn, cotton, sugar, and salt. It has been under British protection since 1826. Pop. (1901) 626,000. (2) A town, the capital of the above state, on an extensive and fertile plain, 110 miles south-southwest of Delhi. It covers an area about four miles in circuit, and was so strongly fortified that in 1805 it stood a siege by Lord Lake of 14 weeks, and cost the besiegers 3,100 men. In a second siege, in 1826, its resistance to Lord Combermere was less successful. The fortifications have been demolished, but the fort still exists, and is enclosed by a wet ditch and a wall of hewn stone, which taken together are 60 feet high. Within the fort is the rajah's palace, built of red and yellow freestone in the Mogul style, and picturesquely crowning an eminence surrounded by flower-gardens and fountains. Pop. (1901) 43,000.

Bhartrihari, bhär-trę-hä'rę, Indian poet, author of a book of apothegms. According to the legend he was the brother of King Vikramâditya, who lived in the 1st century B.C. The collection of 300 apothegms (short poems) bearing his name present us with graceful descriptions of nature, charming pictures of love, shrewd remarks on everyday life, and profound thoughts on the Deity and the immortality of the soul. Bhartrihari was the first Indian writer who became known in Europe, 200 of the apothegms having been translated by the missionary Abraham Roger and published at Leyden (1653). His actual personality has been much discussed without any very satisfactory conclusion having been reached. The weight of opinion inclines to belief in his existence, and that he was a poet of a philosophical cast, possibly a grammarian also, and very likely of royal descent. See Von Bohlen, 'Bhartrihari's Sententiæ' (1833); Tawney, 'Two Centuries of Bhartrihari' (1877); Wortham, 'Translation of the Satakas of Bhartrihari' (1886); More, 'A Century of Indian Epigrams, Chiefly from the Sanskrit of Bhartrihari' (1898); Kale and Gurjar, 'Nitisataka and Vairagysataka, with Notes and an English Translation' (1898).

Bhatti, bhät'tę, Indian epic poet of the 6th or the 7th century. His poem, named after him, 'Bhattikâvyam,' is in 22 cantos. Its theme is the deeds of Râma; but the author designed the work to be also an exemplification of the rules of grammatical and rhetorical composition. It was published with a two-fold commentary at Calcutta (1828).

Bhavabhuti, bhä-va-bhoo'tę, surnamed SRÎ-ḲANTHA, Indian dramatist, of the first half of the 8th century. He wrote at least three plays, the 'Mahâvîracharita' ("life of the great hero"), and the 'Uttararâmacharita' ("later life of Râma"), forming together, in seven acts each, a dramatized version of the story of the Ramayana; and the 'Mâlatî-mâdhava,' a domestic drama in ten acts, full of life and incident. Bhavabhûti is often compared with Kâlidâsa, whom he equaled in vigor and variety, but hardly in genius. All three plays have been translated into English. See Levi, 'Le théâtre indien' (1890).

Bhawalpur, bhä-wal-poor', or **Bahawalpur,** a state of the Punjab, British India, south of the Indus and Sutlej rivers. It is chiefly a desert of shifting sand. Only the river banks are cultivable. The inhabitants are Játs, Baluchis, and Afghans, the greater part Mohammedans. Area, 17,285 square miles. Pop. (1901) 720,000. Bhawalpur, the capital, is on a branch of the Sutlej. It is enclosed by gardens and mud walls, four miles in circumference; noted for the manufacture of a kind of turban and scarf very popular among the Hindus; also produces considerable woolen, silk, and cotton cloth, indigo, alum, and saltpetre. Pop. 14,000.

Bhils, bēls, or **Bheels,** a Dravidic race inhabiting the Vindhya, Satpura, and Satmala Hills, a relic of the Indian aborigines driven from the plains by the Aryan Rajputs. They appear to have been orderly and industrious under the Delhi emperors; but on the transfer

of the power in the 18th century from the Moguls to the Marathas they asserted their independence, and being treated as outlaws took to the hills. Various attempts to subdue them were made by the Gaekwar and by the British in 1818 without success. A body of them was, however, subsequently reclaimed, and a Bheel corps formed, which stormed the retreats of the rest of the race and reduced them to comparative order. The hill Bheels wear little clothing, and live precariously on grain, wild roots, and fruits, vermin, etc., but the lowland Bheels are in many respects Hinduized. Their total numbers are about 750,000. See Rowney, 'Wild Tribes of India' (1882); Reclus, 'Primitive Folk' (1891).

Bhilsa, bēl-sa, or **Bilsa,** a town of Hindustan, on the Betwa, 280 miles southwest of Allahabad. It has a fort enclosed by a ditch and a stone wall surmounted by square towers, and is a place of Hindu pilgrimage. One of the curiosities of the place is a brass gun measuring 19½ feet in length, with a bore of 10 inches; elegantly proportioned, highly ornamented, and said to have been made by order of the Mogul emperor, Jehangir. Fine tobacco is produced in the vicinity. In the neighborhood are some very large and remarkable ancient Buddhist monuments known as *topes,* one of the principal being a dome-shaped structure 70 or 80 feet in height. Pop. (1891) 9,700.

Bhima, bē'ma, **Beemah,** or **Bimah,** (1) a god in Hindu mythology, the son of Pritha (or Kunti) by Vayu, the god of the wind, remarkable for his great size and strength; (2) the name of a river of India rising in the Poona district of Bombay and flowing southeast to the Kistnah River, about 400 miles in length.

Bhiwana, bhe-wā'ne, a town of India in the Punjab, district of Hissar. It is the trading centre of its district, exporting metals, sugar, and spices. Pop. 35,000.

Bhopal, bhō-pal'. 1. A native State of central India, with an area of 6,874 square miles. The country is full of jungles, and is traversed by a hilly tract, forming part of the Vindhya Mountains. The soil is fertile, yielding wheat, maize, millet, pease, and other vegetable productions peculiar to central India. Sugar, tobacco, ginger, and cotton are the chief exports. The district is well watered by the Nerbudda, Betwa, and other minor streams. The state of Bhopal was founded by an Afghan adventurer, named Dost Mohammed Khan, who in 1723 succeeded in establishing himself here by the countenance of Aurungzebe, on whose death he assumed the title of nabob, which was retained by his successors. Bhopal has all along been friendly in its relations with the British. In 1818 the state was placed under British protection. Pop. (1901) 1,198,350; (2) a town, capital of the above state, on the boundary between Malwah and Gundwana, 108 miles east of Oojein. It was defended successfully in 1813 against the forces of Scindia and the rajah of Nagpore. It is surrounded by a wall two miles in circuit, and contains a fort. Outside is another fort on a large rock, the residence of the ruler of Bhopal. Among other buildings of note are two mosques, arsenal, mint, and the palace of the Begum. Large artificial lakes supply good water. Pop. (1891) 70,338.

Bhuj, or **Bhooj,** the chief town of Cutch in India, Bombay presidency, at the base of a fortified hill, with military cantonments, high school and school of art, mausoleums, of the Raos or chiefs of Cutch, pagodas, etc., including a temple dedicated to the cobra di capello. Bhuj is famous for its manufactures of gold and silver. Pop. (1891) 25,421.

Bhutan, bhoo-tän', an independent State in the eastern Himalayas, with an area of about 16,800 square miles, lying between Tibet on the north and Assam and the Jalpaiguri district on the south, and consisting of rugged and lofty mountains, abounding in sublime and picturesque scenery. Pop. (estimated) 200,000. The Bhutanese are a backward race, governed by a Dharm Rajah, regarded as an incarnation of Deity, and by a Deb Rajah, with a council of eight. They are nominally Buddhists. After various aggressive incursions and the capture and ill treatment of Ashley Eden, the British envoy, in 1863, they were compelled to cede to the British considerable portions of territory, in return for a yearly allowance of £2,500.

Bia'fra, Bight of, a large bay on the west coast of Africa, at the head of the Gulf of Guinea, between Capes Formosa and Lopez. The principal rivers flowing into it are the Niger, the New and Old Calabar rivers, the Rio del Rey, the Cameroon, and the Gaboon; its islands are Fernando Po (Spanish), and St. Thomas' and Prince's (Portuguese). Opposite Fernando Po are the Cameroons.

Bialystok, byäl-e-stōk', or **Bielostok,** a town of Russian Poland, province of Grodno, on the Bialy, 45 miles south-southwest of Grodno, with which and Warsaw it is connected by rail. It is a well-built, handsome town, with a spacious market, gymnasium, and several churches, and has among its edifices a palace which belonged to the counts of Braniski, and was once known as the Polish Versailles. Its manufactures are woolen goods, leather, hats, soap, etc. Pop. (1897) 63,927.

Biancavilla, byän-ka-vēl'la (Italian *bianca,* white, and *villa,* town), a city of Sicily situated on the slope of Mount Etna, 20 miles northeast of Catania, founded in 1480 as an Albanian colony. Lava is employed for paving its streets, and in its neighborhood are the noted grottoes of Scila and Archi, the former basaltic, the latter in the lava of 1607 with a tunnel half a mile in extent. Wine and grain are produced in the district and all the cotton in this portion of Sicily is called Biancavilla. Pop. (1901) 13,358.

Bianchi, byän'ke, **Francesco** (called Il Frari), Italian painter: b. Modena, 1447; d. 1510. He was the instructor of Correggio, according to Vidriani, and his works were esteemed for graceful design and agreeable coloring. Among his few works extant are a 'Madonna with Saints,' now in the Louvre. He must not be confounded with Federigo Bianchi, a Milanese artist, born about the end of the 16th century. The paintings of the latter are numerous in northern Italy, and are held in high esteem. He wrote a volume of biographies of painters.

Bianchini, be-an-kē'ne, **Francesco,** Italian astronomer: b. Verona, 13 Dec. 1662; d. Rome, 2 March 1729. He was intended for the clerical

profession, but repaired to Rome, and applied himself to jurisprudence, and continued the study of experimental physics, astronomy, etc., as well as of Greek, Hebrew, and other languages. Pope Alexander VIII. bestowed on Bianchini a rich benefice, with the appointment of tutor and librarian to his nephew, the Cardinal Pietro Ottoboni. Pope Clement XI. also patronized him, and appointed him secretary to the commission employed in the correction of the calendar. Being on a tour through France, Holland, and England, he formed the idea of drawing a meridian in Italy, from one sea to the other, in imitation of that which Cassini had drawn through France. He was occupied eight years at his own expense in that work; but other employments withdrew his attention from it, and it remained unfinished. He concluded his career with two important works (1727) on the planet Venus, and on the sepulchre of Augustus.

Biard, Auguste François, byär, â-güst frŏñ-swä, French genre painter: b. Lyons, 27 June 1801; d. near Fontainebleau, 8 July 1882. He traveled extensively, visiting Spain, Greece, Syria, Egypt, Mexico, Brazil, etc. Among his best known pictures are the 'Babes in the Wood' (1828); the 'Beggar's Family' (1836); the 'Combat with Polar Bears' (1839); and 'The Strolling Players,' now in the Luxembourg. A strong element of caricature runs through most of his works.

Biard, Peter, French missionary in America: b. Grenoble, 1565; d. 1622. He was one of the first two missionary priests sent to New France, and with his companion, Masse, on 10 June 1611, he wrote the earliest letters sent by the Jesuit order from Canada. He at once began a study of Indian languages, established friendly relations with the Indians on the Kennebec in 1612, and in 1613 founded a colony on the island of Mount Desert. The colony was soon destroyed by the forces of Argall, deputy governor of Virginia, and Biard, being captured, was sent to England. This enterprise of Argall's marks the actual beginning of hostilities between the French and English in North America. Biard was liberated after a short time, and returning to Lyons, published in 1616, 'Relation de la Nouvelle France, et du Voyage des peres Jésuites dans cette Countrée.' This is the earliest of the 40 volumes of 'Jesuit Relations' (1632–72), which are such valuable storehouses of material for early American history.

Biarritz, bya-rĕts, a fashionable watering place of France, department of Basses-Pyrénées, five miles south of Bayonne. It is a favorite of bathers and other persons who come from all parts of Europe, and especially of the Basque mountaineers, who deem it an obligation to drink of the mineral waters once a year, as well as to bathe in the sea of Biarritz. In 1856, the place acquired additional importance from being made the summer residence of Napoleon III. and his court. Since then its popularity both in winter and summer, has steadily increased. It has no industries and is composed almost entirely of hotels and lodging houses. Pop. 12,000.

Biart, byär, **Lucien,** French novelist, poet and writer of travels: b. Versailles, 21 June 1829. He published a number of novels, containing masterly descriptions of Mexican and South American nature and customs. Among his works are 'The Mexican Women' (1853), poems; 'Adventures of a Young Naturalist' (1869); 'The Clients of Dr. Bernagius' (1873); 'Across America' (1876).

Bias, bē'as, one of the seven wise men of Greece: b. Priene, one of the principal cities of Ionia, about 570 B.C. He was a practical philosopher, studied the laws of his country, and employed his knowledge in the service of his friends, defending them in the courts of justice, or settling their disputes. He is said to have died at an advanced age immediately after successfully defending in court one of his friends. The inhabitants of Priene having resolved to abandon the city with their property, Bias replied to one of his fellow-citizens, who expressed his astonishment that he made no preparations for his departure — «I carry all that is mine with me.»

Bibb, George M., American jurist: b. Virginia, 1772; d. Georgetown, D. C., 19 April 1859. He graduated at Princeton in 1772, and took up the practice of law in Kentucky. He was twice chief justice of the State court of appeals, served two years in the State senate, and was chancellor of the court of chancery. He was a senator in Congress, 1814–19 and 1829–35, and secretary of the treasury under President Tyler. During later life he practised his profession in Washington, D. C. He compiled 'Reports of Cases at Common Law and in Chancery in the Kentucky Court of Appeals' (1808–11).

Bibbiena, be-byā'na, **Bernardo Dovizio** (styled BIBBIENA), Italian poet: b. Bibbiena, 4 Aug. 1470; d. 9 Nov. 1520. For many years secretary to Cardinal Giovanni de Medici, in whose election as Pope Leo X. he is said to have had a considerable share, he was appointed treasurer, and soon after raised to the dignity of cardinal (1513). In this dignity he became an ardent promoter of art and science. His comedy, 'Calandria,' is probably the earliest in Italian literature.

Bibbiena, Giuseppe, Italian painter: b. 1696; d. 1757. The most distinguished of the Bibbiena family, he was famed as architect, as well as an artist. Not only did he design gorgeous decorations for a court wedding at Munich in 1722 and a dazzling court festival in Prague in 1723, but he built the noted theatre at Bayreuth in 1757 and remodeled the opera house at Dresden. The 'Architettura e Prospettire' (1740) contains several illustrations of his works.

Biberach, bē'bĕ-räH, a town of Würtemberg, on the river Riss, 22 miles south-southwest from Ulm. It is irregularly built, and with its old walls, still in part remaining, and its old towers and gateways, has a mediæval aspect. Among its buildings is a fine church, dating from 1100, and recently restored. The town has important educational institutions, and a richly endowed hospital. The French, under Moreau, defeated the Austrians near Biberach in 1796. There is a monument to the poet Wieland, who was born in the vicinity, and another to the Emperor William I. The town it noted for its bell foundries and manufactures of artificial flowers, leather, toys, and machinery. Pop. (1900) 8,400.

Bibiru, be-bē'roo, a tropical tree of the laurel family.

Bible. I. The word Bible comes from a Greek word meaning book. It has come to us through the Latin *Biblia*. This is in the Greek a neuter plural. But it came to be used as a feminine singular, and so gives us our word Bible. Bibliotheca, also a Greek word, meaning library, was a designation during the Middle Ages. Earlier Latin writers used the word "testamentum" or "instrumentum," both designed to translate the Greek word for covenant. In the New Testament the usual word to designate the Old Testament is "Scripture" or "Scriptures."

II. *Languages.*—The Old Testament was written originally in Hebrew, with the exception of brief portions in Aramaic, a closely kindred dialect, namely, Jer. 10:11, Ezra 4:8–6:18, 7:12–26, Dan. 2:4–7:28. The New Testament was written wholly in Greek.

III. *Divisions.*—The most striking partition in the Bible is into two Testaments, the Old and the New. This is due to the broad difference between the era of Hebrew Messianic hope and the actual appearance and work of Christ. All preceding Christ belongs to the Old and unfulfilled. All following Christ belongs to the New and complete. Within the Old Testament there has been marked from the time of the prologue to Sirach, 132 B.C., a three-fold division. These are the Law, containing the five Mosaic books; the Prophets, including the so-called Former Prophets: Joshua, Judges, I and II Samuel, I and II Kings; and the Later Prophets: Isaiah, Jeremiah, Ezekiel, Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, Malachi; and the Kethubim, a Hebrew word meaning "Writings" (called also Hagiographa, a Greek word meaning "Holy Writings"): Psalms, Proverbs, Job, Song of Songs, Ruth, Lamentations, Ecclesiastes, Esther, Daniel, Ezra, Nehemiah, I and II, Chronicles. There are also smaller divisions made by the Hebrew Scribes, 200–400 A.D. These were called Parashas. The longest of these number 54 in the Pentateuch, and are designed for Sabbath reading. Corresponding with these 54 Mosaic sections there were 54 lessons selected from the Prophets, also for Sabbath reading, called Haphtaroth. These divisions varied in number in different sections and times. The arrangement in books also shows variation. Some schemes give 24 books, so the Talmud; others give 22 books. The Septuagint and Vulgate versions reckon 39 books. This is now universal in Christian editions of the Bible, derived through the great edition of the Hebrew Bible by Jacob ben Hayim in 1525–6. The Talmud refers to still smaller divisions as Pesukim, nearly corresponding to our verses. In the manuscripts of the New Testament divisions appear very early. Such are traced to Tatian in the 2d century, to Ammonius in the 3d century, to Eusebius in the 4th century, to Euthalius in the 5th century. Our present chapter and verse divisions were completed by Robert Stephens in 1551, imitating Rabbi Nathan, c. 1437. Stephens' work was adopted by the Geneva Bible in 1560, and by the English version of 1611. The division into chapters originated with Stephen Langton, who died 1228.

IV. *Its Nature.*— The Bible, as it stands, is in the general judgment of Christendom a book altogether unique. Therein Christians look to find the very word of God. This divine message they deem pure and full, and they gladly adopt it as a binding rule of faith and life. A central feature of the volume is its claim to divine origin. Here God speaks to men. Here men learn of God. This is the direct assertion or the evident implication of its burden everywhere. The covenant with Abraham was made by God. God spoke to Moses. Hebrew history was dominated by God. The messages of all the prophets were obtained from God. The great poetical works carry continually the postulate and the evidence of open fellowship with God. If this note seems lacking, as in Esther and much of Ecclesiastes, this fact raises unfailingly a question as to their being in their proper place. In Christ, as portrayed in the Gospels, this note finds most perfect utterance. Jesus of Nazareth is the Incarnate Word. He hath seen and known the Father; and of all the Father's words he is true and faithful Witness. And the Apostles are Christ's specially prepared heralds of this same heavenly word. They speak for Christ and God. There is in all their ministry the living presence of the exalted Christ. This is "the thesis of the New Testament." Thus throughout, the Bible makes a claim to be the very word of the true and living God. This is its prime trait. This determines its nature.

Touching this quality a few things need to be said. Only so can the Bible be defined. First, as to the nature of the Deity thus made known. He is a Person. He has every personal trait. He is free and wise and kind. He is faithful and gracious and pure. He is full of goodness and truth. He is Spirit. He is of all being the only life and essence and strength. There is in him no transition or decay or change. He is pure and very life. He is transcendent. By him all things are made and ruled and judged. He is a friend. With him all persons may find fellowship. He is holy. His very being is the very energy of infinite and unfailing truth and love. Such is God. His person is the central glory of the Bible. Herein the Bible is unique. Its deity stands in simple, infinite, spiritual majesty unveiled in every part of the record. This truth finds culminating utterances in Christ's words to the woman in John 4:24: "God is a spirit, and they that worship him must worship him in spirit and truth." This fundamental verity stands clear amid all the obscurity of Gen. chapters i.–xi., and all the bewildering mysteries of the closing Apocalypse. This teaching concerning God, more than anything else, gives the Bible its peerless tone and worth. And this teaching is not abstract. It stands in life. Most powerfully is it proclaimed in the great Theophanies. These present at once the glory and the power of the Biblical claim. And these Theophanies are not incidents. They have commanding prominence and embody mighty meaning. They are in every case outstanding landmarks and points of departure. They are typical scenes. They figure in the Biblical landscapes like beacons whose rays fall everywhere.

But these disclosures are all gathered up in Christ. His figure stands in the very centre of this book. On him all symbols and expectations and prophecies converge. In him all excellencies and dignities and graces combine. From him all instructions and commissions, all judgments and mercies proceed. In him the old

and the new are made to agree. He is the very Lord of very life and truth and love. In his person and word and work all the energies and all the intimations of every Biblical scene find an equilibrium that is absolute. In him all Biblical life finds at once free play and full repose. In him the Bible lies concealed. In him the Bible stands revealed. He is the Son and Word of God.

It follows and stands evident that the Bible is a book of life. It is a record of the interplay of wills. It is always dealing with persons. Its central values are moral. Its revelations look toward reform. It is a searcher of hearts. Its appeals are to men; and they are potent. If repulsed, then its rebukes throb with resistless force. It is always scanning character, feeling after conscience, working toward the will. It has an unexampled amount of comment upon righteousness and sin, merit and blame, law and obligation, responsibility and reprisal in the moral field. It is from cover to cover a book of ethics, practical ethics, but an ethics that finds all its roots and regulations in its pure and lofty views of God. God, the pure, the holy, the supreme, is the ethical norm. With him man has vital fellowship — man the godlike and finite, the perishable and immortal, the lord and the slave, the individual and the brother. As is instantly apparent, such being God and such being man, their moral interrelations are bound to be most complex. But just here again, — and this is why these facts are named,— the Bible is in its nature unique. Its values are real, true to life. Its ethics are genuinely ethical, never formal, never partial. Its views of character are balanced and vital and full. It fully recognizes the moral value of humility and aspiration, of truth and love, of isolation and friendship, of physical and spiritual in man. Here again Christ alone is norm — norm of ethics, norm of the religious life, norm of the earthly experience, norm of the immortal life. This balanced completeness of life is a most manifest and distinguishing mark of the Biblical view. Its moral estimates are at once a full-voiced echo and a final interpretation of the life of the world.

These vital moral estimates, while fully unified, fall apart into two most striking subdivisions. This is due to human sin. Because of this undoing two widely different notes resound throughout the Sacred Word, namely, judgment and grace. In one or other of these two forms the Bible may be defined as the adjustment to sin. Universal man has gone morally astray. Upon this perversion moral judgment surely impends. This doom may be inflicted, or delayed, or reversed. This is the inner sum of Biblical truth. This is the Bible within the Bible. Here lies the inner secret of the Bible's matchless power. Under its high beliefs concerning God and its broad and searching thoughts on man, it fashions and proclaims, as no other volume ever did, its estimates of three stupendous themes: the deep and dark iniquity of sin; the awful inevitableness of its proper doom; and the divine provision and proffer of saving, sacrificial grace.

But once again, it needs to be said, the Bible is a book of life. Its messages are all set in the midst of events. It uncovers and traces the flow of a stream of history. This historical factor needs minute attention in defining the nature of the Bible. Here is a book always handling values of the highest, even absolute worth. But it is always setting them forth in simplest concrete forms. Its ideals, always phenomenally lofty and pure, are unfailingly in immediate touch with the real. Its events issue in the alternatives of eternity; but they always run along common historical paths. This striking feature, undeniably one secret of the Bible's strength, is as undeniably prolific of most vexing problems. As a storehouse of eternal principles for the moral and religious life, the Bible rises and stands beyond the reach of criticism, denial, or assault. But as a series and collection of historical events, it lies open on every side to every sort of historical challenge and test. Hence the Bible presents abidingly two widely diverse aspects — the ethical or theological, the philosophical or metaphysical, in a word the abstract; and the historical or literary, the natural or phenomenal, in a word the concrete. The former always challenges character. Its vesture and voice are imperial. It demands acceptance. To renounce its claim is to sin wilfully. The latter is always suggesting inquiry. It invites scholarly scrutiny. Multitudes of its problems hang in continual uncertainty. Hence the various phases of modern Biblical criticism.

Such is the Bible in its nature. It voices God's message to men. It reveals God's true being. It concentrates in Christ. It is a book of life, vivid, complete. Its attention is incessantly fixed on sin. It is enshrined in history. Its central religious and ethical teachings are fundamental postulates. They lie beyond the reach of fair debate. It is so embedded in incomplete and changing scenes as to provoke and sustain age-long debates. Some of the chief of these debates will be traced in succeeding sections of this article.

V. *Genesis of the Old Testament.*— A few general statements may be profitably made first. These will clear the way for a sketch of more special matters. The present Old Testament canon is substantially that adopted by the Jews of Palestine, and in vogue among them at the time of Christ. It had practically held sway there for at least over a century and a half. Prophetical writings and teachings had been sacredly revered for over seven centuries before Christ. Anterior to this, Mosaic laws were recognized as a religious and ethical norm. These scriptures were held by Christ in supreme esteem. In this view and under his interpretation they held the sum and essence of his teaching. They had divine value for such as sought the way of eternal life. In them was the word of God. This high estimate was adopted by Apostles and Church fathers.

All these statements may confidently be made. But they leave unanswered two important questions, each calling for extended treatment: when did the various constituents of the Old Testament gain entrance there? And what problems encumbered this process? These questions are exceedingly broad. They open up the whole debate of modern Bible study. In handling these matters the methods are mainly those of historical and literary criticism. In the historical study factors and arguments shift and change with the years. The method is mainly by comparative study of archæology, chronology, history, and literature. Illustrations are the tablets of Tel-el-Amarna, the Moabite

stone, the creation tablets, the lists of Babylonian and Assyrian kings, and the records of their various campaigns. But these studies deal mostly with the contents of the Old Testament books, and not with the books themselves and the main divisions of the Old Testament viewed as literature and growing into a canonical unity.

Of the literary arguments bearing upon this question the most telling is that of parallel accounts or doublets. These repetitions show variations. These variations suggest different points of view, different authors, and a combining editor. A careful study of these literary phenomena leads into a broad field of Biblical literary criticism. The aim of this study is to trace out the various authors and times and histories of these different documents. At present the tendency in this study is strongly analytic. The accent in the investigations is laid upon the differences. These differences once well defined and fixed, the effort is to trace the origin and date of each distinct document and to explain when, and how, and why they were combined into the present form. The keynote of all this process is differences. Upon this, main arguments rest. These arguments stand strongest, when the differences amount to discords or contradictions. Many of these variations are openly apparent. Many others, so it is claimed, are glossed over by ancient editorial efforts after harmony. These modulations should be removed, and the original contrast stand clear. Hence much textual emendation. It tends to sharpen contrasts. By this process each separate document is brought to a strict unison with itself, and a sharp dissonance with its companion in the doublet. Each fragment has a marked individuality, stripped as much as possible of inner manifoldness. One document, one idea; or if several ideas, then as few and similar as may be. These separate and diverse documents thus reduced and defined are then arranged, as to origin and editorship, in an evolutionary scheme of history. The simple and crude are dated early. The complex and refined are dated late. Thus the origin and evolution of the Old Testament is explained by the method of literary criticism at present characteristically in vogue. Elements aiding this process are direct historical testimony to a document's existence, the argument from silence, literary style, fixed literary forms, ethical, and religious views. A fundamental postulate is an evolutionary view of history. A dominant impulse is to trace phenomena to a natural source.

The outcome of this method is to affirm late origins for most Hebrew literature. A sample arrangement may be found in Driver, 'Introduction to Literature of Old Testament.' In general, the existence of any volume of recognized sacred Mosaic law prior to 622 B.C. is denied; or of anything but Deuteronomy prior to 444 B.C.; or of any recognized prophetical canon prior to 444 B.C.; or of any canonical volume including the books usually clustered with Psalms and Proverbs, prior to 165 B.C. In particular, the Psalms are largely denied to David, and dated instead after the exile. Daniel is dated at 164 B.C. Still it is largely concluded that teachings of Moses and of Prophets, as also certain Psalms, were held in honor earlier.

To this method and its conclusions are opposed considerations like the following: Its scheme of doublets is overworked; its conjectures are too numerous; its textual emendations too frequent and ungrounded; its standards are too uncertain; its documents are so stripped and reduced as to become void of life. By no such rigid rules does man express himself. Silence is no proof. The ancient editors are too mythical and their backs too heavily loaded, and that with most unlikely wares. Too much is made of documents. Not enough is made of men. History is fuller and more manifold everywhere than this method allows. Divine interventions, incitements, instructions, overrulings, and Theophanies are treated with too scanty respect. Evolutionary views do away too easily with the manhood of early men. Biblical history and conditions are not so primitive by long millenniums as this method seems to presume. In particular the lofty value of the Psalms demands more attention. By the negative critical method they stand unexplained. Vastly more lay back of the 8th century than this method presents. Too much is loaded upon Ezra and in the period of the Maccabees. Far too many direct Biblical affirmations have to be reversed.

Thus scholars conflict touching the genesis of the Old Testament. In this far-reaching debate the following evidence and events are of most importance to hold in view. The allusions within the Old Testament to the existence of sacred books, such as Ex. 24:4, 7; 34:27; 40:20; Deut. 31:26; Josh. 24:26; I Sam. 10:25; Isa. 8:16; Jer. 30:1; 36:1, 28; II Kings 22:8; Dan. 9:2; Neh. 8–9; the Praise of the Famous Men in Sirach (chapters 44–50); the prologue to Sirach; the opinions of Philo; the estimate and usage of the New Testament; Josephus, *contra Apion* 1, 8; II Esdras 14:44–46; the work of the Council of Jamnia; and the evidence of the Mishna; also all light obtainable in the great field of comparative studies, specially from Babylonian archæology. In broad outline, the main problems are to find out what sacred literature existed prior to 165 B.C.; then prior to 444 B.C.; then prior to 623 B.C.; then prior to 750 B.C., the period of the great written prophecies; then in the Davidic era; then at the time of Moses; then to find the origin of the various fragments in the unique section Gen. 1–11. Touching most of these problems, definite information is at present nowhere in reach. The precise connection of the Biblical creation and flood accounts with Babylonian material, the contents of the sacred books in the Mosaic era, the range of sacred literature in Isaiah's time, the list of Davidic Psalms, the literature held sacred in the exile, the scope of the books handled by Ezra, the outside outline of Sirach's sources, or of his grandson's allusions, a sharp definition of the rise and influence of apocryphal writings, a satisfying explanation of the varying or the final order of Old Testament books, the meaning of the Septuagint divergences, and the actual evaluation of apocryphal literature by our New Testament writers — these all are questions fairly open to debate. Knowledge is incomplete.

VI. *Canon of Old Testament.*— Study of the genesis of the Old Testament leads naturally into an examination of its development into a fixed and closed canon. While it seems proper and safe to say that our present Protestant Old Testament canon is identical with that accepted

by the Jews of Palestine in and before the time of Christ, there are numerous evidences that even among Palestinian Jews several canonical questions were under debate for a century or two after Christ.

To begin with the latest Jewish testimony and work backward toward origins, first mention has to be made of a full statement from the Babylonian Talmud. This passage is traced to Rabbi Judah the Holy, head of the school of Tiberias in the 2d century. He is said to have collected the Mishna. In this statement all the parts of the Old Testament, as we have it, are named with a definite statement as to authors. "Moses wrote his book and the section concerning Balaam and Job. Joshua wrote his book and those eight verses in the Law. Samuel wrote his book and the book of Judges and Ruth. David wrote the book of Psalms 'at the hand of' 10 old men, to-wit: Melchizedek, Abraham, Moses, Heman, Jeduthun, Asaph, and the three sons of Korah. Jeremiah wrote his book and the book of Kings and Lamentations. Hezekiah and his friends wrote Isaiah, Proverbs, Song of Songs, Ecclesiastes. The men of the great synagogue wrote Ezekiel, the Twelve, Daniel, and the little book of Esther. Ezra wrote his book and the genealogies which we read in the book of Chronicles." This statement seems, considering its probable source, to indicate a fixed canon. But discussions of certain Old Testament books occurred considerably later. These concerned Proverbs, Song of Songs, Ecclesiastes. Proverbs was charged with internal contradictions. All three were deemed uncanonical by some, because they contained parables. Repeatedly, debates rose as to whether Ecclesiastes and Esther were fully canonical, that is, whether they "defiled the hands." The regulations about the feast of Purim in Esther seemed to contradict the Pentateuch. While for Ezekiel, its strange legislation in the closing section made real trouble. At a much later time Jonah made occasion for special remark, because of its neglect of Israel and attention to Gentiles. For full information upon this stage of Jewish thought, see Wildeboer, 'The Origin of the Canon of the Old Testament,' pp. 56–75. As to the meaning of these facts men judge differently. Some say these books were all held canonical; it was simply a discussion of vexing problems which they contained. Others say these debates imply that these books were not as yet within the canon.

Another date and event to be marked is a council at Jamnia, in western Palestine, about 90 A.D. Then problems were raised about certain books, in general the Kethubim, but in particular, Ecclesiastes and Song of Songs. They were all declared holy, that is, canonical.

About this time is to be dated II Esdras 14:44–46. Here is an apocalyptic story of Ezra's miraculous dictation of 94 sacred books, 24 of which were to be promulgated as the public Jewish canon. This story must have found its motive partly in the fact that at about 90 A.D. the Jewish canon held 24 books.

Josephus also belongs to about this date. He has left in *contra Apionem*, 1:8, a painstaking list and estimate of the Jewish canon of his time. He makes the number of the books 22. He reckons five to Moses, 13 to the prophets, and four containing hymns to God and maxims for human life. He does not name the several books. It is therefore uncertain whether his list agrees with ours. Some think he left out Ecclesiastes and Song of Songs. Some think he joined Lamentations to Jeremiah, and Ruth to Judges. In any case his statement is most notable. He boasts of their limited number, of their antiquity and their cordial acceptance. He closes the canon with the period of Artaxerxes. Later books are not deemed worthy of like faith. No one has dared to increase or diminish their volume. They are cordially deemed God's oracle, and held as rules for life and death. All these arguments are made with deliberation for purposes of defense. They form a weighty evidence.

Philo, who lived somewhat earlier, an Alexandrian Jew, seems to have held just the list accepted by us as strictly canonical and of authority. His reverence for the Mosaic writings is most evident. He quotes nothing from the Apocrypha. This is noteworthy. He also leaves wholly unmentioned 17 of our canonical books.

In the prologue to Sirach is a reference three times over to "the Law," "the Prophets" (Prophecies), and the "Others" (other books, remaining writings) with suggestions, also repeated, of their unique value for culture and wisdom, and of their fulness and significance. This was written about 130 B.C. It seems to betoken a complete threefold canonical collection. It occurs in a brief statement explaining the work of his grandfather which he is about to publish and commend to the men of his time.

This work of Sirach, the grandfather of the foregoing, was written about 180 B.C. It is permeated with the very substance of our Old Testament. Its clearest light on the problem of the Old Testament canon is in chapters 44–50. Here he sings the praise of famous men. He selects 24 names, besides the Judges and the 12 Minor Prophets, from Enoch to Nehemiah, and sings their praise. To this he appends a song to Simon of his own time. And at the end he names himself. In these eulogies Sirach holds scripture in high esteem. He seems to especially honor the Law. But it becomes specially difficult to say anything about his views of Old Testament canon. He seems to attribute to Simon and even to himself a respect all but equal to that accorded to the prophets. Plainly all the law and all the prophets and all the historical books were before him. Some of the Hagiographa fail of mention. There was manifestly, at 180 B.C., an Old Testament canon of recognized sacred standing, all but commensurate with ours of to-day.

The situation in the time of Ezra is far from clear. The passages to examine are Nehemiah 8–9; Ezra 7:6, 10, 12, 25, 9:10. From these passages it stands apparent that Ezra was a ready scholar in the law of God; that he had prosecuted his study during the exile; that some literature held sacred by him had been long in hand; that much of our Mosaic law was recognized as Mosaic by him and by the assembly described in Nehemiah 8–9; that religion, morals and life were constructed upon this Mosaic foundation. But just the extent of the Mosiac writings, just their antiquity, and just what other literature may have supplemented them is far from explicitly said.

Daniel 9:2 alludes to books that must have been prophecies, alluding in particular to Jeremiah. In his prayer he alludes to laws, ordinances, a covenant, the deliverance from Egypt, the warnings of the prophets, mentioning Moses. But no canonical list can be constructed here.

To this may be added citations from earlier portions of Scripture, indicating the existence of sacred records. None of these citations are certainly definitive of canonical limits at any period. But it may not improperly be said that the multitudinous allusions throughout Old Testament scripture to early divine revelations and leadership all, if only taken at their face value, go to show that records of these early events were always at hand and held validly sacred depositories of the Word of God. But historically, the inner content and the outside outline of this Old Testament canon comes into sight and shape for the first time in the words of Sirach about 180 B.C. Then it stood practically as it stands with us to-day. Later queryings were limited and substantially insignificant. And such debates as did arise were due to the extreme reverence of the Jews for the Mosaic Law, to their peculiar interpretation of that law, and to their jealousy to have all their sacred writings stand in fullest harmony therewith. For statements of their extravagant respect for the law see Weber, 'Die Lehren des Talmuds,' pp. 1–60, and Wildeboer, pp. 94 —.

From among Church fathers three witnesses call for special mention here. Melito, Bishop of Sardis, about 170, went into Palestine expressly to get the Jewish view of the number and order of the books of the Old Testament. His finding is given in Eus. Hist. Eccl. iv. 26. His order is peculiar. He omits Esther entirely. Nehemiah and Lamentations are not named, but probably they are included, the one with Ezra, the other with Jeremiah. Origen's canon is also found in Eus. Hist. Eccl. vi. 26. This list omits the Twelve Prophets, probably some mistake. It includes Esther. It adds the letter of Baruch. Origen died 254 A.D. Jerome died 420 A.D. In his preface to his translation to Kings he gives the Hebrew canonical list, 22 books. This is a very precise and carefully detailed statement. It is found in full in Wildeboer, pp. 80–84. He gives Jewish views, names the Apocrypha separately, and lists the canon as we have it to-day. He speaks elsewhere of Jewish queryings about Ecclesiastes. The Nestorian Christians reject Esther, Chronicles, Ezra, and Nehemiah, but accept Sirach. But in the main always, and from Jerome onward the Christian Church accepted the Jewish canon as finally fixed by them 200 A.D., and as we have it to-day. Still, through the influence of the Septuagint, the Vulgate, and Augustine, the Roman Catholic Church has retained also the Apocrypha.

VII. *Text of Old Testament.*— Our earliest information names tables of stone. Upon these were written the commandments. Deuteronomy was a roll, when found in the temple. Jeremiah's writings were a roll. The script was originally the old square characters seen on the Moabite stone, and in the Samaritan copy of the law. Later, no one knows when, the Aramaic characters were used. This is the script used to-day in all Hebrew Bibles. In the Maccabean period, the Syrian oppressors destroyed most of the Jewish sacred literature. Judas Maccabeus collected them all again. Possibly it was he who introduced the new writing. See II Maccabees 2:14. When the Jews fixed and adopted an official Old Testament text is unknown. Most date the act at the beginning of our 2d century, at the councils of Jamnia, 90 and 118 A.D. Tradition says they used three manuscripts found at Jerusalem. These early texts were wanting in vowels and separation of words. The scribes, 200–500 B.C., made numerous changes in the way of corrections, definition, pronunciation, and other improvements, including divisions and arrangements for liturgical use. These scribes were followed by students who were called Massoretes who simply guarded and perpetuated the work of the scribes. From this has come our present, so-called Massoretic text. These Massoretes added vowel points, completing their work in the 7th century in Babylon, and in the 8th century in Palestine. This work is perpetuated in the text of Ben Asher of the 10th century. Upon this all later western manuscripts have been based. In these latest years some efforts have been made to reconstruct the ancient texts, notably by Baer and Delitzsch. For samples of just what may be done, consult Kautzsch, 'Die Heilige Schrift des Alten Testaments,' in the textual emendations collected in the appendix.

VIII. *Manuscripts of the Old Testament.*— Jews have been extremely jealous of the purity of their manuscripts. Rules calling for minutest accuracy are laid down in the Talmud. See Kenyon, 'Our Bible and the Ancient Manuscripts,' p. 34. This carefulness secures truthful copies. Hence recent manuscripts are prized quite as highly as those most ancient. Indeed the old manuscripts are religiously destroyed, so that they may escape desecration. Hence we have no Hebrew manuscripts earlier than about the 10th century, and even these are few and incomplete.

IX. *Versions of the Old Testament.*— The Samaritan Pentateuch, though not a version, should be mentioned. If its original form could be produced, it would give us a Hebrew text, perhaps dating from the days of Neh. 13:23–30. But we have no manuscripts older than the 10th century.

The Septuagint version was made from Hebrew into Greek, somewhere between 300 and 130 B.C. This version was extended to embrace the Apocrypha. Other Greek translations were made: one by Aquila about 150 A.D.; one by Theodotian a little later; and one by Symmachus about 200 A.D. Origen tried to restore the Hebrew text about 240 A.D. Only fragments of this work survive. The same effort is made about 300 A.D. by three other men, Eusebius, Lucian, and Hesychius. The best evidence for restoring to us the original Septuagint is contained in the three famous manuscripts: the Sinaitic, the Alexandrian, and the Vatican, dating from the 4th and 5th centuries A.D. The best printed edition of the Septuagint now extant is that by Swete. A much larger edition is now in progress at Cambridge.

Other versions of the Old Testament dating from the early centuries are the Syriac, 2d or 3d century A.D.; the Coptic, 3d century A.D.; and the Latin, chief being Jerome's Vulgate, about 400 A.D.

X. *Genesis of the New Testament.*—In the earliest days of the New Testament Church their sacred book of authority was the Old Testament. The apostles of Christ were continually referring to these Hebrew writings and expounding them. But in this process they were also always preaching that Jesus was the Christ. The Old Testament Messiah and the Nazarene were one. This was their dominant theme. As an outcome their message was full of statements about Jesus. Indeed, this was the centre and the sum of their preaching. Thus their proclamation put into being a body of teaching about the person and words and deeds of Jesus Christ. In this Christic life the Old Testament found its fulfillment. Hence there came to stand alongside the Old Testament material another body of truth, having equal sacred value, namely, the report and record of the life of Jesus Christ. Moreover, at the same time, and in the same process there came into form and shape the substance and sacred authority of an Apostolic message. And so, gradually, and in a vital way, as an outcome of the growing life of the New Church, a set of writings called Apostolic came to be acknowledged as a New Testament Canon and to be set alongside the Old Testament as having equal authority and worth. This process took time, and had its stages. Its separate steps we are not able to trace. It stood complete in the canons of the 3d Council of Carthage 379 A.D. From that date onward the New Testament stands in its full integrity as a canonical body of sacred literature. So all Christendom has agreed.

To trace this historical uprising of our New Testament is well nigh the most urgent task of modern Christian scholarship. Something needs to be said about this. Christ left no writings. This seems undoubtedly sure. It seems almost equally sure that the first New Testament writings were the natural outgrowth of the Apostolic work. In this process Paul holds the preeminent place. His writings, while mostly born of special needs, held an enduring value. They engrossed his authoritative message. As such they were cherished, and formed a nucleus of sacred New Testament literature. In some vital connection with this growing life and work under Apostolic lead, there grew up our gospels. Just how, and just when this most important work was done no one surely knows. Efforts at the reconstruction of this process are making everywhere and all the time. But the procedure is almost entirely theoretic.

Certain facts stand clear. The gospel of John stands in a place by itself. Its outline of Christ's life, its choice and treatment of material, and its central themes are all widely and strangely unlike the main features of the other gospels. Luke also has a striking individuality, containing a surprising quantity of material found nowhere else, though for all that agreeing strikingly and in essential respects with Matthew and Mark. Matthew and Mark are plainly very closely akin. They are commonly felt to have arisen in some way expressive of close felowship of aim, form, sources, and time. Touching the origin of all four explicit inner witness is lacking. The simple fact of their actual rise into a position of supreme authority and respect, whatever may have been the method or means, gives every presupposition in favor of the genuineness of all four as authorized reports of Jesus' life. Thus much needs saying by itself.

Certain traditions about their origin have figured very influentially. Eusebius, about 300, reports from Papias, about 140, that a "presbyter" used to say that "Peter used to give his instructions acording to what was required, but not as giving an orderly exposition of the Lord's words." These "Mark, having become an interpreter of Peter, wrote down accurately, etc." Immediately in the same context Eusebius quotes Papias as saying of Matthew that "he wrote the oracles in the Hebrew dialect, and each one interpreted them as he was able." Of Luke we can gather no helpful traditions; we have to gather all we know from references in his gospel, in Acts and in Paul's writings. While the mention of the gospel of John opens a world of sharpest scholarly divergence and debate.

Now to outline briefly leading theories: The gospels are conjectured to have originated something thus: First, in the first three gospels there are striking signs of broad similarity; their general synopsis of the main outline of Christ's public life is the same; they use many phrases in common; they expand and condense at the same points; such facts intimate that very definite and potent influences operated in common upon all three. This solicits explanation. But they also strikingly differ; these differences are commanding and broad. Luke has much unique material; Matthew distributes his material into coherent masses; Mark seems simpler, truer, strikingly independent. These variations also call for explanation. These resemblances and divergences are being traced with minutest carefulness. The aim is to find the facts as to their origin. Which gospel was first; which was next; what were their sources respectively and in common; how are Matthew and Mark, Matthew and Luke, Mark and Luke, related; did any one depend on any other, or upon the other two; did some fourth account, now lost, lie back of these; what was the Hebrew gospel, etc.? These are the leading questions which students are trying to answer. A view widely held at present supposes that Mark preserves to us a document which came to his hand from some source unknown to us; that Matthew preserves to us another document called the Logia; that these two were combined by Matthew in forming his gospel; that Luke also used the Logia, combining it with his own new material. This is the now widely known "two-document" theory. The main efforts here are to define the original full pure form of each of these two documents. Here positions vary manifoldly. Another view urges vigorously that no written documents lay behind any of our gospels. What preceded our written gospels was an era of very careful catechetical instruction. Out of this memorized and crystallized material grew our gospels. This method seems to find a measure of illustration in the oral discourses of the book of Acts. For a historical review of this study see Sanday, 'Expositor' 1891, 'A Survey of the Synoptic Question.'

The study of the origin of the gospel of John is getting to be a science by itself. It has hardly a single thing in common with the debate over the first three gospels. Look at

the fourth gospel carefully. Its progress of events, its relation to Judæa and Jerusalem, its report of the great debates, its miracles, its discourses, its style, its ideas, its very words are all peculiarly its own. Two questions have come to the front. Are its narratives authentic history? Was it written by the son of Zebedee? But other problems are also urgent: When and where and how was it written? What is the sum and drift of its internal evidence? What has been its external history? Has its order of chapters or paragraphs been disturbed? How is it related to the epistles of John, and to the Apocalypse? To list and classify the views that have been held, saying nothing of the literature, would be impossible here. See special article on Gospel of John. Suffice it to say that among scholars, as they strive to give some rational account of these matters, there has been a strong tendency to discount the historical value of this gospel, and to deny its full authorship to the apostle John. But the great heart of Christendom has always felt that it found and felt in the Gospel of John the very presence of its very Lord, as discerned and described by his most profound and intimate disciple. The prime question has always been in plain view. Did the only begotten Son of God become incarnate for our salvation? This is *the* Johannine question. Upon this prime problem hangs every other. Once state in full and in brief the entire sum and nature, the whole scope and purport of its words, as they stand; note its unity, its homogeneity and its profundity; survey the sweep of its thought; look into its religious purity, its ethical absoluteness, its transparent clarity; sense its overwhelming momentum; observe its entire fluidity, the energy of the whole pouring full from every part; being watchful all the while to see that these impressive qualities, all and single, lie throbbing and shining in this gospel wholly and only because of the clear and full presence of the Christ, whom some author, with an all-absorbing devotion, has endeavored to unveil — and one must conclude and exclaim that here is no human invention, no poetic embodiment of any earth-born type of thought; but rather the declaration and disclosure, by an anointed and enraptured eyewitness, of his own full and immediate vision of the heavenly glory of Jesus Christ, the only begotten and incarnate Son of God. At any rate it can be boldly said that a discussion of the origin of the Gospel of John, to say nothing of the other three gospels, deals with the inmost essence of the subject of this essay.

Some special mention of the book of Acts is also needful in any statement of the genesis of New Testament writings. Here is an authority of the first rank and importance. It is our sole reliable record of the earlier days of the Christian Church. It defines and presents the actual process of the transition from the life and time of Christ to the Apostolic Age. Its references to geography, and archæology and politics and civil administration and customs, all presented with singular minuteness, at the same time expose it to the sharpest tests of historical criticism and establish its singularly full trustworthiness. Written without much doubt by Luke, a personal friend and companion of Paul, and a man of painstaking accuracy, it offers from chapter 20:5 on, and also in chapter 16, the testimony of an eyewitness; from chapter 12 on, a record of first-hand knowledge; and in its first 12 chapters a compilation from sources which he was in a peculiarly good position to obtain and inspect with the aid of first rate authorities. But problems beset the book. The leading of these concern the day of Pentecost; the relation of the speaking with tongues in Acts 2 to that in I Corinthians 14: the relation of chapter 15 to Galatians 1 and 2; the sources of the book; the authorship; the text; and the speeches. In particular, certain scholars impugn chapters 1–7, and all records of miraculous events. But in the main these are matters that lie beyond the range of precise historical outside proof. Hence theories may continue to abound. But sober views must contend that here is a faithful reflection of the primitive Christian days, from the hand of an alert and competent historian who wrought under the immediate influence and presence of apostolic men, in the very midst and upon the very ground of the scenes which he reports.

One other section demands mention in this study of the genesis of the New Testament — the Apocalypse. The surface aspect of this book is bewildering. Its historical allusions are the puzzle of the ages. Interpretations are a crazy medley. But statements of another nature may also be made. This book belongs to a class. It is one of many. In fact it marks a world current. Taken altogether, the outpour of Apocalyptic literature is a phenomenon of noteworthy persistence. It springs up repeatedly in Old Testament life. A striking instance is Daniel. It wells up frequently in the speech of Christ. Many would deny all such ideas to him. But this is rash and violent in the extreme. His conscious connection with Daniel cannot be impugned. His own apocalyptical utterances must be allowed. Then the teachings and experiences of Paul cannot be erased. Thus much touching form. But once one penetrates beneath the form, and confronts the inner message of every Biblical apocalypse, — he is a rash assailant who would assume to undo its word. This is pre-eminently true of the Apocalypse of John. It is a book of impregnable strength. Its central theme is the world struggle between the true God and his blasphemous counterfeit for the worshipping allegiance of mankind. This is the one inmost and uppermost errand and office of the book. Specially in chapters 12–22 the evolution and description of this conflict stand forth in stupendous strength. The true God, the living God, the creator God, the spirit God, sole Lawgiver, Judge and Saviour of angels and men, holy, infinite and pure; the suffering and glorified Christ, mighty, gracious, and true; with their innumerable, worshipping, devoted human and angelic hosts, on the one side — the Dragon and Beast and pampered Queen, full of blasphemy, treachery, cruelty, and lust; with their hosts of devotees to every sordid lust, on the other side, representing all the personnel, good and bad of a teeming universe, surge and strive unto issues of eternal life and eternal death amid the scenes of this mysterious book. It is a volume of life in which the awful struggles within the realms of religion and ethics attain their ultimate culmination. It fixes for-

ever the issue toward which all the teachings of the Bible tend. Here, as nowhere else, the solemn undertone of the entire volume sounds forth in full expression. Here the full majesty of God, the full enormity of sin, the full anguish of guilt, the full felicity of grace stand clear. Here the inner structure and substance of true morals and religion are shown and seen to be imperishable. However mysterious and confusing the outer guise of this incomparable book, whatever historical allusions its various enigmas may really intend, whoever its author, whencesoever its sources, and whatever the motive stirring its writer's mind, its inner teaching, simple and sublime, concordant, inclusive, and pure, forms the crown and marks the consummation of all for which the Bible most distinctly stands. Its nature befits its place. It well corresponds to the mysteries and enduring strength that mark the opening chapters of the book standing at the beginning of the Biblical list. It is a book of issues. A study of its genesis leads back into a deep and far-seeing study of the real inner meaning of all the volume which it concludes. Thus much needs saying about its inner value.

Critical study of the origin of this book has in recent years taken a new turn. This study deals distinctly with its apocalyptical features, and its historical intimations. It has pursued two marked courses, one that of literary, the other that of historical criticism. The latter is at present paramount, and bids fair to hold the first place. It consists in an effort to trace, through a study of the world's apocalyptical literature, the actual historical genius of the forms found in this work ascribed to John. This work is as yet but fairly begun. Till it is done efforts at final estimates are vain. The nature and field and status of this study may be seen in Bousset, 'The Antichrist Legend.'

XI. *Canon of the New Testament.*— This study seeks to trace the actual historical acceptance of the New Testament writings by the Church as a recognized body of sacred literature, worthy to stand alongside the Old Testament. One has to begin with 140 A.D. Witness as to this date is very meagre and indefinite. The data are from the epistle of Clement to the Corinthians, the II Epistle of Ignatius the Epistle of Polycarp, the Didache, the Epistle of Barnabas, the Shepherd of Hermas, the writings of Justin Martyr. Some of these testimonies date later than 140 A.D. by a few years. But they stand so near that date as to form fair testimony as to that era. The evidence is mostly by way of allusions to sayings found in our New Testament writings; and not in the form of direct citation or mention. But these allusions and references are sufficiently numerous and suggestive to support quite firmly the supposition, which otherwise seems most natural, that our New Testament writings were at that date widely known and honored. In a few cases the exact words of our gospels were used by these early writers, as a quotation from the Lord's Prayer, and from his words in Gethsemane. In some cases New Testament writings are mentioned, as Paul's epistles, I Corinthians and Philippians. One writer refers to the words of Christ in Matthew 22:14 as Scripture. In particular the work of Papias is important. His words shed light on the period prior to 140 A.D. He explicitly attests "writings" as of Apostolic value, one from Peter through Mark, and one from Matthew. He also seems to have known of other writings from the hands of Peter and John. See Eus. 'Hist. Eccl.' iii. 39. The words of Justin are of the greatest value, though still indeterminate. He alludes repeatedly to 'Memoirs of the Apostles.' He uses the word "Gospels." He traces these writings to the "Apostles and those who followed them." He seems certainly to have had in hand our first three gospels. Some important elements of his work seem almost as surely traceable to the Gospel of John. He alludes to Paul's epistles as standard. He also names John's Apocalypse. Marcion also apparently knew and used Luke, and accepted 10 epistles of Paul, namely, Galatians, I and II Corinthians, Romans, I and II Thessalonians, Colossians, Philemon, Philippians, Laodiceans. Statements like the above are as definite as can be made about our New Testament prior to 150 A.D. The fullest testimony within the Church is from Justin Martyr. He bears witness that a New Testament canon was in vogue in his day, having fully equal validity with the Old Testament. How far back can this condition be supposed to date; and how many books were included. Zahn says that our four gospels and the 13 Pauline epistles were widely circulated as collections at the latest about 125 A.D. Harnack declares this unsupported by historical evidence.

200 A.D. In stating in general the situation of the New Testament canon at this date the chief witnesses are Tatian, Irenæus, Clement of Alexandria, Tertullian, Hippolytus, the Muratori canon. These sources make many features stand clear. Tatian prepared from our four gospels his Diatessaron. Irenæus attests all our New Testament books except Philemon, II Peter, Jude, specially emphasizing the value of the four gospels. He calls these New Testament writings the "pillar and ground of the faith." He combines them with the Old Testament as upborne by the same spirit. Clement of Alexandria distinctly attests the same writings as sacred writings, including II Peter, Jude, and Hebrews. Tertullian made abundant use of our New Testament writings as holy writings, excepting that he is silent about II Peter and II and III John, and sets Hebrews, I Peter, and Jude into a second rank. The Muratori Fragment makes a sharp definition of canonical books. It includes the four Gospels, Acts, 13 epistles of Paul, I and II John, Jude; and omits Hebrews, I and II Peter, III John. At this period, as in the earlier era, certain writings, not now held canonical, notably Barnabas, Shepherd of Hermas, and Apocalypse of Peter, seem to have stood near to sacred Scripture in Christian respect. For this era the Syriac version yields peculiar material. It accepts Hebrews, but omits II Peter, II and III John, Jude, and Revelation. In brief, at 200 A.D. our four Gospels, Acts, 13 epistles of Paul were established universally in supreme respect as sacred Scripture with the old Testament.

200 to 323 A.D. In this era two names call for mention. Origen, who died 254 A.D., has left quite outspoken statements. The most valuable are in Eus. H. E. VI. 25. He gives the four gospels sharp definition as unique and canonical. He exalts the works of Paul without numbering his books. He declares I Peter

«acknowledged,» and II Peter as in circulation. He includes Revelation and I John, mentioning II and III John as not held «genuine by all.» He discusses at length on Hebrews, honoring its contents, but wondering about its authorship. In other passages he includes Acts as by Luke, and credits 13 epistles to Paul, and uses James and Jude. One striking feature is Origen's distinctions. He speaks of some books as «not spoken against,» of others as not held «genuine» by all, of another as «acknowledged,» a term which he also applies to all the «Apostolic writings.»

Eusebius in H. E. III. 25 gives a classified list, aiming to summarize the views of the whole Christian period to his day. He gives the four gospels, Acts, 14 epistles of Paul, I John, I Peter, and Revelation. These he called «acknowledged.» He then names James, Jude, II Peter, II and III John as «disputed.» He names next «Acts of Paul,» Shepherd, Revelation of Peter, Barnabas, Teachings of the Apostles as «spurious.» Here is notable testimony. It is representative. It is discriminating. It contributes toward conclusions. It shows a universal, undoubted canonical standard. It shows cautious study and practice. It shows that precisely our present canon was held at that time, and we cannot be sure how early or how far his testimony reaches. And it shows that writings now finally rejected were then rejected. This is one of the chief landmarks in the history of the New Testament canon.

323 to 397 A.D. Constantine gave standing to the Christian Church. He revered and disseminated sacred Scripture. Conflicts with heretics made outlines precise. The canon, accordingly, became clear and took final form. Doubts vanish. The word «canon» comes into vogue. The Synod of Laodicea, about 360 A.D., has been said to have left a list, in its 60th canon. At any rate it belongs in this period. It gives the present Protestant canon for Old Testament and New Testament, only omitting Revelation. This omission was characteristic of the Eastern Church at this time. In the West, Hilary and Rufinus held to this canon. Augustine and Jerome also fixed upon our present list, though recognizing that some books were challenged. The formal concluding steps were taken authoritatively for the Western Church at the third Council of Carthage, 379 A.D. In 495 A.D. Bishop Gelasius I. of Rome put forth a synodical verdict as a decree adopting the list and fixing the order of the New Testament canon as we have it to-day. In 691 A.D. this was adopted for East and West by a universal council.

XII. *Text of the New Testament.*— Up to the time of Constantine the fortune of New Testament Scriptures was precarious. We know too little about it all. But Christians were largely poor, often persecuted, sadly scattered and altogether unable to solidify and maintain in permanent form all the elements and instruments of their life. We have no original New Testament manuscripts. We have no copies from the first three centuries. When Constantine accepted Christianity, among other things, he ordered Eusebius to prepare 50 copies of the Scriptures for the churches of Constantinople alone. From that century manuscripts begin to appear, two being preserved to our day. Two more date from the 5th century. From the 6th century 27 documents have come to our time. From the 7th century 8 small fragments. These authorities and many more of later days restore to us our New Testament text. Aid is also rendered by versions. Chief of these are the Syriac and the Latin. Further aid comes from the Church fathers. The text which lay underneath our authorized English version was based on very inadequate knowledge and study of textual authorities. In later years this study has become a noble science. In most recent years its prosecution has taken a turn of phenomenal meaning. Scholars are trying to group textual authorities. In this impressive undertaking Westcott and Hort are leaders. They seek to classify sources into families, and so to be able to estimate manuscript values. In this process one group is called «Syrian,» including a great number of authorities, but all alike being of low value. Another group is the «Western.» Of this the leading manuscript is D, Codex Bezæ, so-called. This group is remarkable for freedom, specially for adding otherwise unknown material. Another group is the «Alexandrian.» This group is of minor weight. The fourth group is called «Neutral.» This is believed to represent most nearly the original New Testament. Its leading authority is B, the Codex Vaticanus, so-called. This is the oldest and weightiest manuscript we have.

This raises the whole question of the relative worth of manuscripts. It may be surely expected that this problem is by no means solved. It is little more than opened.

Independent workers are challenging the positions of Westcott and Hort. But after all is said and done, our New Testament text is mainly assured. «The great bulk of the words of the New Testament stand out above all discriminative processes of criticism, because they are free from variation, and need only to be transcribed. . . . The words in our opinion still subject to doubt can hardly amount to more than a thousandth part of the whole New Testament. See Westcott and Hort, 'Principles of Textual Criticism.'

Manuscripts of the New Testament.— Four manuscripts deserve emphatic mention, as they are prime sources for both Old Testament and New Testament. Codex Alexandrinus, named A, dates probably from the 5th century. It contained originally the whole Bible in Greek, also the two epistles of Clement. At present it is mutilated. Parts of Genesis, I Kings, and Psalms, most of Matthew, parts of John and II Corinthians are lost. It is now in the British Museum. It came from Constantinople to England in 1627. As an authority it rates lower than the two next named.

Codex Vaticanus. B.— This dates from the 4th century and contained originally the whole Greek Bible. This is deemed by many the oldest and most precious manuscript known. It is in the Vatican library at Rome, since 1450 A.D. In its present state it lacks portions of Genesis, II Kings, Psalms, Hebrews, the Catholic epistles, and all of Revelation. Its text had predominant influence with Westcott and Hort and with the revisers of our English Bible.

Codex Ephræmi. C.— This dates from the 5th century. Originally it contained the whole Greek Bible. It is now in the National Library

in Paris. Early in the 16th century it was brought to Italy from the East. It was taken to Paris by Catherine de Medici. At present it is a palimpsest and only a fragment, having only a small part of the Old Testament and barely more than half of the New Testament. It is of great value.

Codex Sinaiticus. Aleph.— This dates from the 4th century. It now exists in two parts: one, of 43 leaves, in the Court Library in Leipsic; the rest in the Imperial Library in St. Petersburg. It originally contained the whole Greek Bible. But now the Old Testament is in fragments. The New Testament is complete. This is the manuscript that was found by Tischendorf under such thrilling experiences in the monastery of St. Catherine at Mount Sinai. It is of priceless value as a witness to the New Testament text.

Codex Bezæ. D.— This manuscript orginated perhaps in the south of France in the 6th century. It is now in the University Library at Cambridge, being the direct gift of Beza in 1581. It contains the Bible in two languages, Greek and Latin. The relation of these two texts to each other is a very curious and unsolved problem. As a witness it has to be used with great caution. Its New Testament text contains only the Gospels and Acts and a few verses from the Catholic epistles. Its most striking and puzzling feature is its strange omissions, and still stranger quite extensive additions.

The above named are the leading manuscripts. These are all written in large letters called uncials. Of these there are over 100. Many more, considerably over 2,000, are written in smaller letters and in a more running style, and so are called cursives. For further statements consult the Variorum Bible.

XIII. *Versions of the New Testament.*— Of these the Syriac would naturally date early. Until toward the middle of the last century all supposed the so-called Peshitto, or common version, to be the one and only Syriac translation of Scripture. In 1842 manuscripts came to view suggesting another and perhaps earlier version. Since that time there has been much debate over the problem of two versions in Syriac. Of late new light has come, and again from Mount Sinai. Here in 1892 two ladies found a palimpsest of a Syriac version which may possibly be older than either. This debate is destined to continue for some time. Of these versions the Peshitto is the great standard version of the Syriac Church. It has been current and in general use from the 4th century. We know of 177 manuscripts, gathered from the Nitrian Desert in Egypt, and now in the British Museum. This version does not include II Peter, II and III John, Jude, and Revelation. Other Syriac versions have been made.

Egyptian Versions.— These must have begun to originate by 300 A.D. At present five are known. The Memphitic represents lower Egypt, where the dominant dialect was at home. Here alone are complete copies of the New Testament found. Over a hundred manuscripts have been examined, all of late date, the oldest from 1173. Its text is surprisingly good. The Thebaic version was current in upper Egypt. It probably originated somewhat later than the Memphitic. It exists only in fragments, though many of them are very old manuscripts, some dating possibly into the 4th century.

Armenian Version.— This originated in the 5th century. It was made from mixed texts, Greek and Syriac. Its earliest manuscript dates from the 8th century.

Gothic Version.— This was made by Ulfilas in the 4th century directly from the Greek. Now it is in fragments.

Old Latin Version.— This was made, perhaps, in Africa about 150 A.D. Scholars trace rival translations and classify them as African, European, and Italian. These were supplanted by the Vulgate. Textual study of this early version is of peculiar interest, disclosing, as it does, a very free treatment as characteristic of that time, and containing what is called the «Western» text.

Vulgate.— This is a work undertaken by Jerome at the order of Pope Damasus in 382. At first he merely revised the Old Latin, working on the Gospels. Then he developed the rest of the New Testament. His Old Testament work was much later and more thorough-going. Manuscripts of the Vulgate exist everywhere in Europe. The best is the Codex Amiatinus. The text of this version has been in very bad condition, and it is very difficult to restore. The work is in progress. This is the standard Bible of Latin and Roman Catholic Christendom everywhere.

XIV. *History of the Bible as a Whole.*— Jerome's influence through his Vulgate version and through separation of the Apocrypha from the canon was far-reaching. In the 16th century the Roman Catholic and Protestant Churches took different courses. The Roman Catholic Church in its Council of Trent in 1545, adopted the Old Testament Apocrypha as an integral part of the Old Testament canon. The Lutheran party, after some indecision, settled down by usage upon the pure and full Biblical canon as held by us to-day, though during the process there was free discussion of the value of the parts that we have found under dispute. The same holds true of the Swiss or Reformed party. Through them, and by way of the Westminster Confession of Faith, we have received our present body of sacred Scripture.

Previous to this the Bible had made its way to England. About 670 A.D. Cædmon made a paraphrase in verse of the Bible narrative in Anglo-Saxon. Before 800 Aldhelm had translated the Psalms into English. In 735 Bede finished, with his life, a version of John. King Alfred also did some work of this kind. But of these nothing surely remains. Numerous other translations of parts of the Bible were made later. Of some of them manuscripts remain.

Wycliffe's first translation dates from 1380–2. This was a composite work. Soon after his death this was revised; and this revised Wycliffite Bible became the current version. About 170 copies are known. This is the first known complete English Bible. Though of untold value, it was not a scholarly work, being based upon a poor Latin translation.

In the 15th century printing appeared, November 1454. In the same century, and at about the same time the Turks took Constantinople and scattered scholars out of the East, with their learning and treasures, over Europe. Out of this revival of learning and printing came mighty sequels for the Bible. Translations and

copies now could multiply. In England several versions need mention.

In 1525 Tyndale completed in Hamburg his translation of the New Testament. Despite strenuous efforts to destroy it, copies multiplied. But most of them have perished. This version, variously revised, is the influence lying most potently underneath the present King James Bible, and through it our English tongue has gained and retained not a little of its peculiar charm.

Other translations are Coverdale's, undertaken at the request of Cromwell, dedicated to Henry VIII., covering the whole Bible, and published in 1536; Matthew's, really a completion of Tyndale's, made under favor of the king, finished in 1537; the Great Bible, a grand, authorized edition of Matthew's, under Cromwell's patronage, by the hand of Coverdale, published in 1539 and set up in every church; the Genevan Bible, prepared in Geneva by English refugees under the influence of Calvin and Beza and published in 1560; the Bishop's Bible, prepared under the patronage of Elizabeth and the editorship of the Archbishop of Canterbury for the English Church, and printed in 1568; and the Roman Catholic or Douay Bible made from the Latin Vulgate for the Roman Catholic Church, and published 1582 and 1609. Of these the Genevan Bible had the widest influences; it was the first entire English Bible to adopt the division of chapters into verses.

Authorized Version.— This work was produced under the patronage of King James I. at the suggestion of the Church leaders. About 50 scholars were engaged in the work, arranged in six groups. They used Beza's Greek Testament of 1589 for the New Testament. The Bishop's Bible formed the English basis, though the Genevan and Douay versions had much influence. Through the Bishop's Bible Tyndale still made his power felt. This version was published in 1611 to become the standard form of sacred Scripture for over 200 years for the entire English race. Its influence upon literature and life can never be told.

Revised Version.— Increase of knowledge of Biblical lore since 1611 made a revision imperative. This work was proposed officially by the Established Church of England in its Convocation of 1870. Rules were laid down governing the translation, enjoining use of best text, faithfulness to the original meaning, and as few alterations as possible. Two companies were formed, of 27 members each, selected from various denominations. These were supplemented by a body of American scholars, whose results, when not adopted by the English body, were incorporated in an appendix. The work began in 1870. The New Testament appeared in 1881, the Old Testament in 1884. The changes from the version of 1611, while very numerous (Dr. Kenyon records that the Greek New Testament of 1881 differs from that of 1611 in 5,788 readings, of which about one quarter are a notable change) are prevailingly in matters of minor moment.

American Version.— In 1901 the surviving members of the American committee, appointed by the English committee in 1870, published an edition of the English Bible in which the opinions of the American members of the revision hold first place. In this edition there are several notable improvements in the way of faithfulness and modernness and facility in use. Chief among these is the new list of marginal readings.

German Versions.— Luther's is the standard, though many translations appeared before his. He translated directly from the Greek and Hebrew, putting out 10 editions during his life. In 1863 the Evangelical Church Diet set afoot a revision of Luther's Bible. Specially to be mentioned for scholarly value are Weizsäcker's German translation of the New Testament; and the translation of the Old Testament conducted by Kautzsch and completed in 1894.

French Versions.— The chief early version is that by Olivetan in 1535. In 1588 a revision was made at the suggestion of Calvin and under the lead of Beza. This has been the standard French Bible. A new translation by Segond 1874–9 is now most widely used.

The standard Dutch Bible, called the States Bible, is a translation authorized in 1624 by the States-General of Holland, and completed in 1637.

To-day there exist at least 108 translations of the entire Scriptures. If partial translations are added, the total will nearly reach 500. In this work the past century has been a phenomenal era. It has seen the Bible put into the possession of 1,200,000,000 of people. This is pre-eminently the work of Protestant Christianity. During this past century 80 Bible Societies have come into being, with a multitude of auxiliaries. Of these the leading one, the British and Foreign Bible Society, issues annually nearly 4,000,000 copies.

XV. *Influence of the Bible.*— The persistence of the Bible and its unexampled dissemination command some remark. Its age-long and world-wide promulgation must contribute to extend and fortify its power. But its own original, creative force alone can explain its amazing diffusion and vitality. It proves itself pre-eminently the Book of Life. The sacred Scriptures of no other religion or faith can ever begin to parallel it for the number and value of its manuscripts, the number of its versions, the number of its publishing houses, and the number of its copies actually sold. As literature it is wholly unique. The stamp of its style has fixed the taste of the leading nations of our time. And its manifoldness is quite as wonderful as its excellence. It embodies history and oratory, dialogue and drama, philosophy and poetry, giving every essential form of human literary utterance. It has laws, tragedies, annals, parables, prayers, satires. It contains the epic, the lyric, the ode, the chorus, the oracle, the riddle, the chant, the liturgy, the refrain, the acrostic, the apostrophe, the proverb, the epistle, the philippic.

But it is not the form, pleasing and refining as it is, that holds the secret of the Bible's power. It is always the message that transmits force. The Bible figures always as the Word of God. It engrosses and addresses character. Its moral energies are the sources of its strength. It reveals and declares God. It announces law. It portrays the judge. It stirs up conscience to a final verdict upon human life. It summons the human will. Its heroes are prophets. Its great victors are princes in the moral realm. Its central figure is Jesus Christ. Its typical explorers are apostles. Its closing book is an apocalypse. Its outlook is eternity. These things create and sustain its matchless

style; and these explain and feed its undying life. It has to do with the being and majesty of a holy God, and with the inmost character and uttermost destiny of immortal man. Hence all its excellence and strength.

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Bible, Harmony of the, with Science. The history of science in its connections with the Bible is full of these conflicts between the scientific and theological classes. Both parties have participated in them, as assailants and defenders. Sometimes scientists, after misleading the divine into some supposed scientific interpretation of Scripture, have charged back upon him their own exploded errors, and sometimes divines, after attacking some true theory of the scientists as hostile to Scripture, have gladly accepted it as among their best defenses of the faith.

Astronomy and the Bible.— The first of the seeming conflicts was between astronomy and the Bible. The Psalmist David, who was not a scientist, had poetically depicted the starry heavens as a spangled canopy wondrously wrought by the divine hand. But the astronomers in later times devised what is known as the theory of Ptolemy, according to which the heavens were composed of vast crystal spheres, one within another, having the sun, moon, and stars attached to them as they revolved around the earth, which was conceived of as a flat, circular plane, immovably fixed at the centre of the system. The divines of the day, docilely accepting this crude mechanism of the scientists, proceeded to celebrate the divine power, wisdom, and goodness which it displayed in producing the wonderful vicissitudes of day and night and summer and winter. Their logic was correct enough in form, but needed to be reinforced with better science. The better science at length came, not indeed from a professed scientist, but from a faithful priest of the Church, Nicholas Copernicus, who modestly broached as a working hypothesis, what is now known as the Copernican theory of the solar system. Galileo, however, who could equal Huxley in sarcasm and invective, published in his scientific journal called 'The Siderial Messenger,' such proofs of the Copernican theory as provoked a bitter controversy with the Church authorities and led to his pretended recantation. It is difficult for us now, with our advanced knowledge, to understand what a radical change was coming into men's opinions. Not only was the solid earth sent spinning through space like a cannon ball, but the entire orthodox conception of heaven and hell was literally revolutionized. The Inferno of Dante, with its descending ranks of lost spirits and demons, could not be contained within such a revolving globe, and his Paradiso, with the saints and angels worshipping the Blessed Virgin and Holy Trinity, vanished from such a receding firmament like sunset clouds. And when Bruno came with his daring speculations concerning other inhabited worlds our little planet seemed too utterly insignificant to be made the scene of a divine incarnation, redemption, and judgment. Every essential article of the faith appeared to be imperiled. It is no wonder that free thinking men of science fared badly in such a conflict with the Roman Inquisition. Galileo was imprisoned as a heretic, and Bruno was burned at the stake as an atheist and blasphemer. But what has been the issue of the conflict? Scarcely a trace of it remains. Gradually the new astronomy has been accepted, not only as true in itself, but as far more accordant with Scripture than the old astronomy of the Hebrew or Greek. Instead of a star spangled tent or an illuminated dome of glass, it has opened an unbounded universe for the illustration of the divine perfections and revealed doctrines. Does astronomy tell us of an immensity of space, with regions beyond regions which we cannot even conceive? The Bible also teaches us that Jehovah inhabiteth eternity, and the heaven of heavens cannot contain Him. Does astronomy tell us of countless orbs, moving with tremendous forces, in fixed orbits, under immutable laws? The Bible also teaches us that He hath ordained the heavens and established in them His power and faithfulness. Does astronomy tell us of wonderful adaptations of planet to sun, with changing zones, and climates, and

seasons? The Bible also teaches us that wisdom was with Him when he prepared the heavens, the sun and moon and stars for signs and for seasons, and that He hath garnished them by His spirit. Does astronomy hint to us of a variety of habitable worlds, with a corresponding variety of intelligent races? The Bible also teaches us of the heavens as the abode of angels and archangels and of a heavenly Father and His house of many mansions. Does astronomy tell us that our earth is akin to other orbs in mechanical and chemical constitution, and suggest that we may be some day knit together with them by ethereal vibrations in psychical sympathy? The Bible also teaches us that the angels desire to look into the mysteries of human redemption, that its manifold wisdom is now made known to principalities and powers in all heavenly places, and that there is rejoicing among them when one sinner on earth repenteth. Let it be observed, I am not now saying that the Bible teaches astronomy, but simply that its teaching is in harmony with astronomy.

Geology and the Bible.—The next seeming conflict was between geology and the Bible. It is certain that Moses did not speak as a man of science in his dramatic vision of the creation, when he described the heavens and the earth, land, sea and sky, plants, animals and man, as produced by divine commands in six working days, ending in a seventh day of rest. The early geologists, however, accepted this sublime vision as a scientific cosmogony, and like-minded divines followed them, magnifying such creative miracles as the formation of the terraqueous globe in 24 hours, the arrangement of its seasons and climates between a single sunrise and sunset, and the marshaling of its vegetable and animal kingdoms by divine fiats from Monday morning until Saturday night in the autumn of the year 4004 B.C. Here again the argument, absurd as it now seems, lacked scientific content rather than logical form. It is within living memory what a shock ensued when that scientific content was furnished, and it was discovered that the earth is of indefinite antiquity, that its continents have emerged from its oceans through long ages of subsidence, and that successive dynasties of plants and animals have flourished and decayed, leaving only a few fossil remains in its crust. The very doctrines of the creation and the Sabbath itself seemed directly assailed, and the defense of them was fierce and desperate. The geologists were not persecuted like Galileo and Bruno; but the most extraordinary makeshifts were devised to evade their conclusions. It was intrepidly declared that the Almighty created the earth in a stratified form with all its fossils, to serve as a trial of our faith. It was ingeniously surmised that the whole prehistoric geology was a chapter omitted in Genesis as not relevant to the purpose of the narrative. It was even fancied that the six days' works were a special miraculous creation in Eastern Asia to fit up a Paradise for the temptation and fall of man. When at length the vast geological periods could no longer be denied, they were forced into correspondence with the Mosaic days, conceived as days of Jehovah, with whom a thousand years are as one day; and elaborate schemes of reconciliation were proposed by such distinguished geologists as Hugh Miller, Dawson, Dana, and Guyot, with which some less distinguished geologists have since made themselves merry. Nevertheless, we are already emerging from these heated discussions with reassured faith. As astronomy has opened unbounded regions of space for the illustration of the divine immensity, omnipotence, immutability and omniscience, so geology has recalled unlimited periods of time for unfolding the divine power, wisdom, and goodness with cumulative richness and fulness. And as astronomy has shed new light upon the revealed doctrine of the heavens and the angels, so geology is confirming the revealed doctrine of an orderly creation and a sabbatical calendar. Though the dramatic days of Genesis be measured in hours or in ages, though the time element be excluded from them altogether, though they be treated as ideal rather than actual, they will still appear as coincident acts of creation and phases of evolution, founded perhaps in the periodicities of nature and expressed in the Fourth Commandment. On comparing them we have, first, a formless waste or the nebulous chaos; second, the earth as divided from the firmament or the planet as parted from the solar nebula; third, the seas and the dry land bringing forth grass and herb, or the terraqueous globe with its photosphere and commencing verdure; fourth, the appearing sun, moon, and stars for signs and seasons, or the mature planet, in the solar system, with its zones and climates; fifth, the swarming of the great fishes and winged fowl, or the production of sea monsters and mammoth reptiles; sixth, the earth bringing forth beasts each after its kind, and the making of man in the image of God, or the evolution of the higher animal and human species; seventh, the divine day of rest, or the tranquil historic period. The correspondence, it will be seen, is at least logical, even if not chronological. On the one hand, geology clearly indicates that there have been successive periods of energetic evolution ending in a period of repose and order; and on the other hand, the Bible declares that in six days God created the heavens and the earth, and rested from his works on the seventh day. Geology also tells us of a primitive watery globe, whose glaciers and inundations have ceased since the appearance of man; and the Bible also, after the deluge, speaks of a covenant between Jehovah and the earth for man's sake, that summer and winter, and seedtime and harvest shall not cease. Geology still hints of interior fires which might at any time burst forth in general conflagration; and the Bible still warns latter day scoffers of a day when the earth and all the works that are therein shall be burned up. You may say that this teaching of the Bible is religious rather than scientific; that is not the point — whatever it be, it is in harmony with geology.

Anthropology and the Bible.— We are still in the midst of a seeming conflict between anthropology and the Bible. In the vision of creation man appears as made in the

image of God, with dominion over all inferior nature. Then follows an allegorical picture of the first man, Adam, as formed out of the ground, inspired with a living soul, and placed among the beasts of the field, and the fowls of the air, which had also been formed out of the ground and brought to him to receive their names. The first woman, Eve, his wife, is depicted as fashioned out of one of his ribs while he was in a trance, and the pair were placed in a garden to till it, with liberty to eat of every tree but the tree of knowledge of good and evil. They were tempted to disobedience by the subtlety of Satan in the form of a serpent, and so fell from their state of innocence, entailing the curse of labor, sorrow, and death upon the whole of mankind. It would seem impossible to find any strict anthropological science in this instructive parable; and yet until recently it has been so treated by both scientists and divines, who have held that man was molded by the divine hand as a lifeless clay image among living plants and animals; that he was endowed with psychical faculties and God-like qualities in a few minutes or hours, and that the man Adam was the sole progenitor of all the savage and civilized races of Asia, Europe, Africa, and America. But scientists are now urging some very different theories of human origin and development. We are told by palæontologists and ethnologists that man was but the product of the whole evolution of organic nature; that his remote ancestor was a man-like animal or anthropoid ape; that next came a succession of pre-Adamite races, of which the Hottentot, the Patagonian, and the Esquimau may be the survivors; that there have also been co-Adamite races as indigenous in other continents than Asia as the plants and animals with which they are there found associated; that all civilized races, including the Adamite, or Caucasion, have risen from savagery, with improving implements and arts, through long epochs of stone, of bronze, and of iron, and have a prospect of indefinite improvement in the future. In spite of theological prejudice and some instinctive repugnance, we have begun to entertain these theories, and may already provide, if need be, for their acceptance. As astronomy and geology have afforded new illustration of the physical attributes of Jehovah, so anthropology is unfolding His intellectual and moral attributes, in the structure of both body and soul, and may in like manner be adjusted to the revealed doctrines of human depravity and the divine image. The essential truths in the allegorical story of Eden will stand unimpaired, whether we view man's sinfulness as a primitive lapse or as a present condition; whether we regard his ideal Godlikeness as impressed upon him thousands of years ago or as still in process of development. If anthropologists shall prove that primeval man, physically considered, was evolved from pre-Adamite and anthropoid races as a half-animal savage in a state of nature; that he slowly developed psychical powers and religious beliefs; that while many breeds of men remain debased and deteriorated the Caucasian breed, both Hebrew and Christian, has been steadily advancing in knowledge, virtue, and religion, and that the perfected man of the future, with growing arts and sciences, may yet transform the globe and even bring it into connection with other worlds and races. If the anthropologists, I say, shall prove all these things, the Bible will teach, in correlation with them, that the first man Adam was of the earth, earthy, placed in a fruitful garden, associated with the animals, but with dominion over them; that God breathed into him a living soul and made him after His own image; that as in Adam all die, so in Christ shall all be made alive, and as we have borne the image of the earthly, so also shall we bear the image of the heavenly, and that the man of prophecy, as renewed after the image of Christ, the Lord from heaven, shall yet inhabit the new heaven and the new earth, wherein dwelleth righteousness. And still, too, will such teaching of the Bible, though unscientific, be found to be in harmony with such facts of anthropology.

Archæology and the Bible.— And now we are entering a seeming conflict between archæology and the Bible. The historical books, with no show of historiographic art, record the fortunes of the peculiar people of Israel as descended from the patriarchs, Abraham, Isaac, and Jacob, as worshipping Jehovah in distinction from the false gods of the heathen around them, as returning even from their captivities in Egypt and Babylon with a fresh reassertion of their own creed and ritual, and as ever looking forward to the Messiah, Christ, in whom their whole religion was at length absorbed and fulfilled. Philosophical historians, as well as learned commentators, have hitherto accepted these simple annals as accurate and trustworthy. Of late, however, some discredit has been cast upon them by certain archæologists, who claim that the inscriptions on the tablets unearthed at Babylon bear suspicious resemblances and affinities with Biblical stories of creation and paradise. The American Professor Hilprecht, with the true scientific spirit, declines to make such invidious comparisons, and declares that the Babylonian polytheism stands in contrast with the Hebrew monotheism. But the German Professor Delitsch hastily infers from them that the Hebrew monotheism was no better than Babylonian polytheism, and jumps across the following centuries to the conclusion that our Saviour himself thus depreciated the Jewish religion. Meanwhile, the German Emperor William, after admonishing the learned antiquarian professor to stick to the Babylonian tablets, without drawing theological inferences, proceeds to give his own somewhat conservative views of the theology of the Old and the New Testaments. It is a very interesting controversy. But suppose we should concede, for the sake of argument, all that the theolgical archæologists are trying to prove,—grant that the inspired vision of creation and the divine allegory of Eden may have some crude counterparts in the corresponding myths and legends of Babel—is it quite inconceivable that both have descended, the one in a pure and the other in a corrupted form, from the same primeval revelation in the dim period before the flood? Are not the Hebrew Scriptures one continual

protest against the religious errors of surrounding nations, and have they not at the same time infinitely surpassed them in the religious truths which they have unfolded? Is it any more incredible that Judaism should have been developed out of, or in spite of, preceding religions than that Christianity should have been developed out of or in spite of Judaism, both of them under that wonderful Providence which has educated the chosen races of mankind? Moreover, it has distinctly taught that both Judaism and Christianity, after their isolation and pupilage, were destined to universal prevalence; that in Abraham all the families of the earth would be blessed, and Christ himself be revealed as the desire of the nations. And the Gospel, therefore, was proclaimed among the Gentiles as well as among the Jews. St. Paul, too, the Apostle to the Gentiles, when preaching to the Athenians, insisted upon the consensus of Christianity with their religion in those great theistic beliefs which were taught by their own poets and philosophers, and which are common to all mankind. And, as Christianity, clad in civilization, is now going forth among the religions of the world reclaiming their truths and rejecting their errors, she is simply fulfilling her mission as the one absolute and universal religion—the faithful saying, and worthy of all acceptation, that Christ came into the world to save sinners.

I do not forget how much the question is complicated by the views of a radical school of the higher critics who maintain, on literary grounds, that the Old Testament Scriptures themselves betray that mythical and legendary origin which some archæologists would ascribe to them. Many of the conclusions of this school are based upon unverified conjecture and continual asseveration. But it may be well to accept them hypothetically, in order to state the whole problem of opinion. Assume then, if you like, that the books of the Pentateuch or Hexateuch were not written by Moses, but were a sort of mosaic of pre-existing documents written by unknown scribes and collected by unknown redactors or editors, as we now possess them. Assume also that the Biblical stories of creation and paradise in their literary form are anthropomorphic, dramatic, allegorical, and unhistorical. Assume still further that in these respects they bear some external resemblance to the creation-myths and paradise-legends of other Eastern peoples. Prove all this, if possible; and yet you will not have destroyed the incontestable fact that these ancient writings contain an objective revelation from God to man which is infinitely superior in kind and degree to any supposed revelations in the religions of Babylon, Nineveh, Assyria, Egypt, Greece, and Rome; and which even as to literary form surpasses any other sacred books, ancient or modern. Nor will you have lessened the evidence which the Bible thus affords of growing harmony with the very sciences of archæology and philology which are now arrayed against it.

In this article I have sketched in a popular manner those physical sciences which have seemed to be in conflict with revealed religion, because such sciences just now are most popular in their impression and most likely to disturb existing faith in the inspiration and authority of the Holy Scriptures, and because they are the most advanced sciences. The argument might be carried up into the higher sciences of psychology, sociology, and the science of comparative religion, but such sciences, as yet, are not so mature nor in so apparent conflict with the Scriptures. It will be seen that the argument is strongest where science is most clear and full. It is also cumulative, and already, I trust, warrants the belief that when science shall have reached the utmost goal of its development it will still be, as it always has been, in harmony with the Bible.

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Bible, The Polychrome. A new translation of the Scriptures from a revised text, by eminent biblical scholars of Europe and America; Professor Paul Haupt of Johns Hopkins University, editor, with the assistance in America of Dr. Horace Howard Furness. The special scheme of this great work is its use of color backgrounds upon which to print the various passages by different writers which have been made up into one work, as Isaiah or the Psalms. It is not based on any doubt of inspiration, but on the general conviction of biblical scholars that only good can come from making perfectly clear to the public the full results of modern critical research.

Bible Statistics, an interesting compilation, said to be the fruits of three years' labor by the indefatigable Dr. Horne, and given by him in his introduction to the study of the Scriptures. The basis is an old English Bible of the King James version.

Old Testament.— Number of books, 39; chapters, 929; verses, 23,214; words, 593,493; letters, 2,728,100.

New Testament.— Number of books, 27; chapters, 260; verses, 7,959; words, 181,253; letters, 838,380.

The Bible.— Total number of books, 66; chapters, 1,189; verses, 31,173; words, 773,746; letters, 3,566,480.

Apocrypha.— Number of books, 14; chapters, 184; verses, 6,031; words, 125,185.

Old Testament.— The middle book of the Old Testament is Proverbs. The middle chapter is Job xxix. The middle verse is 2 Chronicles xx., between verses 17 and 18 The shortest book is Obadiah. The shortest verse is 1 Chron. i. 25. The word "and" occurs 35,543 times. Ezra vii. 21 contains all the letters of our alphabet. The word "Selah" occurs 73 times and only in the poetical books. 2 Kings xix. and Isaiah xxxvii. are alike. The Book of Esther does not contain the words God or Lord. The last two verses of 2 Chronicles and the opening verses of the Book of Ezra are alike. Ezra ii. and Nehemiah vii. are alike. There are nearly 30 books mentioned, but not found in the Bible, consisting of civil records and other ancient writings now nearly all lost. About 26 of these are alluded to in the Old Testament.

New Testament.— The middle book is 2 Thessalonians. The middle chapter is between Romans xiii. and xiv. The middle verse is Acts xvii. 17. The smallest book

is 2 John. The smallest verse is John xi. 35. The word «and» occurs 10,684 times. The name Jesus occurs nearly 700 times in the Gospels and Acts, and in the Epistles less than 70 times. The name Christ alone occurs about 60 times in the Gospels and Acts, and about 240 times in the Epistles and Revelation. The term Jesus Christ occurs 5 times in the Gospels.

The Bible.— The middle book is Micah. The middle (and smallest) chapter is Psalm cxvii. The middle verse is Psalm cxviii: 8. The middle line is 2 Chronicles iv. 16; the largest book is that of the Psalms; the largest chapter is Psalm cxix. The word Jehovah (or Lord) occurs 6,855 times. The word «and» occurs 46,227 times. The number of authors of the Bible is 50. The Bible was not until modern times divided into chapters and verses. The division of chapters has been attributed to Lanfranc, Archbishop of Canterbury, in the reign of William I.; but the real author of this division was Cardinal Hugo de Sancto-Caro, about 1236. The number of languages on earth is estimated at 3,000; the Bible or parts of it have been rendered into only about 180, or, languages and dialects together, 345. The first English translation complete of the Bible was by Wyclif in 1380. The first American edition was printed in Boston in 1752.

Bibles, The Seven, the seven principal Bibles of the world are the Koran of the Mohammedans, the Eddas of the Scandinavians, the Tripitikes of the Buddhists, the Five Kings of the Chinese, the three Vedas of the Hindus, the Zend Avesta, and the Scriptures of the Christians. The Koran is, except the Eddas, the most recent of these seven bibles and not older than the 7th century of our era. It is a compound of quotations from the Old and New Testaments, the Talmud and the Gospel of St. Barnabas. The Eddas of the Scandinavians was first published in the 14th century. The Tripitikes of the Buddhists contain sublime morals and pure aspirations, but their author lived and died in the 6th century before Christ.

The sacred writings of the Chinese are called the Five Kings, the term king meaning web of cloth or the warp that keeps the threads in their place. They contain the best sayings of the best sages on the ethico-political duties of life. These sayings cannot be traced to a period higher than the 11th century before Christ. The three Vedas are the most ancient books of the Hindus, and it is the opinion of Max Müller, Wilson, Johnson, and Whitney that they are not older than 11 centuries before Christ. The Zend Avesta of the Persians is the grandest of all these sacred books next to our Bible. Zoroaster, whose sayings it contains, was born in the 12th century before Christ.

Biblia Pauperum (Bible of the poor), the name for block books common in the Middle Ages, and consisting of a number of rude pictures of Biblical subjects with short explanatory Latin text accompanying each picture. A similar work, but more extended and with rhymed text, was the 'Speculum Humanæ Salvationis' or 'Mirror of Human Salvation'. Prior to the Reformation these two books were much used by the preaching monks, and as such orders as the Franciscans, Carthusians, etc., were styled 'Pauperes Christi,' the first named book, so popular with them, came to be known, therefore, as the 'Biblia Pauperum'.

Biblical Criticism, the science which has for its objects (1) to decide which books are entitled to a place in the Scripture canon, and (2) to bring the text of these canonical books to the utmost possible degree of purity. In prosecuting the first of these aims, the Biblical critic must not be confounded with the Christian apologist; the function of the former is a strictly judicial one, while the office of the latter is that of an advocate. One important subject of investigation is as to what Old Testament books were recognized as divine by the ancient Jewish Church or Synagogue; as also what New Testament books were at once and universally welcomed by the early Christian Church, and what others were for a time partially rejected, though they ultimately found acceptance everywhere. In seeking to purify the text, the Biblical critic must do much toilsome work in the collation of codices or manuscripts. He does not put the whole of these on one level and admit whatever reading has a majority of manuscripts in its favor; but attempts to test the value of each one apart, forming an hypothesis if he can as to when, where, and from whom it emanated, and from what other manuscripts it was copied at first, or in technical language, to what recension it belonged. See Bible.

Bibliog'raphy, a term signifying the knowledge of books, in reference to the subjects discussed in them, their different degrees of rarity, curiosity, reputed and real value, the materials of which they are composed, and the rank they ought to hold in the classification of a library. It is therefore divided into two branches, the first of which has reference to the contents of books, and may be called, for want of a better phrase, *intellectual* bibliography; the second treating of their external character, the history of particular copies, etc., may be termed *material* bibliography. The object of the first branch is to give information regarding the most valuable books in every department of study by means of catalogues.

Bibliography has been, and still is, cultivated most successfully in France. This is owing partly to the riches of the great and daily increasing public libraries, liberally thrown open to the use of the public, partly to the large number of fine private collections. Brunet's well-known 'Manuel du Libraire' was the first important work which contained, in an alphabetical form, a list of the most valuable and costly books of all literatures; Barbier's 'Dictionnaire des Ouvrages Anonymes,' the first systematic and satisfactory treatise on this subject; Renouard's 'Catalogue d'un Amateur,' the first, and for a long time the best guide of the French collectors; the 'Bibliographie de la France,' the first work which showed how the yearly accumulation of literary works can be recorded in the most authentic manner. No less valuable are the works of Peginot, Petit Radel, Renouard on the Aldines, and various others. Among more recent French works may

be cited 'Bibliographie de la France,' a periodical publication commenced in Paris in 1810. H. Bossange, 'Ma Bibliothèque Française' (1855), gives a list of standard editions of the best French authors. I. M. Quérard, 'La France Littéraire ou Dictionnaire Bibliographique,' an account of the literature of the 18th and 19th centuries (10 vols. 1827–39); Quérard, 'La Littérature Française Contemporaine' (1827–49); Brunet's 'Manuel du Libraire' (new edition, 6 vols. 1860–5); E. Hatin, 'Bibliographie de la Presse Périodique Française' (1 vol. 1866); Lorenz, 'Catalogue Général de la Librairie Française depuis 1840,' giving French publications from 1840 to 1899.

In England, although it contains many rich public and private collections, bibliography has not been so successfully cultivated as in France. The most extensive catalogues of books of which it can boast are those of the Bodleian Library, the British Museum, the Advocates' Library, Edinburgh, the Harleian Library (compiled partly by Dr. Johnson), etc. Catalogues compiled on a scientific system, by which the reader is assisted in his researches after books on a particular subject, are not numerous in English, but we may mention Sonnenschein's 'The Best Books' (1891), and 'Guide to Contemporary Literature' (1895), presenting classified lists of about 100,000 works. The most splendid catalogue perhaps ever published is that of the Earl of Spencer's Library, compiled by Dibdin, in four large volumes, with numerous engravings. Among English bibliographical works are the 'Typographical Antiquities' of Ames, Herbert, and Dibdin; Adam Clarke's 'Bibliographical Dictionary and Miscellany' (1803–6); Dibdin's 'Introduction to the Knowledge of Rare and Valuable Editions of the Classics' (1827, 2 vols.); Brydges' 'Censura Literaria' (1805), and 'British Bibliographer (1818); Beloe's 'Anecdotes of Literature' (1807); Savage's 'Librarian' (1808); Dibdin's 'Bibliographical Decameron' (1817); and 'Tour in France and Germany' (1821); Horne's 'Introduction to the Study of Bibliography' (1814); Robert Watt's 'Bibliotheca Britannica' (1824, 4 vols. 4to), a work of stupendous labor and great utility; Joseph W. Moss' 'Manual of Classical Bibliography' (1825); Darling's 'Cyclopædia Bibliographica' (chiefly theological literature, 1854); 'A Bibliographical and Critical Account of the Rarest Books in the English Language,' by J. Payne Collier (1865); Lowndes' 'Bibliographer's Manual,' edited by H. G. Bohn (1869, 6 vols.); S. A. Allibone's 'Critical Dictionary of English Literature and British and American Authors' (Philadelphia 1859–71, 3 vols., and 2 of Supplement 1891); Halkett and Laing's 'Dictionary of the Anonymous and Pseudonymous Literature of Great Britain' (1882–8, 4 vols.); Sampson Low's 'English Catalogue of Books,' which in a series of successive volumes catalogues the British books published from 1835 onward to the present time.

American literature has already given rise to quite an extensive series of bibliographical works on both sides of the Atlantic. Among these are: 'Bibliographical Catalogue of Books, etc., in the Indian Tongues of the United States' (1849); Duyckinck, 'Cyclopedia of American Literature' (1856); Ternaux-Compans, 'Bibliothèque Américaine' (Paris 1837); Trübner, 'Bibliographical Guide to American Literature' (London 1856); and 'General American Catalogue' of Leypoldt and Jones (1880, with continuations); 'The Publisher's Trade List Annual'; 'Monthly Cumulative Index'; 'American Book Prices Current.'

The learned Germans, little assisted by public and almost entirely destitute of private collections, consulting only the real wants of the science, have actively endeavored to promote it. Ersch is the founder of German bibliography. He gave it a truly scientific character by his extensive work, 'Allgemeines Repertorium der Literatur' ('Universal Repertory of Literature' 1793–1807), and by his 'Handbuch der Deutschen Literatur' ('Manual of German Literature'). German bibliography is particularly rich in the literature of separate sciences; and the bibliography of the Greek and Latin literature, as well as the branch which treats of ancient editions, was founded by the Germans. The first attempt, in Germany, to prepare a universal bibliographical work was made by Ebert. The following are valuable German bibliographical works in particular departments of science and literature: T. A. Nosselt, 'Anweisung zur Kenntniss der Besten Allgemeinen Bücher in der Theologie' (4th ed. 1800), and the continuation of it by Simon (1813); C. F. Burdach, 'Literatur der Heilwissenschaft' (1810); W. Gf. Ploucquet, 'Literatura Medica' (1808, 4 vols.); T. G. Meusel, 'Bibliotheca Historica' (1782–1802); his 'Literatur der Statistik' (1816); G. R. Böhmer, 'Bibliotheca Scriptorum Historiæ Naturalis' (1785–99, 7 vols.); Alb. Haller, 'Bibliotheca Botanica' (Zurich 1771, 2 vols.); 'Anatomica' (Zurich 1774, 2 vols.); 'Chirurgica' (Bern 1774, 2 vols.); and 'Medicinæ Practicæ' (Bern, 1776, et seq., 4 vols.); R. Buckner, 'Bibliographisches Handbuch der Deutschen Dramatischen Literatur' (Berlin 1837); W. Engelmann, 'Bibliotheca Geographica' (2 vols. 1858), a classified catalogue of all works in geography and travels published in Germany from the middle of the 14th century down to 1856, with prices, index, etc.; W. Engelmann, 'Bibliotheca Philologica' (3d ed. 1853) contains a list of Greek and Latin grammars, from 1750 to 1852; the same writer has published bibliographical works on mechanical technology, medicine, economy, veterinary art, geography, zoology, palæontology, etc.; W. Heinsius, 'Allgemeines Bücherlexikon,' an extensive work forming (with its continuations) an alphabetical catalogue of all the books published in Germany from 1700 to 1888, with sizes, prices, and publishers' names; and Keyser's 'Vollständiges Bücherlexikon,' giving books published between 1750 and 1882.

Directions for the study of bibliography are contained in Achard's 'Cours Élémentaire de Bibliographie' (1807, 3 vols.); Th. Hartwell Horne's 'Introduction to the Study of Bibliography' (1814, 2 vols.); and Brunet's 'Connaissances Necessaires à un Bibliophile' (Paris 1878).

Material Bibliography, often called by way of eminence bibliography, considers books in regard to their exterior, their history, etc., and has been principally cultivated in France and England. The different branches of material bibliography may here be mentioned: the knowledge of the ancient editions (*incunabula,* or, if classical authors, *editiones principes*), some of the best works on which are G. Wfg. Panzer's 'Annales Typographici' (1793–1803, 11 vols.),

coming down to 1536; the 'Annales Typographici,' by Maittaire (Hague 1719, et seq., 11 vols. 4to), which not only contains the titles, but investigates the subjects of works. More exact descriptions of particular ancient editions are found in Serna Santander's 'Dictionn. Bibliogr. du 15ième Siècle (Brussels 1805, 3 vols.); Fossius' 'Catalogus Codicum,' sec. 15, 'Impressor. Bibliothecæ Magliabecchianæ (Florence 1793, 3 vols. fol.); and others. The study of rare books, on account of the vague principles on which it rests, is more difficult than is generally believed, and easily degenerates into superficial and capricious trifling. This has been more injured than promoted by I. Vogt's 'Catalogus Librorum Rariorum' (1793), and J. Jac. Bauer's 'Bibliotheca Libror. Rarior. Universalis' (1770–91, 12 vols.). We may also mention here the catalogues of the books prohibited by the Roman Catholic Church ('Indices Librorum Prohibitorum et Expurgatorum'). For the discovery of the authors of anonymous and pseudonymous works, we may use Barbier's 'Dictionnaire des Ouvrages Anonymes et Pseudonymes' (1806–9, 4 vols.), which is valuable for its accuracy (but contains only French and Latin works); Quérard's 'Dictionnaire des Ouvrages Polyonymes et Anonymes de la Littérature Française' (Paris 1854–6), and his 'Supercheries Littéraires Dévoilées (5 vols. Paris 1845–56). We need not observe what an important source of information in the department of bibliography are literary journals. Poole's 'Index to Periodical Literature' contains references to an immense number of articles that have never been republished in books. See BIBLIOMANIA.

Bib'liomancy, divination performed by means of the Bible, also called *sortes biblicæ,* or *sortes sanctorum.* It consisted in taking passages at hazard, and drawing indications thence concerning things future. It was much used at the consecration of bishops. It was a practice adopted from the heathens, who drew the same kind of prognostications from the works of Homer and Virgil. In 465 the Council of Vannes condemned all who practised this art to be cast out of the communion of the Church; as did the councils of Agde and Auxerre. But in the 12th century we find it employed as a mode of detecting heretics. In the Gallican Church it was long practised in the election of bishops; children being employed, on behalf of each candidate, to draw slips of paper with texts on them, and that which was thought most favorable decided the choice. A similar mode was pursued at the installation of abbots and the reception of canons; and this custom is said to have continued in the cathedrals of Ypres, St. Omer, and Boulogne, as late as the year 1744. In the Greek Church we read of the prevalence of this custom as early as the consecration of Athanasius, on whose behalf the presiding prelate, Caracalla, archbishop of Nicomedia, opened the Gospels at the words, "For the devil and his angels" (Matt. xxv. 41). The bishop of Nice first saw them, and adroitly turned over the leaf to another verse, which was instantly read aloud: "The birds of the air came and lodged in the branches thereof" (Matt. xiii. 32). But this passage appearing irrelevant to the ceremony, the first became gradually known, and the Church of Constantinople was violently agitated by the most fatal divisions during the patriarchate.

Biblioma'nia ("book-madness"), a word formed from the Greek, and signifying a passion for possessing rare or curious books. The true bibliomanist is determined in the purchase of books less by the value of their contents than by certain accidental circumstances attending them. To be valuable in his eyes they must belong to particular classes, be made of singular materials, or have something remarkable in their history. Some books acquire the character of belonging to particular classes from treating of a particular subject; others from something peculiar in their mechanical execution (as the omission of the word "not" in the seventh commandment, which gives the Wicked Bible its name), or from the circumstance of having issued from a press of uncommon eminence, or because they once belonged to the library of an eminent man. But there are certain fashions in bibliomania, and books much sought at one time may at another be comparatively neglected. Some collections of books may possess or have possessed much intrinsic value; such as collections of the various early editions of the Bible; collections of editions of single classics (for example, those of Horace and Cicero); the editions of the Greek and Latin classics *in usum Delphini* and *cum notis variorum;* the editions of the Italian classics printed by the Academy *dell a Crusca;* works printed by the Elzevirs and by Aldus; the classics published by Maittaire or Foulis; and the celebrated Bipont editions, with others. It perhaps was more customary in former times than at present to make collections of books which have something remarkable in their history (for example, books which have become very scarce, and such as have been prohibited), yet various scarce books are highly prized on account of nothing but their rarity, the original (1786) Kilmarnock edition of Burns' Poems, for instance. First editions may be ranked in the same class. Books distinguished for remarkable mutilations have also been eagerly sought for. Those which appeared in the infancy of typography called *incunabula,* from the Latin *cunæ,* a cradle, and among them the first editions (*editiones principes*) of the ancient classics, are still in general request. An enormous price is frequently given also for splendid proof impressions of copperplate engravings, and for colored impressions, for works adorned with miniatures and illuminated initial letters; likewise for such as are printed upon vellum. Works printed upon paper of uncommon materials, or various substitutes for paper (asbestos, for instance), have been much sought after; likewise those printed upon colored paper. Other books in high esteem among bibliomanists are those which are printed on large paper, with very wide margins. In English advertisements of rare books some one is often mentioned as particularly valuable on account of its being "a tall copy." If the leaves happen to be uncut the value of the copy is much enhanced. Other works highly valued by bibliomanists are those which are printed with letters of gold or silver, or ink of singular color; for example: (1) 'Fasti Napoleonei' (Paris 1804, 4to), a copy on blue vellum paper, with golden letters; (2) 'Magna Charta' (London 1816, fol.), three copies upon purple-colored vellum, with golden letters.

Bibliomania often extends to the binding. In France the bindings of Derome, Padeloup, and

Bozerian are highly valued; in England those of Charles Lewis and Roger Payne, among 18th century binders; while Hayday, Rivière, Bedford, and Zaehnsdorf may be mentioned as among the notable craftsmen of the 19th. Even the edges of books are often adorned with fine paintings. Many devices have been adopted to give a factitious value to bindings. Jeffery, a London bookseller, had Fox's 'History of King James II.' bound in fox-skin, in allusion to the name of the author; and the famous English bibliomanist, Askew, even had a book bound in human skin. In the library of the castle of Königsberg are 20 books bound in silver (commonly called the silver library). These are richly adorned with large and beautifully engraved gold plates in the middle and on the corners. To the exterior decoration of books belongs the bordering of the pages with single or double lines, drawn with the pen (*exemplaire réglé*), commonly of red color — a custom which we find adopted in the early age of printing in the works printed by Stephens. The custom of coloring engravings has generally been dropped, except in cases where the subject particularly requires it (for instance, in works on natural history, or the costumes of different nations), because the colors conceal the delicacy of the engraving.

Other means of idle competition being almost all exhausted, a new method of gratifying the bibliomanist taste was adopted, that of enriching works by the addition of engravings,—illustrative indeed of the text of the book, but not particularly called for,—and of preparing only single copies. Books are often mutilated in this way to enrich some other book. Such "grangerized" copies have long been well known.

Among recent books valued as specimens of typography are some of those that issued from the Kelmscott Press of the late William Morris. Bibliomania, which flourished first in Holland (the seat likewise of the tulipomania) toward the end of the 17th century, has prevailed in England to a much greater extent than in France, Italy, or Germany. The modern bibliomania is very different from the spirit which led to the purchase of books in the Middle Ages at prices which appear to us enormous. External decorations, it is true, were then held in high esteem; but the main reason of the great sums then paid for books was their scarcity, and the difficulty of procuring perfect copies before the invention of the art of printing. See Dibdin, 'Bibliomania' (1811); Fitzgerald, 'The Book Fancier' (1886); Lary, 'The Library' (1886); Burton, 'The Book Hunter' (1882); Field, 'The Love Affairs of a Bibliomaniac' (1896); Merryweather, 'Bibliomania of the Middle Ages' (1849, reprint, 1900).

Bibra, bē-bra, **Ernst von,** German scholar and writer: b. Schwebheim, Bavaria, 9 June 1806; d. Nüremberg, 5 June 1878. Being left an orphan with a large fortune at an early age, he devoted himself to physical science, and published various works that brought his name before the public. He traveled in South America, taking home with him important natural history and ethnological collections. Among his numerous works are: 'Travels in South America'; 'Memories of South America'; 'Sketches of Travel and Novels'; etc.

Bib'ulus, Lucius Calpur'nius, Roman politician; d. near Corcyra, Greece, 48 B.C. He was consul with Julius Cæsar in 59 B.C., which office he acquired through the influence of the aristocratic party. After his opposition to Cæsar's agrarian law had failed, he secluded himself in his house, whence he issued edicts against the measures of Cæsar. In 49 B.C. Pompey appointed him commander of the fleet in the Roman Sea. In the following year Cæsar eluded him and crossed over into Greece.

Bicanere, bīk-ā'nēr, India, a town, capital of a principality of the same name; 240 miles west by south from Delhi. With its battlemented walls and large citadel, both flanked with round towers, and its temples, one of which rises to a great height, it presents a magnificent appearance to the traveler approaching it through the desolate tract of country in which it stands; but a nearer inspection dispels the illusion, and the greater part of the houses are found to be hovels of mud, painted red. Water is obtained from wells. Pop. (1901) 53,071.

Bicar'bonate. See CARBON.

Bicci, Ersilio, bē'chē, ār-sēl'yō, Italian poet: b. 1845. He studied in Florence, and became professor of Italian literature in the Licei Dante and Toscanelli of that city. His best composition is in the collection styled 'New Verses.'

Bice, bīce, the name of two colors used in painting, one blue, the other green, and both native carbonates of copper, though inferior kinds are also prepared artificially.

Bi'ceps (*biceps flexor cubiti*), the principal flexor muscle of the arm, the muscle popularly shown as evidence of muscular development. At its upper end it consists of two parts, one being attached to the coracoid process of the scapula, and the other to the margin of the glenoid fossa, about the joint. This latter, the long head, passes over the head of the humerus as a tendon and unites with the short head to form the belly of the muscle. The lower end of the biceps is inserted for the greater part to the radius, and a smaller tendonous expansion is inserted in the fascia of the forearm. The action of the biceps is to bring the forearm to the arm and to turn the inturned hand outward.

Bicêtre, bē-sātr, France, a village a little to the southwest of Paris, with a famous hospital for old men in indigent circumstances, and an asylum for lunatics, together forming one vast establishment. This establishment was originally founded by Louis IX. as a Carthusian monastery, became later a castle, which was demolished in 1632, after being long in a ruinous state, and was restored by Louis XIII., and destined as a retreat for infirm officers and soldiers. When Louis XIV. afterward erected the great Hôtel Royal des Invalides, Bicêtre became a general hospital, and it continued as such down to the Revolution, while it contained also a house of correction for swindlers, thieves, etc. The establishment was then entirely altered and converted to its present use, the buildings being partly pulled down and replaced by new ones. The poor persons admitted must be at least 70 years of age, or incapacitated by some incurable disease from earning a livelihood. The lunatics are such as belong to the department of the Seine. They are attended to with the greatest

care, and fabricate neat little articles of wood and bone, known in France by the name of «Bicêtre work.» The number of beds in the institution is over 2,700.

Bichat, Marie François Xavier, bē-shär, mä-re' frän-swä ksäv-ē-ā, French physician: b. Thoirette, department of Jura, 14 Nov. 1771; d. 22 July 1802. His father, a physician, early initiated him into the study of medicine, which the young Bichat prosecuted at Lyons and Paris, where he studied under the direction of Desault (q.v.), who treated him as a son. On the latter's death, Bichat superintended the publication of his surgical works, and in 1791 began to lecture upon anatomy in connection with experimental physiology and surgery. From this period, amidst the pressing calls of an extensive practice, he employed himself in preparing those works which spread his reputation through Europe and America, and which had the most beneficial influence upon medical science generally. In 1800 appeared his 'Treatise on the Membranes,' which passed through numerous editions, and immediately after publication was translated into almost all European languages, and 'Researches Concerning Life and Death,' followed, the next year, by his 'General Anatomy' (4 vols. 8vo) — a complete code of anatomy, physiology, and medicine, which was translated into English by Dr. G. Hayward, and published in 3 vols. 8vo. In 1800 he was appointed physician of the Hôtel-Dieu, in Paris, and with the energy characteristic of true genius began his labors in pathological anatomy. In a single winter he opened no less than 600 bodies. He had likewise conceived the plan of a great work upon pathology and therapeutics; and immediately upon commencing his duties as physician to the Hôtel-Dieu he began his researches in therapeutics by experiments upon the effects of simple medicines. In the midst of his activity and usefulness he was cut off by a malignant fever, probably the consequence of his numerous dissections. His friend and physician, Corvisart, wrote to Napoleon in these words: «Bichat has just fallen upon a field of battle which counts more than one victim; no one has done so much, or done it so well, in so short a time.» He was the creator of general anatomy, or of the doctrine of the identity of the tissues of the different organs, which is the fundamental principle of modern medicine.

Bichir, bĕ-shēr', one of the African mud-fishes (*Polypterus bichir*), which inhabits the upper Nile and its tributaries, and is regarded as the best food-fish of those waters. It is only about a foot long, and is one of the few remaining species of the great extinct group *Ganoidea* (q.v.), and is related to the American gar-pike. See Mud-Fish; Reed-Fish.

Bichlo'ride (-klo'-) **of Gold,** a substance formed by the action of chlorine gas upon dry metallic gold that has been previously thrown down in the form of an impalpable powder, by chemical means. Some authorities assert that the substance so formed is a true chemical compound, having the formula $AuCl_2$; while others maintain that it is a mere mixture of metallic gold and the well-known trichloride, $AuCl_3$. The so-called «bichloride of gold» has risen into notoriety on account of the use made of it by the late Dr. Keeley of Dwight, Ill., in the cure of dipsomania and chronic alcoholism. Its general characteristics, chemically and physiologically, are to a great extent similar to those of mercury bichloride. Its employment by Dr. Keeley produced a profound impression on the medical world, and many partisans both for and against its virtues exist. The success, from a financial standpoint, of the Dwight sanitarium, brought forth many imitators, and much harm has been done by unskilful persons using this dangerous and powerful medicinal agent.

Bickerstaffe, Isaac, Irish dramatic writer: b. Ireland, about 1735; d. about 1812. He wrote many successful pieces for the stage, some of which such as the operas of 'Love in a Village' and 'The Padlock,' are still represented. His celebrated comedy of 'The Hypocrite,' adapted from Colley Cibber's 'Nonjuror,' which was again borrowed in its leading incidents from Molière, long retained its place on the stage, with its well-known characters of Mawworm and Dr. Cantwell. The music of many of Bickerstaffe's pieces was composed by Charles Dibdin. Latterly he retired to the Continent, and died there.

Bick'ersteth, Rev. Edward, English clergyman: b. Kirkby-Lonsdale, Westmoreland, 19 March 1786; d. 24 Feb. 1850. He was educated in the grammar school of his native town, and at the age of 14 found a place in the post-office, London, where he remained for six years, afterward spending five years as an articled clerk with a London attorney. He then commenced business as a solicitor in Norwich, in partnership with his brother-in-law, and soon was in receipt of a large and increasing income. A great change, however, came over his mind and he began to exert himself in promoting the diffusion of the truths of religion among his fellowmen. Among other works accomplished by him was the establishment of the Norwich Church Missionary Society. He also published in 1814 'A Help to the Study of the Scriptures,' which met with great success. He then resolved to abandon the legal profession for that of a minister of the Church of England. The Church Missionary Society wished to send him abroad on a special mission to Africa, and in this view the bishop of Norwich, dispensing with the usual course of a university education, admitted him to deacon's orders on 10 Dec. 1815, and a fortnight afterward he was admitted to full orders by the bishop of Gloucester. Mr. Bickersteth thereupon, with his wife, proceeded to Africa, from which, after accomplishing the objects of his mission, he returned in the following autumn. He now filled the office of secretary to the Church Missionary Society, and from this period to 1830, when he resigned it, was indefatigable in the performance of its multiform duties. In the year last mentioned he became rector of Watton, in Hertfordshire, and spent there the remainder of his life. He had now become widely known as one of the most influential and popular clergymen of the evangelical section. Besides taking an active share in furthering the cause of the various religious societies, including the Evangelical Alliance, of which he was one of the founders, he likewise issued a series of publications which had an immense circulation, among others: 'The Christian Student'; 'A Treatise on the Lord's Supper'; 'A Treatise on Prayer'; 'The Signs of the Times'; 'The Promised Glory of the

Church of Christ'; 'The Restoration of the Jews'; 'A Practical Guide to the Prophecies,' besides sermons and tracts without number.

Bick'more, Albert Smith, American naturalist: b. St. George, Me., 1 March 1839. He graduated at Dartmouth College in 1860, and studied under Agassiz at the Lawrence Scientific School of Harvard. In 1865–9 he traveled in the Malay Archipelago and in eastern Asia; in 1870 became professor of natural history in Madison (now Colgate) University; and in 1885 professor in charge of the department of public instruction at the American Museum of Natural History, New York. His publications include: 'Travels in the East Indian Archipelago' (1869); 'The Ainos or Hairy Men of Jesso'; 'Sketch of a Journey from Canton to Hankow.'

Bick'nell, Frank Martin, American author: b. Melrose, Mass., 24 Jan. 1854. He graduated at the English High School, Boston, in 1872; engaged in business till 1888; and afterward devoted himself to literature. He has contributed largely to 'St. Nicholas'; 'Harper's Young People'; 'Youth's Companion'; 'Outing'; New York *Evening Post;* etc. He wrote 'The City of Stories'; 'The Apprentice Boy'; etc.

Bicknell, Thomas William, American educator: b. Barrington, R. I., 6 Sept. 1834. He was graduated from Brown University in 1860. During his senior year in college he was elected to the Rhode Island legislature, and after graduation was principal of schools in Rehobart, Bristol, and Providence, R. I., and in Elgin, Ill. In 1869–75 he was commissioner of the public schools of Illinois, and during this incumbency he secured the establishment of the State Normal School. He founded, edited, and owned 'The Journal of Education'; 'The Primary Teacher'; 'The American Teacher'; 'Education'; and 'Good Times,' between 1874 and 1886. He has been president of a number of educational institutes and Sunday-school unions. He has written 'State Educational Reports'; 'John Myles and Religious Toleration'; 'Life of W. L. Noyes'; 'Brief History of Barrington'; 'Barrington in the Revolution'; and 'The Bicknells.'

Bicycle, a light steel vehicle consisting of two wheels arranged tandem, united by a frame with the **rider's** seat upon it; propelled by his feet acting on pedals connected with one of the axles, at present that of the rear wheel; and steered by a handle-bar guiding the direction of the front wheel. As at present constructed the wheels are of equal size; the driving mechanism is usually a chain with the links fitting over a sprocket-wheel, but about one in 25 are chainless, mainly with a shaft and bevel driver; the weight is 23 to 27½ pounds, complete; the frame is of hollow cold-drawn tubing, with brazed joints; the wheels are suspension, with crossed tangent spokes, wooden rims, pneumatic tires, and ball bearings. The name dates from about 1865, though first so spelled in a patent of 8 April 1869, and elsewhere called "bysicle," "bicircle," "bicycular velocipede," etc.; but prior to 1870 the form of the machine was usually called a velocipede, a French name dating from 1779.

The pedomotor itself goes back perhaps to Egyptian and probably at least to classic times, winged figures astride of a stick connecting two wheels being found in the frescoes at Pompeii. In the 17th century it suddenly appears with surprising frequency; there is a picture of a bicycle in a stained-glass window at Stoke Pogis, England; in August 1665, John Evelyn writes in his diary of "a wheele to run races in"; in 1690 a Frenchman named De Sivrac invented a two-wheeled *célérifère* having a horse-shaped wooden body with a saddle, and steered by the rider's feet; in 1693 Ozanam described before the Royal Society a vehicle pedaled by a foot traveler. In 1761 the 'Universal Magazine' describes a similar one invented by an Englishman named Ovenden; in August 1769 the 'London Magazine' describes "a chaise to go without horses." On 27 July 1779, *Le Journal de Paris* describes a *vélocipède* invented by MM. Blanchard and Magurier, which is merely the *célérifère* with an upright bar to support the hands; this gained considerable vogue. From France and England the idea spread to Germany, which added to it the one idea needed to vivify it. In March 1784 one Ignaz Trexler, of Gratz, Austria, invented a pedomotor credited with the speed of a galloping horse — unquestionably meaning down hill. But the direct progenitor of the modern bicycle was one built in 1816 by Baron Karl von Drais, Freiherr von Sauerbronn (1784–1851), chief forester to the Grand Duke of Baden (to whose memory in 1891 the bicyclers erected a monument at Carlsruhe), often called "the father of the bicycle." It was designed to aid him in his daily journeys. The whole was of wood; the wheels of equal size, connected by a perch, astride which the rider sat in a saddle, and to the fore end of which was swiveled a fork into which the front wheel was axled; the rider propelled it on level ground or up hill by striking the ground with his feet, and coasted down hill. But the significant feature, the germ of the bicycle, was the pivoting of the front wheel and its steering by a handle-bar; for which there was a stuffed arm-rest on an elevated cross-piece. Drais patented this in Paris, 1816, and claimed that it would go up hill as fast as a man could walk, on a level, after a rain, at six or seven miles an hour, or courier's pace, the same when dry at eight or nine, and down hill at a horse's gallop. It excited much attention and was called the "draisine"; and in 1818 one Dennis Johnson patented in England an improved form called the "pedestrian curricle," with adjustable saddle and elbow-rest. This started a fashionable furore, and those who could not afford it laughed at it as the "dandy-horse," and "hobby-horse," while the serious-minded invented a swarm of names for it, such as "patent accelerator," "swift-walker" (a literal translation of "velocipede"), "manivelociter," "bivector," etc., and finally, in 1819, "bicipede" and "tricipede"; but by this time the name "velocipede" had become the recognized current term. It had then become common enough to be prohibited in London, and to make dodging the machines a common exercise on the suburban roads; and bred complaints of leg disease, and a consequent invention by one Birch for using the arms instead. In 1821 Louis Gompertz patented an improvement in which the handle-bar was connected with a segment rack gearing into a pinion on the front wheel, so that either arms or feet could be used for propulsion; but the craze had worn itself out, and

it was nearly half a century before it revived with a better machine. Meantime, in June 1819, the curricle had been introduced into the United States, and became a craze in Boston, New York, Philadelphia, etc.; and many riding-schools were opened. On 26 June 1819 William K. Clarkson was granted a patent for an "improved velocipede"; but the excitement soon subsided here also. The grotesque appearance of a person leaning forward on his elbows and kicking away at the ground beneath his clumsy vehicle proved too much for the national sense of humor, and riders were the objects of ridicule. A typical "hobby-horse" in the early 'twenties had the following specifications: Wheels, wood, 32 inches; wheel base, 4 feet 7 inches; backbone, wood, 5 feet 9 inches long; saddle, hard wood, 1 foot 6 inches long; handle-bar, wood, 9 inches, elevated 48 inches above ground; finish, black paint; weight, 90 pounds. The arm-rest was of wood.

With the death of the draisine the idea was not altogether forgotten; both in England and on the Continent scattering pedomotors were built every few years, and the capital improvement of putting cranks on the front axle, creating the true modern bicycle, was at length devised. It is asserted, though not proved, that one Kirkpatrick McMillan of Courthill, Scotland, having tried in 1835 a system of cranks, side-levers, connecting-rods, and pedals, for propelling a tricycle, applied them successfully to a wooden bicycle in 1840; and it is certain that in 1846 Gavin Dalzell of Lesmahagow, Scotland, who had heard of McMillan's machine, invented and rode a rear-driving velocipede propelled by pedals on hanging levers, which, by means of connecting-rods instead of chains, rotated cranks on the rear axle. This machine, whose wheels were of wood shod with iron, and its frame somewhat dipped like the present ladies' wheel, made 10 or 12 miles an hour; it was a rather striking forecast of the modern "safety," though not in the least a germ of anything, as its existence was not known till 1892. It had also some important differences: the rear wheel was the larger, as in the "Humber" and "Star" machines, and the action was to-and-fro and not rotary. In 1855 a German instrument-maker named Philipp Maritz Fischer made and extensively rode a velocipede. But none of these were ever made for any persons but the owners, nor incited further invention.

The real ancestor of our bicycle, the crank-driven velocipede that led straight to better things, arose in France: the honor of the invention is hotly disputed. According to one account it belongs to Ernest Michaux, the son of a Parisian carriage repairer (to whom a monument was erected in 1894); but if so, he did not make it public and it led to nothing, and it is generally accredited as theory, where it belongs as practical result, to Pierre Lallement, a Parisian blacksmith, said to have been in Michaux's employ. It sprang, in fact, not from Michaux's, if that existed, but from a multicycle invented in 1865 by one Marechal; a five-wheeler, each wheel having an independent axle with cranks, loose pedals, and a separate seat; the front was the guide-wheel, but it could be ridden by one or many. In September MM. Woirin and Leconde patented a tricycle, with two smaller rear wheels on the same axle, and a large front one with cranks and loose pedals, the whole connected with a wooden horse-shaped body like De Sivrac's, on whose back the rider sat well over the front wheel; this was the progenitor of the modern tricycle. Lallement, against the judgment of his friends, who thought that keeping one's balance would be impracticable on two wheels tandem, applied the principle thus the same year, learned the art of balancing, and exhibited his machine and his skill at the Paris Exposition of that year; but thought too little of it to patent it. The next year (1866) he came to the United States to look for work, made a velocipede and rode it about New Haven, Conn., and was induced by one James Carroll to patent it with him, which was done 20 November. It had two wooden wheels, the front one slightly the larger, with iron tires; was a front-driver; and the saddle was on a steel spring midway between the wheels. But it was too crude and unpleasurable to attract much notice. In France, however, great improvements were shortly made on it, and in the winter of 1867 it became the sensation of Paris; riding schools sprang up all about, and straps to fasten the machines were part of the equipment of the great places of amusement. This continued till the Franco-German war temporarily destroyed the business, which had developed a large manufacturing interest. Meantime, in England, Edward Gilman in 1866 had patented a rear-driver with a single treadle, and the chain gear had been broached. In 1869 the improved velocipede and the reflex of the French enthusiasm brought it into sudden vogue in the United States, and American inventiveness was turned toward perfecting it: at the time the "boom" burst in 1870 the Patent Office was receiving half a dozen applications for new patents every week. Up to 1869 the two wheels were of about the same size, 30 to 40 inches; and the earlier machines had wooden hubs, spokes, and rims, with steel tires. But the wire-spoke suspension wheel, re-invented in France in 1864, soon came in, and by 1869 all-steel wheels with hollow tubing were built; the prices were from $75 to $300, and cycling was a mark of some social distinction. In the West it was the universal roading sport, the leading manufactories being located there; rinks were built everywhere, and the wonderful trick-riding possible with the heavy wheels then made,—on flights of stairs, by jumps, etc., which our modern light wheels would not endure,—drew large crowds. But this weight,—116 pounds was medium, and in 1871 a 75-pound racer was much borrowed from its lightness,—made the sport a heavy tax even on the athletic, and insupportable to any others; the rigid tire made the jolting on rough roads or paved streets a torture, so that a current nickname for the machine was "bone-shaker." The low build covered the rider with the dirt of roads and carriages, and to avoid this and gain speed the front wheel was gradually raised and the seat carried up with it, and in 1869–70 two western builders placed large numbers of high or "ordinary" wheels on the market. But the steel tire made the exertion still more severe; and hostile municipal legislation, controlled by the horse owners, drove the bicyclers off every desirable riding road. The sport (till the "safety" came in it was only such) collapsed, with the suddenness of a financial crash, within a single week; thousands of machines, worth $100 to $150 one day, could not be sold at any price the next, and were ultimately disposed of to boys or the poorest classes at

nominal prices, or allowed to become old iron; manufactories crowded with orders had them countermanded in a mass; rinks no longer drew; and what little was left of the sport, among those who owned fine machines and clung to them, was killed by the sale at nominal prices of a stock of cheap wheels made of gas-pipe, malleable fittings, and wooden wheels with steel tires, which soon fell to pieces, but destroyed all prestige in the sport. It was nearly a decade before America took it up again in any general way, and then with a different wheel, the bicycle proper.

Meantime a great development had gone on in England, where the hard, smooth macadam roads, and beautiful by-paths for cyclers without disturbing horses, made all conditions more favorable. The bicycle under that name was patented 8 April 1869; it had steel rims and solid rubber tires, round or half round. For speed the front wheel was gradually enlarged and the rear reduced to a mere steerer, till the Ordinary was attained in 1871, with a 40- to 48-inch front wheel and 16-inch rear; it was made feasible and popular by the rubber tires, which reduced the friction and jar, and consequently the needed propelling power. The front wheel was gradually raised in proportion to the rider's height and skill, and in the early eighties attained 60 and even 64 inches. It still remains the perfection of grace and simplicity in bicycle construction: the motive power being applied direct, and the wheel, with cranks and pedals, forming a solid body. It is also the most exhilarating to ride, given strength and skill. The greatest improvements were made by James K. Starley, of Coventry, England, the second "father of the bicycle"; his wheels in 1873 had become nearly all that made the best Ordinary, with steel frame, cross tension spokes, and solid rubber tires. In 1874 he patented the tangent wheel.

The Ordinary, however, could not be the bicycle of the future. It was hard to mount, except in favorable spots, and if the rider was dismounted had often to be walked long distances on streets or hillsides; both from this and the great air resistance due to the rider's elevation, it was merely the sport of a few athletic men, mostly young; headers were frequent from the rider's mass centre being directly over that of the large wheel, and liable to be serious from his high seat, though the danger was exaggerated. A safer build was therefore mooted. The first idea was to bring the rider's centre below that of the driving wheel; this could only be accomplished by operating the pedal with some kind of leverage, and a rear-driving safety with lowered front wheel was patented in 1879 by H. T. Lawson of England. A similar type, called the "Bicyclette," followed in 1880. In the same year the "Star," a reversed Ordinary with the small wheel in front, was introduced and had something of a run; the "Humber Safety" in 1885 copied the type with more extreme difference in wheels, and the current joke upon it was an imaginary Irish description that "the big wheel is the smallest and the hind wheel is in front." But with the high wheel there is always liability to a tumble, and a "backfall" is worse than a "header"; and the "Dwarf Bicycle," as the safeties were called, grew in favor. The "Xtraordinary" and the "Facile" about 1882 had some trial; but a more popular form, which had high racing speed and made new records, was Starley's "Kangaroo" (1883), with diamond frame, independent crank-shafts, and two chains gearing them to the front wheel. The gain of the geared wheel over the Ordinary is not only in lessened air resistance from the lower seat, but because length of crank and pedal speed can be gauged to the most favorable speed for the rider, while in the Ordinary the crank is too short and the pedal speed too rapid for the best results. But the alternate tightening and loosening of the chain twice in every revolution, and other defects, caused its early displacement by Starley's famous and still speedier "Rover" (1884), for a long time the popular term for "safeties" of any pattern. Here the cranks and pedals were on a separate axle, connected with the driving-wheel by a single chain which was therefore permanently tight; the seat was far back over the rear wheel, so that headers over the handle-bar were absolutely impossible. The front wheel was about one fourth larger than the rear; later they were made of practically the same size as now, completing the evolution back to the velocipede, and making its general utility possible. With the low seat any one can mount, and the exercise is not too severe; and it makes possible the drop-frame for ladies. The Ordinary, as its name implies, maintained the field for a while; the sporting idea was still in the ascendant, the "safety" was sneered at as the effeminate and rather cowardly refuge of weaklings and old men, and it was not believed that it could compete in racing speed. But about 1886 the public began to realize its immense business and social advantages, and with numbers the fear of ridicule vanished; by 1888 five sixths of the sales were of "safeties," and by 1890 the Ordinary had become a curio or the equipment of trick riders. For many years now both names have gone out of use, all being "safeties," and the compendious "bicycle" or simply "wheel" (a reminiscence of the Ordinary, where the driving-wheel was everything) covers all. This advent of the "safety" has carried the bicycle into every-day business and the life of every household; carriers, policemen, messengers, etc., find it of great service; competition has lowered prices to the level of the very servant-girls and street boys; and there is hardly a spot in the modern world into which it has not penetrated. There are great manufactories engaged in bicycle manufacture, and also in making the machines used in their construction. In the United States alone, in 1900, nearly 20,000 people were earning their living by their direct manufacture, besides more than 6,000 establishments and nearly 10,000 persons employed in repairing and many more in selling them. Even in war they have shown their utility. They have been adopted for military purposes by many of the nations of the world: by Austria-Hungary in 1884; by England and Switzerland in 1887; by Belgium in 1889. The French army is said to be equipped with several thousand bicycles, and a perfected system of drill and tactics for advance-

guard duty, skirmishing, and rapid movements has been introduced into the various armies. A detachment of bicycle-mounted soldiers has been found useful in accompanying the motor Maxim gun, first tried in 1899. The military bicycle is especially constructed for hard work and rough usage. Some of the French machines are made to fold, so that when the riders come to impassable ground they can double them up and carry them on their backs.

Partly effect but mainly cause of this general use has been the direction of inventive genius to the advancement of speed or comfort, often both at once. Every feature,—material, frame, spokes, gearing, tire, bearings, rim, handle-bar, brake, and others,—has been vigilantly and tirelessly studied to win public favor, and there is hardly a more wonderful machine existent. The enormous brain-power devoted to its perfection is shown by the fact that in the United States alone 7,573 patents had been granted up to 1900 for cycles and their parts, and probably double that in the world altogether. Of these, in our own country only 16 had been issued before 1865, and the great majority were granted after 1890. In 1892 the applications had grown so numerous that a special department of the Patent Office was created for them.

The greatest of all single ones, and the one which has revolutionized the business and made cycling a luxury rather than an exertion, is the pneumatic tire, which not only saves jolts by rolling into instead of on and off the minute obstructions of the roadway, but for the same reason increases speed, each rise of the wheel taking so much more muscular exertion. It must be confessed, however, that a heavy price is paid in the endless nuisance of punctures, ending many rides abruptly, and involving a walk for miles — something unknown with the solid tire. It was originally invented, not for bicycles, but road wagons, by an English civil engineer named R. W. Thompson, in 1843, and patented in the United States in 1847; but fell flat and was allowed to lapse. The first bicycle tires were iron or steel; then a strip of rubber was fastened over the tire; later, a round or half-round piece of solid rubber was cemented or fastened into the hollow of the rim. But in 1889 an Irish veterinary surgeon, Dr. John B. Dunlop, fitted a piece of rubber hose to his son's bicycle; it worked so well that he patented it, not broadly, but for specific details now disused. Shortly after, I. W. Boothroyd of London described, but did not patent, a tire of this sort; and about the same time P. W. Tillinghast, of Providence, R. I., patented one in this country. Received with utter incredulity at first, and a not unjustifiable dread of punctures, in two years 40 per cent of all bicycles were fitted with it, and in two more no other was on the market. (The cushion tire, a large tire, solid except for a small air space running through it, was tried for a time in 1891 and after but was not a success). But even this would have been ineffectual save for the enormous reduction in weight by the use of steel weldless tubing and wire, so that a machine of the incredibly small weight of nine pounds has been used for racing, with a wheel on whose spokes four men can stand without injuring them: these machines are too frail for road use, but even the average roadster does not reach 28 pounds, while in 1873 65 pounds, and even in 1885, 48 was thought fair, and 27 a racing wonder.

The ball-bearing, invented by an Englishman named Bonn, is another epoch-making invention, which revolutionized all previous theories. The earliest bicycle bearing was a plain one with a sleeve, known as the parallel bearing. The friction was so heavy that the roller bearing was substituted, but did not work well; the next was the adjustable cone, which for a time was the universal one. But in all solid-surface bearings the grinding of the sand which worked in made them irregular and rattling after a while, and the layers of gudgeon grease required a steady tax on time for cleaning. In the ball-bearing, the conical axle bears against a row of steel balls in a circle, tangent to the bearing surface and to two other surfaces at right angles, so that the friction is only against three points, and the bearing parts roll over instead of sliding upon each other. The wear of the balls is astonishingly slight, and from the constant change of surface there is little irregularity, and from the small contact points scarcely any making of axle grease.

A fundamental invention is the suspension wheel, by which, in the words of an English patentee of 1826, "the weight they have to carry is suspended from that part of the wheel which happens to be uppermost, instead of being supported, as is usual, by the spokes that happen to be under the axle-tree" — a principle invented by Leonardo da Vinci before 1490, reinvented as above stated, and in France in 1864. Spring seats have abolished the saddle-galling which was one of the worst tortures of the "bone-shaker," and even of the earlier bicycles. The wooden rim takes two and a half pounds off the weight of a machine, but is not used in England, the roads being too wet. The drop-frame for ladies' use is perhaps the most important single advance made on the velocipede, so far as the increase of social pleasure is concerned: in the same line are the construction of coupled machines for two, taking away the reproach often made that bicycling is "an essentially selfish pleasure." The coaster-brake is another important advance. The chain gearing which made the "safety" possible has been noted; later, much ingenuity has been employed to get rid of it, but not with perfect satisfaction, the cost being prohibitive to the mass, and the complaint of extra exertion being heard. The two chief devices for chainless machines are the pin-wheel gearing, which works smoothly but lacks durability; and the bevel gear, which is very difficult to cut so that the teeth shall fit exactly, but is said to increase in both accuracy and ease of driving with use, as the surfaces of the teeth grow to fit each other. In the chain gear the case is the reverse, as the links and rivets wear and dust grinds them off.

In the United States the bicycle did not appear after the collapse of 1870 till the Centennial Exposition of 1876, when some English machines were imported and exhibited. Col. Albert A. Pope of Boston saw them and thought of reviving the business here; went to England to study the industry, brought back some English wheels, and had W. S. Atwell of Boston build him one, weighing 70 pounds, and costing $313. Again

visiting England, he decided that conditions here warranted their manufacture for the market, and in 1878 had the Weed Sewing Machine Company, of Hartford, Conn., make some "Columbias" for him in a corner of their shop, the first bicycles made in America. From the first, these have been the American model of durability and excellence of make, as well as of advanced invention in construction and fittings, and unsurpassed in the world; and they still maintain that position. The business has grown into one of the great manufactories of the country, and was the chief of the companies merged in the American Bicycle Company a few years ago. The "safety" brought the same expansion here as elsewhere; but its very commonness and cheapness, with other causes, has, since about 1895, produced a severe decline. The chief falling off is in women's use: they have tired of it, as they do of every muscular sport except when novelty gives a brief stimulus or social opportunity; and the lamp laws in many localities nearly killed evening parties, the chief use they could make of it. The slackening of this demand produced a severe crisis in the business. Also, inventions have nearly reached their limit, to tempt youth with money to buy the latest new pattern; and the business has settled upon a firm though more limited basis of practical service and every-day pleasure. The statistics of the industry in this country, as returned by the census of 1900, were as follows, showing its almost incredible development; but in fact it was far greater and quicker, as the volume was much greater about the middle than at the end of the decade.

	1890	1900
Number of establishments	27	312
Capital	$2,058,072	$29,783,659
Number of employees	1,797	17,525
Wages paid	$982,014	$8,189,817
Cost of materials	718,848	16,792,051
Value of products	2,568,326	31,915,908

Of the 312 establishments, however, 35 were in the American bicycle trust. Of these total values, $23,689,437 was for bicycles; 1,136,122 being chain, 42,929 chainless, 3,640 tandem, and 159 motor. The difference between the production of chain and chainless is sufficiently accounted for by the immense difference in price-average at the factories, $18.91 for the former, against $45.59 for the latter.

See H. A. Garratt, 'The Modern Safety Bicycle' (New York 1899); Andrew Sharp, 'Bicycles and Tricycles' (London 1896); and the valuable historical summary in the United States census reports of 1900, 'Manufactures' (Part IV., p. 329).

Bida, Alexandre, bē'dą, al-ek-sŏñdr, French painter: b. 1813; d. 2 Jan. 1895. He traveled in the East for two years, and most of his paintings have Oriental or Scriptural subjects. His best-known work is his illustrations for the 'Four Evangelists' (1876), and the 'Book of Ruth'; among his paintings are 'The Slave Market,' 'The Massacre of the Mamelukes,' 'Jews Praying at the Well of Solomon,' and 'The Field of Boaz.'

Bidar, bē'där, India, an ancient town in the Nizam's dominions, 75 miles northwest of Haidarábád; noted for the metal ware to which it has given the name of Bidri or Bidery. It occupies a commanding site above the surrounding country, and its mosque and madrissa or college testify to its former splendor and importance. Pop. 14,000.

Bidassoa, bē-dąs-sō'ą (Basque, "way to the west," or "two streams"), a river in Spain, about 45 miles long, the last 12 of which form the boundary between France and Spain. It rises in the mountains of Spanish Navarre, and, after various changes of direction, falls into the Bay of Biscay near Fontarabia. In former times Spain claimed not only the entire river, but so much of its banks, on the French side, as its waters covered at full tide. This difference was finally settled by each country contenting itself with its own shore. Near Irun there is a small island in the middle of the stream, called the Island of Pheasants, on which, being neutral ground, Louis XI. and Henry IV. met in 1463. Here also a peace was concluded between France and Spain in 1654.

Biddeford, Maine, city in York County, on the right bank of the Saco River, 6 miles from the sea, and on the Boston & Maine R.R., 15 miles southwest of Portland. The river separates it from Saco (q.v.), and, like that city Biddeford grew up as a manufacturing centre, its development being favored by the abundant water-power furnished by the falls, the stream descending here about 40 feet. The city also has a large local trade.

Industries.— The leading industries include the extensive manufacture of cotton goods, lumber, boots and shoes, machinery, etc. Here are some of the most important cotton mills in New England, the products of which are found in the markets of many states. Near the city are granite quarries which annually produce large quantities of superior stone, used in many parts of the world. Several thousand people are employed in the city's industries, and the flourishing of these has led to its gradual growth. It has two national banks.

Schools and Churches.— The public school system is well organized and conducted, and the various religious denominations are represented by 14 churches. The intellectual life of the people is also stimulated through useful local publications and an excellent public library.

History and Government.— The city was named from Biddeford, England, the home of some of its early settlers. In 1616 a small settlement was made at Biddeford Pool, near the mouth of the Saco, and Biddeford was settled under a patent in 1630, embraced Saco until 1718, and was then incorporated under its present name. This was long the chief settlement of the Maine province. In 1855 Biddeford received a city charter. The present government includes a mayor and a city council, elected annually. The population in 1900 was 16,145. In 1903 it was estimated at 16,655. Consult: Folsom, 'History of Saco and Biddeford' (1830); Clayton, 'History of York County' (1880); Ridlon, 'Saco Valley Settlements and Families' (1895).

Biddle, Anthony Joseph Drexel, American publisher, journalist, and miscellaneous writer: b. Philadelphia, 1 Oct. 1874. He has written 'A Dual Role, and Other Stories,' 'An Allegory and Three Essays,' 'The Madeira Islands,' 'The Froggy Fairy Book,' 'All Around Athletics' (1894); 'The Flowers of Life' (1898); 'Shantytown Sketches' (1898).

Biddle, Arthur, American lawyer: b. in Philadelphia, Pa., 23 Sept. 1852; d. 8 March 1897. He studied law and was admitted to the bar in 1878. Later he became a member of his father's firm and devoted much time to the study of certain branches, the results of which were published in his works, 'Treatise on the Law of Stock Brokers' (1881); 'Treatise on the Law of Warranties in the Sale of Chattels' (1884); and 'The Law of Insurance' (1893).

Biddle, Clement, American Revolutionary soldier: b. Philadelphia, 10 May 1740; d. there, 14 July 1814. He was educated in the tenets of the Society of Friends (Quakers), and in early life engaged in commercial pursuits in his native city; but notwithstanding his Quaker training, he joined a number of Quaker friends, in 1764, in forming a military corps for the protection of a party of friendly Indians who had sought refuge in Philadelphia from the fury of a band of lawless zealots known as the "Paxton Boys," who had recently massacred some unoffending Conestoga Indians at the interior town of Lancaster. These banditti, powerful in numbers, had advanced within five or six miles of the city, threatening destruction to all who should oppose them, when the vigor of the military preparations checked their further progress. Scarcely had this local disturbance been quieted when news was received of the resolution of the British House of Commons to charge certain stamp duties in the colonies. The feeling engendered throughout the whole country by this step and by the subsequent passage of the Stamp Act, induced, in Philadelphia, the celebrated "non-importation resolutions" of 25 Oct. 1765, signed by the principal merchants of the city, including Col. Biddle and his brother Owen. When all hope of a reasonable adjustment of the differences was lost, Col. Biddle was greatly instrumental in forming the "Quaker" company of volunteers raised in Philadelphia in 1775, of which he was elected an officer before the corps joined the army. Congress, on 8 July following, elected Col. Biddle deputy quartermaster-general of the militia of Pennsylvania, New Jersey, Maryland, and Delaware, ordered to rendezvous at Trenton. Col. Biddle took part in the battle of Trenton at the close of the same year, and, with another officer, was ordered by Washington to receive the swords of the Hessian officers. He was also engaged in the victory of Princeton, the surprise and retreat at Brandywine, and the unsuccessful enterprise of Germantown, and during the winter of 1777–8, shared the sufferings of the American army at Valley Forge. As commissary-general of forage under Gen. Greene he rendered important service to the army in several critical junctures, especially during the famine at Valley Forge. At Monmouth he shared the success of his countrymen. In September 1780, owing to the pressure of his private affairs, he was compelled to return to private life. His military career, however, was briefly renewed in the capacity of quartermaster-general of Pennsylvania in the expedition under Washington, in 1794, against the whiskey insurgents of that State. Col. Biddle labored earnestly also in the early political movements of the patriot party of his State, advocating effectively the revolutionary State constitution of 1776 (which his brother Owen had had, as a member of the convention, a share in framing). He was also active in support of a declaration or bill of rights as a constituent part of the Federal Constitution to prevent abuse or misconstruction of its powers. After the organization of the Federal government under the Constitution of 1787, Col. Biddle was appointed marshal of Pennsylvania, as an evidence of the regard in which he was held by Washington.

Biddle, James, American naval officer: b. 28 Feb. 1783; d. 1 Oct. 1848. He was educated at the University of Pennsylvania, and entered the navy in 1800. In the war against Tripoli he served as a midshipman, was taken prisoner and kept in confinement for 19 months. In the War of 1812, he was a lieutenant on the Wasp when she captured the Frolic and was later captured by the Poictiers. Though a prisoner for a short time, Biddle was exchanged, and in 1813 took command of the Hornet and captured the British brig Penguin on 23 March 1815, being wounded in action. He was made captain in 1815, and received a gold medal from Congress in reward for his services. He was afterward commissioner to Turkey and China, and in 1845 negotiated the first treaty between the United States and China. He also served in the Mexican war.

Biddle, John, English Socinian writer: b. Wotton-under-Edge, Gloucestershire, 14 Jan. 1615; d. London, 22 Sept. 1662. He entered Magdalen College, Oxford, in his 19th year, and graduated A.M. in 1641. Being led to doubt the doctrine of the Trinity, he drew up 'Twelve Arguments' on the subject, for which he was committed to jail, but was released on bail. About six months afterward, on examination before a committee of Parliament, he acknowledged his opinion against the divinity of the Holy Ghost, and his 'Twelve Arguments' were ordered to be burned. He persisted in his opinion, and in 1648 published two tracts, containing his 'Confession of Faith Concerning the Holy Trinity,' and 'Testimonies' of Irenæus, Justin Martyr, and several other early writers on the same subject. On this the Assembly of Divines asked Parliament to decree the punishment of death against those who should impugn the established opinions respecting the Trinity, and to enact severe penalties for minor deviations. Such a decree was passed, but differences of opinion in the Parliament itself, and the penalties to which this sweeping measure rendered many in the army liable, prevented its execution. Biddle was again remanded to prison, however, and remained for some years in rigorous confinement. A general act of oblivion in 1651 restored him to liberty, when he immediately disseminated his opinions both by preaching and by the publication of his 'Twofold Scripture Catechism.' For this he was confined in the Gate House for six months. Cromwell banished him to St. Mary's Castle, Scilly Is., assigning him an annual subsistence of 100 crowns. Here he remained three years, until liberated in 1658. He then became pastor of an Independent congregation, and continued to support his opinions until fear of the Presbyterian Parliament of Richard Cromwell induced him to retire into the country. On the dissolution of that parliament he preached as before until the Restoration, after which he was obliged to confine himself to private preaching. In June 1662 he was apprehended at one of the private assemblies, and

upon process of law fined £100, and ordered to lie in prison until it was paid. He fell a victim to jail fever and died in the 47th year of his age, a martyr to religious intolerance. His private character was moral, benevolent, and exemplary, and Toulmin styles him the "father of the modern Unitarians."

Biddle, Nicholas, American naval officer: b. Philadelphia, 10 Sept. 1750; d. 7 March 1778. In 1765, while on a voyage to the West Indies, he, with two others, chosen by lot, were left for two months on an uninhabited island. In 1770 he entered the British navy. When Phipps, afterward Lord Mulgrave, was about to start on his exploring expedition, young Biddle, though a midshipman, deserted his own vessel and shipped as a seaman on the Carcass, serving through the cruise with Lord Nelson, who was a mate of Phipp's vessel. On the commencement of the American Revolution he came to America and was made captain of the Andrew Doria, a brig of 14 guns and 130 men, taking part in Commodore Hopkins' attack on New Providence. After refitting in New London he was ordered on a cruise to the banks of Newfoundland, and in 1776 took, among other prizes, two transport ships with valuable cargoes and a battalion of Highland troops. He was appointed to the command of the Randolph, a 32-gun frigate, in February 1777. In March 1778 he was wounded in an action with the Yarmouth, an English 64-gun ship. While under the hands of a surgeon the magazine blew up, and the whole crew of the Randolph were lost, except four men, who were tossed about on a piece of wreck for four days before being rescued. The other vessels of the squadron escaped in consequence of the disabled state of the Yarmouth.

Biddle, Nicholas, American financier: b. Philadelphia, Pa., 8 Jan. 1786; d. same city, 27 Feb. 1844. He became secretary to John Armstrong, United States minister to France, in 1804, and subsequently went as secretary to James Monroe, then United States minister to England. He returned home in 1807, was elected to the Pennsylvania legislature in 1810, and was appointed a director of the United States Bank in 1819. He became president of the bank in 1823 and managed it ably down to the expiration of its charter. The financial trouble precipitated upon the country by Jackson's withdrawal of the government deposits in 1833 gave an unfortunate ending to Biddle's career as a banker, but while both his ability and his integrity were questioned at the time, he has been amply vindicated since. Besides miscellaneous writings, he published a 'Commercial Digest,' and 'History of the Expedition Under Lewis and Clarke to the Pacific Ocean.' He was president of the board of trustees for the funds of Girard College, and was instrumental in establishing that institution.

Biddle, Richard, American lawyer: b. Philadelphia, Pa., 25 March 1796; d. Pittsburg, 7 July 1847. He studied law and was admitted to the bar in Pittsburg. He was a member of Congress (1837–41), and was author of a 'Memoir of Sebastian Cabot, with a Review of the History of Maritime Discovery' (1831).

Bid'dulph, Sir Michael Anthony Shrapnel, English military officer: b. Cleeve Court, Somersetshire, 1823. He entered the Royal artillery in 1844; became captain in 1850; major, 1854; colonel, 1874; major-general, 1877; lieutenant-general, 1881; and general in 1886. He served in the Crimean war at Alma, Inkerman, Balaklava, and the siege of Sebastopol. In India he commanded the field force and marched to Kandahar and the Helmund, and returned by the Tal Chotiali and Boree to the Indus, in 1878–9. He was retired in 1890, and in 1896 became gentleman usher of the Black Rod. He published 'Illustrated Forrester's Norway' (1849).

Bid'eford, England, a market town and municipal borough of Devonshire; 44 miles north of Plymouth; situated on both sides of the Torridge, four miles from the sea, the principal portion being on the west side, on a bold acclivity. A handsome stone bridge of 24 arches, and 677 feet in length, connects the two divisions of the town. It has a spacious marketplace; an Elizabethan town-hall, public assembly rooms, and music hall. The Bridge Hall in French Renaissance style, contains a free library, a reading-room, and a science and art school. The most important church is that of St. Mary, in Perpendicular style, rebuilt, except the tower, in 1865. The chief industries comprise the manufacture of coarse earthenware, and collars and cuffs, tanning, malting, iron-founding, etc. In former times Bideford had an extensive shipping trade, and is said to have imported more tobacco in some years than the metropolis. Pop. (1901) 8,754.

Bidie, George, English medical officer: b. Blackies, Banffshire, 3 April 1830. He was educated at the University of Aberdeen, and appointed deputy surgeon-general, in charge of the British Burma division in 1884; sanitary commissioner of the Madras presidency in 1885–6. He discovered, in 1867, a preventive for an insect pest which threatened to destroy the coffee growth in southern India. In 1898 he became honorary surgeon to the queen. His publications include 'Reports on the Ravages of the Borer Insect on Coffee Estates' (1869); 'Handbook of Practical Pharmacy' (1883); 'Catalogue of Gold Coins in the Government Central Museum, Madras' (1874); 'Neilgherry Parasitical Plants Destructive to Forest-trees' (1874); 'Catalogue of Raw Products of South India sent to Paris Exhibition' (1878); 'Native Dyes of Madras' (1879); 'Pagoda or Varaha Coins of South India' (1883); 'Sand-binding Plants of South India' (1883); etc.

Bidpai, bĭd'pī, or **Pilpai.** When we consider the wonderful history of 'Bidpai's Fables,' their fame, and their charm, we naturally invest their suppositious author with a personality and a name, in fact, however, "Bidpai" is probably a changed form of an Indian word for "court-scholar," misunderstood as a proper name, and implying therefore neither personality nor specific date. In India, from early times the parable or "example" has been the recognized method of conveying moral instruction. In the didactic literature, some general truth or some rule of life is stated in the form of a maxim, and a beast fable or other story then added as a concrete instance or "example." The folk-lore of which these tales are a reflex is not the exclusive property of any of the great religions of ancient India, but is common to Buddhism, Jainism, and Brahmanism alike. The sculptured representations of the stories upon the great

Buddhist monuments of 250 B.C. make it certain that the stories themselves were familiar to the common people at that early date; and it is hardly less certain that they were so known long before that time. The oldest and most important collection of Indian folk-lore is the Buddhist one called 'Jataka' — that is, 'Birth-stories,' or stories of Gotama Buddha in his previous births: it consists of 550 tales, each containing a moral; each is placed in the mouth of the Buddha, and in each the Buddha plays the best and most important part. It is this device of a framework or setting for the folk-tales that constitutes the principal essentially literary element of the collection. Next in importance to the Buddhist 'Jataka' stands the Brahmanical 'Panchatantra.' Here the material is not essentially different in kind from that of the 'Jataka'; but again it is the setting of the material which gives the work its distinctive literary character. It is a kind of 'Mirror for Magistrates.' Both the 'Jataka,' written in Pali, and the 'Panchatantra,' in Sanskrit, are still extant, and contain many of the stories which in translations of translations attained great currency and celebrity in mediæval literature.

The precise Indian original of these translations is lost; but we know that it was translated into the literary language of Persia (the Pehlevi, or Pahleir), by command of the Sassanian king, Khosru the Just, about 550 A.D. From the Pehlevi came two notable versions: one the Old Syriac, called 'Kalilag and Damnag,' after the two jackals, Karataka and Damanaka, who figured prominently in the framework of the Sanskrit original; and the other is the Arabic version, called 'Kalilah and Dimnah,' or 'Fables of Bidpai,' made about 750 A.D. by Abd-allah ibn al-Moqaffa, a Persian convert to Islam under the Caliph al-Mansor. According to the Arabic introduction, Dabshelim was the first king of the Indian Restoration, after the fall of the governor appointed by Alexander at the close of his campaign in the Panjab, 326 B.C. When firmly established, Dabshelim gave himself over to every wickedness. To reclaim the king, a Brahman philosopher takes up his parable, as did Nathan before David, and at last wins him back to virtue. The wise man is called in Arabic *bid-bah,* and in Syriac *bid-vag.* These words are traced through the Pehlevi to the Sanskrit *vidya-pati,* «master of sciences.» Accordingly *bidbah,* which has become Bidpai or Pilpai in our modern books, is not really a proper name, but an appellative, applied to a «chief pandit» or «court-scholar» of an Indian prince.

From the Arabic are descended, in the fourth generation from the original, a dozen or more versions, of which three may be mentioned as noteworthy links in the chain of tradition: the Greek one, made about 1080 by Symeon Seth, a Jewish physician; the Persian, made some 50 years later, by Nasr Allah of Ghazni; and the Hebrew, ascribed to Rabbi Joel, and probably made before 1250. Of the descendants in the fifth degree from the original, the 'Directorium Humanæ Vitæ,' made about 1270 by John of Capua from the Hebrew, is distinctly the most celebrated, because it gave rise in turn to Danish, Dutch, Spanish, Italian, and French, and above all to the famous German and English versions mentioned below. But besides the 'Directorium,' we must notice the 'Specimen of the Wisdom of the Ancient Hindus,' a version into Latin from the Greek of Symeon, made by the Jesuit father, Petrus Possinus (1666); and the 'Anvár-i Suhailí' or 'Lights of Canopus,' a simplified recast of Nasr Allah's. In the second edition of his fables, La Fontaine tells us that he owes the largest part of his new material to «Pilpay, the Indian sage.» Pierre Poussin's 'Specimen' was the one embodiment of his shadowy Oriental fabulist, and a French version of the 'Lights' was the other. Two offshoots of the 'Directorium' are of unrivaled interest to the student of the beast fable. The one is the 'Book of Examples of the Ancient Sages'; and the other is Doni's 'La Moral Filosophia' (1552). The 'Book of Examples' was made at the instance of Duke Eberhard in Bart, whose name and motto, «*Eberhart Graf z(u) Wirtenberg Attempto,*» appear as an acrostic in the initials of the first sections. It was first printed about 1481, and has since been admirably edited by W. L. Holland (Stuttgart 1860). Holland used, besides three manuscripts, two printed editions without place and year, and enumerates 17 dated editions that appeared between 1483 and 1592. Four dated editions appeared at Ulm between 1483 and 1485. The great number of editions of the work, and their rapid succession, are the best proof of its importance as a means of instruction and amusement at the beginning of the age of printing. The examples themselves had doubtless pointed the moral of many an ancient homily long before the days of Gutenberg: but the language of the old German version of them is so remarkable for its simplicity, dignity, strength, and beauty, that we cannot wonder at its immense popularity; and to this version, more than to any other, is Europe indebted for the wide-spread knowledge of this cycle of literature from the last part of the 15th to the middle of the 17th century. The other offshoot of the 'Directorium' — namely, 'The morall philosophie of Doni: drawne out of the auncient writers. A worke first compiled in the Indian tongue, and afterwardes reduced into divers other languages: and now lastly Englished out of Italian by Thomas North' (London 1570) — is most interesting to us as English-speaking people because it is «the first literary link between India and England, written in racy Elizabethan,» a piece of «Tudor prose at its best,» a veritable English classic. Consult Keith-Falconer, 'Kalilah and Dimnah' (1885); Lanman, 'Sanskrit Reader' (1888); Rhys Davids, 'Buddhist Birth Stories' (1880); North, 'Morall Philosophie of Doni' (ed. Jacob 1888).

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Bidwell, John, American politician: b. Chautauqua County, N. Y., 5 Aug. 1819; d. 5 April 1900. He went to California in 1841; served in the Mexican war, reaching the rank of major; was a member of the Constitutional Convention of 1849; and of the National Democratic Convention in Charleston, in 1860. In the Civil War he was brigadier-general of California militia. In 1864 he was elected to Congress as a Republican; in 1866 was a member of the Philadelphia Convention; in 1890 was the unsuccessful Prohibition candidate for governor of California; and, in 1892, unsuccessful candidate of his party for the Presidency.

Bieda, bē'da, the modern name of the ancient Blera, a town in Italy. It is noted for its extensive Etruscan necropolis of rock-hewn tombs, built in several terraces. These tombs are interesting from their imitation of dwellings. They have molded doorways, and within the ridge beams and rafters of the roof are cut in relief. There are rock benches on three sides, made to receive the dead, and besides the doors, numerous windows.

Biedermann, Friedrich Karl, German author: b. Leipsic, 25 Sept. 1812; d. 1901. He became professor of philosophy in Leipsic University in 1838 and held this chair till 1845, when he was deposed on account of his political opinions. In 1849 he played an important role in the parliament of Frankfort, and was reinstated as professor at Leipsic, but was again removed in 1853 for political reasons. He was editor of the *Deutsche Allegemeine Zeitung* (1863–6); and founded and edited a number of other liberal papers. His works include 'Wissenschaft und Universitat' (1838); 'Die Deutsche Philosophie von Kant bis auf unsere Tage' (1842–3); 'Vorlesungen uber Socialismus und sociale Fragen' (1847); 'Erinnerungen aus der Paul's Kirche' (1849); 'Fünfzig Jahre in Dienste des nationalen Gedankens' (1892).

Biefve, Eduard de, byĕf ā-doo-är dė, Belgian painter: b. Brussels, 4 Dec. 1809; d. there, 7 Feb. 1882. He painted many portraits, and was also noted for his scenes from history. His best known work probably is his 'Compromise of the Netherland Nobles at Brussels, 1566.' Among others are 'Last Moments of Anne Boleyn,' 'The Introduction of Rubens to Charles I. of England,' 'Masaniello,' 'Raphael and La Fornarina.'

Biel, bēl, **Gabriel,** German philosopher: b. Spire, about 1442; d. Tübingen, 1495. He was educated at Heidelberg and Erfurt; and became a cathedral preacher in Mainz. In 1477 he was made provost of Urach, and an adviser in the founding of the University of Tübingen, where he became professor of theology, in 1484. He has been erroneously called "the last of the Schoolmen." His principal work was 'Collectorium ex Occamo.'

Biela, bē'la, **Wilhelm von,** Austrian officer and astronomer: b. Rossla, 19 March 1782; d. Venice, 18 Feb. 1856. On 27 Feb. 1826, he discovered at Josephstadt, Bohemia, a new comet which, a few days later, was sighted by Gambart from Marseilles. Both noticed its similarity to comets appearing in 1772 and 1805, and fixed its period at between six and seven years; but it was named after Biela, who had first discovered it. Shortly after its reappearance at the end of 1845 it was seen to divide into two portions, each of which afterward developed a tail and a brilliant nucleus, features wanting in the original body. In August 1852 the double comet reappeared, but this time the two portions were much farther apart; and not long after the comet vanished, and has never been sighted since.

Biela's Comet, a comet of short period, named after its discoverer, Wilhelm von Biela (q.v.), who discovered it in 1826 and furnished such data regarding its movements as to convince the other astronomers of his day that he had a proprietary right to it. The same comet had been noticed 8 March 1772, and again in 1805. It was reckoned that the comet had passed its perihelion six times between the two periods without being detected by the astronomers. On another visit it passed out of sight on 3 Jan. 1833. Its next appearance was in July 1839. It was found again late in November 1845, and in the following month an observation was made of one of the most remarkable phenomena in astronomical records, the division of the comet. It put forth no tail while this alteration was going on. Prof. Challis, using the Northumberland telescope at Cambridge, on 15 Jan. 1846, was inclined to distrust his eyes or his glass when he beheld two comets where but one had been before. He would call it, he said, a binary comet if such a thing had ever been heard of before. His observations were soon verified, however. Late in August 1852, the larger came into view and three weeks later the smaller one, now much fainter than its former companion, was seen about 1,500,000 miles in the lead. Schiaparelli's investigations showed it to be probable that the comet is the illuminated central mass of a stream of meteorites. The Leonid stream of meteors revolves around the sun in a period of 33¼ years, and the earth passes their orbit every year, but meets the main swarm only when passing the point of intersection of the two paths. On 12 Nov. 1799, 13 Nov. 1833, and 14 Nov. 1866, the earth is known to have encountered a dense portion of the stream. Astronomers looked for the reappearance of this stream of meteors 13–14 Nov. 1899, but were disappointed, only a few stray meteors putting in an appearance.

Bielaga, a Russian name for the great European sturgeon (*Accipenser huso*), also called "hausen" and "huso." See STURGEON.

Bielaya, byĕl-a-ya, the name of 10 Russian rivers, the most important of which is about 500 miles in length, rises in the Ural ridge and flows northwest to the Kama River. From April to November it is navigable from its mouth to the city of Uta, about 200 miles, regular trade in minerals, lumber, and salt being carried on. Of the other rivers of this name, may be mentioned the one in the government of Irkutsk, Siberia, which is a branch of the Angara; and another in the government of Yekaterinoslav which flows through a coal region.

Bielefeld, bē'lē-felt, a town of Prussia, in the province of Westphalia, at the northern foot of the Teutoburger-Wald, 38 miles east from Münster. The river Lutter divides it into an old and a new town. The best German linens are manufactured here, flax-spinning and bleaching are largely carried on, and there are various other industries, among which some of the chief are shirt-making, silk-weaving, the manufacture of cycles and sewing-machines, and of cigars, glass, cement, leather, etc. It contains a gymnasium, two hospitals, and other public buildings. The castle of Sparenburg, built in 1017, is in the immediate vicinity, and since its recent restoration has been occupied as a museum. Pop. (1900) 63,044.

Bielefeld, a small town in Westphalia, Germany, with 50,000 inhabitants. Particularly noted as containing the Bethel colony for epileptics.

Bielgorod, byĕl'gō-rōt. See BELGOROD.

Biëlo-ozero, byĕl-ō-ō'za-rō («white lake»), a lake of European Russia, in the government of Novgorod, whose outflow is carried by the Cheksna River to the Volga. It is of a somewhat circular form, and has an area of about 430 square miles. A system of canals connects it with Lake Onega, the Dwina, and other rivers, and fishing is carried on in it.

Bielowski, byĕ-lōv'skę, **Augustus,** Polish poet: b. Krechowice, Galicia, 1806; d. 1876. Among his poetical compositions is to be mentioned the historical rhapsody, 'Lay of Henry the Pious.' He wrote a 'Critical Introduction to the History of Poland' (1850), but his principal work was the publication of 'Monumenta Polonise Vetustissima' (1864–72); a collection of Polish chronicles up to the time of Duigoz, since his death continued by the Cracow Academy of Sciences.

Bielshöhle, bēlz'hēl-ĕ, a stalactite cavern in the Bielstien Mountain Harz, on the right bank of the Bode. It was discovered about 1672, but first made accessible in 1788. Its entrance is 108 feet above the bed of the stream; and its total length is 230 yards.

Bielski, byĕl'skę, **Marcin,** Polish historian: b. Biala, near Sieradz, 1495; d. there, 1575. His 'Kronika swiata' and 'Kronika Polska' (1550 and 1564), contain the first comprehensive attempt at a history of Poland. He wrote two satirical poems, 'Sen majowy' (1590), and 'Seym niewiesci' (1595), picturing, in the one, the degradation of Hungary, and calling upon his countrymen to exhibit a nobler spirit than the Hungarians, while the other gives a keen analysis of the condition of Poland in his days. A strategetical work of his, 'Sprawa rycerska' (1569), gives valuable information upon the condition of the Polish army, and the character of Polish tactics. After serving in the army, and taking part, in 1531, in the battle of Obertyn, he devoted himself for the rest of his days to literary pursuits. In 1617 the bishop of Cracow interdicted his 'Chronicles,' as they were suspected to contain heterodox sentiments.

Bienne, byĕn, **Lake of,** called in German, Bielersee, a Swiss lake about 10 miles long by 3 broad, with a depth of 30 fathoms. Its scenery is more beautiful than bold. Being eight feet below the level of Lake Neufchâtel, it receives its waters by the Thiel and discharges itself into the Aar. On the islet of St. Pierre, in this lake, J. J. Rousseau resided for two months in 1765. That the lake was a centre of population from remote times, the remains of numerous pile-dwellings prove. At the northern extremity of the lake is the town of BIENNE, superbly seated at the foot of the Jura, surrounded by ancient walls with watch towers at intervals. It is a busy manufacturing place, its industries including watch-making, cotton-spinning, tanning, dyeing, book-binding, etc. A railroad connects it with Nidau and Boujean and cable roads ascend the mountains near by. The town contains among other institutions, the Wert Swiss Technical Institute, with its school for railroad employees, and a watchmakers' school. Pop. (1900) 22,100.

Biennials, in botany, plants which do not produce flowers and fruit during the first year of growth, but store up a stock of nourishment in a thickened stem or root, whence they draw the material for the growth of the second year, during which flowers and fruits are developed and the plant dies. Several of our commonest food-plants, such as turnip, cabbage, and carrot, are biennials. Under special circumstances, favorable to rapid growth, a plant, ordinarily biennial, may become an annual.

Bienteveo, byān-tā-vā'ō, a flycatcher of southern South America, related to our kingbird and familiar about the villages and gardens of the Argentine Republic. Its name comes from its loud and cheerful cry, which resembles the Spanish phrase *Bien te Veo,* «I see you well.» Unlike its relatives elsewhere, it erects a domed nest of so elaborate a construction that it sometimes takes weeks of work to build it.

Bienville, Jean Baptiste le Moyne, byăn-vel, zhŏn bāptēst lē mwän (SIEUR DE), French colonist: b. Montreal, 23 Feb. 1680; d. 1765. In 1698, with his brother, Iberville, he left France to found a colony at the mouth of the Mississippi. In 1700 he constructed a fort 54 miles above the mouth of the river, and in 1701, at the death of Sauvolle, a second brother, he succeeded to the direction of the colony, the seat of which became Mobile. In 1718 he received a commission as governor of Mississippi, and about this time founded the city of New Orleans. In 1724 he was summoned to France, and, on 9 Aug. 1726, was removed from office. In 1733 he was sent back to the colony as governor, with the rank of lieutenant-general. In 1743 he was again removed and returned to France, where he died.

Bierbaum, bēr'bowm, **Otto Julius,** German poet: b. Grüneberg, Silesia, 28 June 1865. He is a rising man of letters; his 'Songs of Experience' (or 'Poems That Were Lived') (1892), is as yet his most noteworthy volume. Other works of his are 'Studentenbeichten' (1897); 'Der sunte Vogel von 1897 und 1899'; 'Ein Kalenderbuch' (1896 and 1898).

Bierce, Ambrose, American author and journalist: b. Meigs County, Ohio, 24 June 1842. He served in the Civil War as a lieutenant of volunteers, and was brevetted major for gallantry. In 1866 he went to California and for 30 years was closely identified with Californian journalism. He edited the 'Argonaut,' and the 'Wasp,' and was a constant contributor to the 'Overland Monthly,' and San Francisco *Examiner.* His publications are 'Cobwebs From an Empty Skull' (1874); 'Black Beetles in Amber' (1892); 'Can Such Things Be?' (1893); 'In the Midst of Life' (1898). His most popular work was originally published at San Francisco (1891), under the title of 'Tales of Soldiers and Civilians'; 'Fantastic Fables' (1899); in collaboration with G. A. Danziger, 'The Monk and the Hangman's Daughter' (1892).

Bierman, Karl Eduard, bēr'man, kärl ĕd'-oo-ärd, German painter: b. Berlin, 26 July, 1803; d. 16 June 1892. He first took up painting on china and decorative painting, then turned his attention to landscape painting, studying in Switzerland and Italy. He is one of the founders of the Berlin School of Landscape Painting. Perhaps his best-known work is 'Evening in the High Alps'; others are 'View of Florence,' 'Isle of Philæ,' and the 'Temple of Edfu.'

Biernatzki, Johann Christoph, be-er-näts'-ke, yō'hän krĭs'tŏf, German pietist, poet, and story writer: b. Elmshorn, Holstein, 17 Oct.

1795; d. Friedrichstadt, 11 May 1840. A country pastor, he devoted himself to the versification of his own precepts and beliefs, the volume 'Faith' being the result. In 'The Brown Boy,' and 'Hallig, or the Adventures of Castaways on an Island in the North Sea,' he displays a not unpleasing capacity for prose narrative.

Bierstadt, bēr'stạt, **Albert,** American painter: b. near Düsseldorf, Germany, 7 Jan. 1830; d. New York, 18 Feb. 1902. He removed with his parents to New Bedford, Mass., in 1831; began to paint in oils in 1851; and in 1853 returned to Düsseldorf to study his art, spending a winter in Rome, traveling in Italy and Switzerland, and returning to the United States in 1857. In 1859 he accompanied Gen. Lander's expedition to the Rocky Mountains, and spent several months in studies of mountain scenery. He was elected a member of the National Academy in 1860. In 1861 he finished his painting, 'Laramie Peak,' and in 1863 'View of the Rocky Mountains — Lander's Peak.' These at once gave him a national reputation. Among his many other paintings of American subjects are 'Valley of the Yosemite' (1866); 'El Capitan'; 'Looking Down the Yosemite' (1865); 'Great Trees of California' (1874); 'Geysers' (1883); 'On the Saco, New Hampshire' (1886); 'California Oaks' (1886). 'A Storm on the Matterhorn' is the best known of his Alpine subjects. Bierstadt received many foreign medals and decorations, and was a member of the National Academy of Design from 1860.

Biesbosch, bēs'bōs, a marshy sheet of water interspersed with islands, between the Dutch provinces of North Brabant and South Holland, formed in November 1421, by an inundation which destroyed 72 villages and 100,000 people, and spread over an area of 80 square miles.

Biester, João Ernesto, bē'stėr, zhō'owñ' ėr-nĕs'tō, Portuguese dramatist: b. Lisbon, 1829; d. 1880. He wrote some 90 plays, the most noteworthy among them being 'The Nineteenth Century Gentleman,' 'Luck and Labor,' and 'The Scandal Mongers.' He founded the journal 'Revista Contemporanea de Portugal e Brazil' in 1859, and was its first editor. He was for many years the most popular dramatist in Portugal.

Biet, Antoine, byā, äñ-twän, French missionary, who in 1652 accompanied 600 colonists to Cayenne, where he remained 18 months. He was the author of 'Voyage de la France Equinoxiale' (1664), with a Galibi dictionary at the end.

Bievre, Maréchal, bẹ-āvr, mä-rā-chạl (Marquis de), French writer: b. 1747; d. Spa, Germany, 1789. He served in the corps of the French musketeers, was a life-guard of the king of France, and acquired much reputation by his puns and repartees. After publishing several entertaining works, he composed (1783) 'Le Séducteur,' a comedy in verse, for the theatre, which has maintained its place on the stage, although it is bad both in plan and execution. *Mes amis,* he said, dying, *je m'en vais de ce pas (de Spa).*

Bifrost, bē'frėst ("the trembling way"), in northern mythology the name of the bridge represented as stretching between Heaven and Earth (Asgard and Midgard); really the rainbow. It was used only by the gods and was guarded by Heimdal.

Big Bend Country, a volcanic plain near the centre of the State of Washington. It covers 4,800 square miles, a third of it being gently rolling, brown loam prairie, suitable for farming, and the rest low hills and plateaus of bunch grass and sage brush, where live stock is ranged. The Columbia River curves round this region, bounding it on the north and west and partly on the southwest for 20 miles, and flowing in a ravine 1,500 feet below the general level. It is traversed by several remarkable chasms, many miles long, and from a furlong to half a league wide, with sheer walls of black basalt 500 feet high. There are a number of wheat farms in the region.

Big Bethel, Va., a village on the peninsula between the York and James rivers; where an unsuccessful attempt, directed by Gen. Butler, was made by Gen. Pierce, with four regiments, to dislodge outposts of Magruder's Confederate encampment at Yorktown, 10 June 1861. The Federal regiments, under Townsend and Bendix, *en route* for the Big Bethel camp, mistook each other for the enemy, and fired. This created great confusion. Pierce arrived and pushed on to the Confederate earthwork on Back River, destroying the camp at Little Bethel. The Federal troops crossed Back River and charged the earthwork, but were repulsed with considerable loss, Maj. Theodore Winthrop, the well-known novelist, losing his life on this occasion.

Big Black River, an affluent of the Mississippi, which it enters at Grand Gulf, Miss., after flowing about 200 miles, 50 of which are navigable. On 16 May 1863 a battle took place on this stream during Grant's pursuit of Pemberton toward Vicksburg. The Confederates were defeated, and lost heavily both in killed and captured. McClernand, swiftly following the retreating Confederates, came upon them drawn up on both sides of the Big Black River. McClernand led 10,000 Federals, Pemberton, 8,000 Confederates, his main command having gone on toward Vicksburg. McClernand began the fight. He was for a time unsuccessful, but Lawler, discovering a weak spot in the Confederate line, immediately took advantage of it and charged impetuously.

Big Bone Lick, a salt spring, in Boone County, Ky., 11 miles south of Burlington, where fossil remains of mastodons and other extinct fauna have been found. These animals are supposed to have resorted here to lick the salty earth in the vicinity of the spring.

Big-horn, the wild sheep of the mountains of western North America, so called on account of the massive, spiral horns of the ram, which resemble those of the Asiatic argali. They originally ranged throughout the whole mountain system from New Mexico to northern Alaska, and as far down the valley of the Missouri River as the rough country extended. They are still to be found in the loftier and wilder parts of this territory, but remain numerous only about the head-waters of the Yellowstone, and thence northward. Their home is upon the loftiest parts of the ranges, where they find plentiful pasturage between the highest growth of timber, and the snow or ice of

the summits; and upon the elevated and rocky plateaus of the Bad Lands of Dakota. In summer they wander about a good deal in small flocks, climbing to the highest points, where a wide out-look enables them to see quickly the approach of an enemy, and where they are least troubled by flies. In winter they are forced to descend somewhat, but rarely enter the forest, finding shelter against the storm in the mountain gorges, and sufficient dried grass upon the wind-swept ridges. Its principal enemy, in the old days, were the pumas and Indian hunters, whose constant pursuit taught it an alertness and wariness which now makes it one of the most difficult animals for the sportsman to approach. The speed, agility, and endurance of this mountaineer, are equal to that shown by any wild sheep or goat of the Alps or the Himalayas, and equally tax the skill and patience of the hunter. Its horns therefore are highly valued as trophies, and its flesh is universally regarded as the best of all western game.

The common Rocky Mountain big-horn (*Ovis cervina*) is a strongly built sheep, standing about 40 inches high. In color, in its summer coat, it is tawny yellow, and in winter, grayish brown, with the face ashy, and a dark line along the spine. The under parts, and a conspicuous roundish patch on the buttocks, are whitish. The horns of the ram are of large circumference at the base, and thick and rugged, with a distinct keel at the outer edge; and sweep around backward into a spiral, which is complete in the largest specimens, and will measure 40 to 42 inches along the outer curve. A smaller and paler variety of Utah and Idaho, is called Nelson's big-horn. In the mountains of British Columbia is found Stone's big-horn, which is larger in size, and much darker in color (almost black, indeed), with comparatively slender horns. A third species, Dall's sheep, belonging to the mountains of central Alaska, is perfectly white, with horns of moderate size, and of a clear amber color. A fourth species, also Alaskan, may prove to be a variety of Dall's, which it resembles, except that a mantle of brownish-gray covers the body, as if a blanket were laid across its back. This last species has been named Fannin's sheep. All these sheep breed once a year, at the beginning of warm weather, usually producing two kids at a birth. They are hardly separable from the argalis of northeastern Asia, and doubtless all are descendants from the same primitive stock. See Mayer, 'Sport with Rod and Gun' (1892); Roosevelt, 'Hunting Trips of a Ranchman' (1883); Baillie-Grohman, 'Fifteen Years' Sport and Life in the Hunting Grounds of Western America' (1900). See also SHEEP.

Big-Horn Mountains, a range of mountains beginning near the centre of Wyoming and running north into Montana, containing heights of from 8,000 to 12,000 feet, and covering 7,500 square miles.

Big Horn River, a river of Montana and Wyoming. It rises in the Rocky Mountains near Fremont's Peak, and flows northeast into the Yellowstone. Along its course is some of the grandest mountain scenery in the world. It is navigable in its lower course, and has a total length of 400 miles. At its junction with the Little Big Horn is Fort Custer.

Big Jaw, or **Lumpy Jaw.** See ACTINOMYCOSIS.

Big Rapids, Mich., a city and county-seat of Mecosta County, on the Muskegon River, and several important railroads; 56 miles north of Grand Rapids. The river is here dammed in two places, providing a very valuable water-power. The city has the Holly system of waterworks, and an extensive trade in lumber and manufactures of furniture, sash, doors, and blinds, coiled elm hoops, shingles, etc. Among the noteworthy institutions is the Ferris Industrial School. There are daily and weekly newspapers, a private bank, several hotels, and a public library. Pop. (1900) 4,686.

Big Sandy River, a stream forming the boundary between West Virginia and Kentucky, and flowing into the Ohio; having two confluent forks, Tug Fork, that rises in West Virginia, and West Fork, that rises in Kentucky. It is navigable for 100 miles of its lower course and flows through a timber and coal region.

Big Sioux, soo, a stream of South Dakota, uniting with the Missouri near Sioux City, after a course of 285 miles.

Big Spring, Texas, town and county-seat of Howard County, 270 miles west of Fort Worth, on the Texas & P. R.R. It is of importance as a railroad town, the division shops and offices of the Texas & Pacific railroad being situated here. It carries on an active trade in live stock, hides, fruit, and agricultural products. Extensive deposits of salt are found underlying the region, and in the neighborhood is the great spring for which the town is named. Pop. (1900) 2,000.

Big Stone Lake, a body of water in Big Stone County, Minn., drained by the Minnesota River. It is about 25 miles long.

Big Trees. See SEQUOIA.

Big Woods, a wooded tract in the southeast part of Minnesota, extending south from St. Cloud to Le Sueur, where it crosses the Minnesota, and sends branches toward Faribault and Mankato. It is 100 miles long and from 10 to 40 miles wide, covering 5,000 square miles, four fifths of which lie north of the Minnesota. This great belt of hardwood timber is one of the most valuable forests in the West.

Bigamy, in the canon law, means being twice married; in the common acceptation of the word, as a term of ordinary law, it means the being married to two wives or husbands at the same time. The laws relating to plurality of wives or husbands might be supposed to come strictly under the head of polygamy; but, as it constitutes an offense against these laws to have more than one husband or wife, they are usually brought under that of bigamy. The laws of every civilized society make some provision respecting this subject. By the statute of 4 Edward I. stat. 3, cap. 5, the marrying of a second husband or wife, the first being alive, was made felony; and by that of 2 James I. cap. 11, this crime was made punishable by death. But the same statute provided that, where either party was absent beyond seas for seven years, whether known or not known to the other party to be alive, or was absent, though not beyond seas, for the same

period, and not known by the other party to be alive, the other party was at liberty to marry again. Now, however, one of the parties is not held guiltless unless the other was absent continuously for seven years, and was not known to be alive. The penalty has been lessened by subsequent enactments, and the guilty party is now liable to penal servitude for seven years, or not less than five; or to be imprisoned with or without hard labor for not more than two. Every person aiding or abetting the bigamist is held to be equally guilty, and may receive the same punishment, By a Scottish statute of 1551 bigamy was made punishable as perjury —that is, with confiscation of goods, imprisonment and infamy; now, imprisonment is the usual sentence, but in some cases penal servitude is inflicted. If the accused had reasonable ground for believing the first spouse dead, he is not guilty of the crime; and if the first marriage was void for any reason, or dissolved by divorce, the second is not bigamous. In Scotch law, too, it is not necessary that either marriage should be regular for bigamy to be committed. The statute of James I. has been adopted in most of the United States as to the description of the crime; but the State laws generally differ from it as to the penalty, having assigned, heretofore, instead of death, as provided by the English statute, the punishment of imprisonment and hard labor for a number of years, according to the discretion of the court; others leaving it to the verdict of the jury to fix the period of imprisonment.

The New York statutes against bigamy are substantially similar to those in nearly all the States of the Union. These statutes provide that any person who having a husband or wife living, marries another person, is guilty of bigamy, and is punishable in State's prison or a penitentiary for not more than five years. The statute does not extend to a person whose former husband and wife has been absent for five years successively, without being known to him or her within that time to be living, and believed by him or her to be dead; or to a person whose former marriage has been pronounced void, or annulled or dissolved, by the judgment of a court of competent jurisdiction, for a cause other than his or her adultery or to a person who being divorced for his or her adultery, has received from the court which pronounced the divorce, permission to marry again; or to a person whose former husband or wife has been sentenced to imprisonment for life. A person who knowingly enters into a marriage with another which is prohibited to the latter by the statute is punishable by imprisonment for not more than five years, or by a fine of not more than $1,000, or both.

Big'elow, Edith Evelyn (Jaffray), American novelist: b. New York, 23 Dec. 1861; married Poultney Bigelow (q.v.) 1884. She has published 'Diplomatic Enchantments' and several novelettes.

Big'elow, Edward Fuller, American scientist: b. Colchester, Conn., 14 Jan. 1860. He was editor of 'Popular Science' for three years, and of 'The Observer,' a nature magazine, for eight years, and has lectured much on nature themes for the New York Board of Education and in private and other schools. He has published 'Bigelow's Plant Analysis.'

Big'elow, Erastus Brigham, American inventor: b. Boylston, Mass., 2 April 1814; d. Boston, 6 Dec. 1879. He became a leading manufacturer in Clinton, Mass.; invented looms for suspender-weaving, for counterpanes, for coach lace, and for carpets; and published a textbook on shorthand writing; 'The Tariff Question' (1862), and other works.

Bigelow, Frank Hagar, American clergyman and meteorologist: b. Concord, Mass., 28 Aug. 1851. He graduated at Harvard in 1873, and at the Episcopal Theological School at Cambridge, Mass.; was ordained in 1880, and became assistant rector at St. John's Church, Washington, D. C. In 1873–6 and 1881–3 he was astronomer at the Cordova Observatory, Argentine Republic; in 1884–9, professor of mathematics at Racine College, Wisconsin; in 1893 became professor of meteorology in the United States Weather Bureau, and in 1894, professor of solar physics at Columbian University, Washington, D. C. He has written many articles on solar and terrestrial magnetism, astronomy, and meteorology. His most important contribution to astronomy is a monograph on the solar corona, published by the Smithsonian Institution in 1889.

Bigelow, Jacob, American physician: b. Sudbury, Mass., 27 Feb. 1787; d. Boston, 10 Jan. 1879. He graduated at Harvard College in 1806, and began medical practice in Boston in 1810. He early became known as a botanist, and a number of plants were named for him by Sir J. E. Smith, in the supplement to 'Rees' Cyclopædia,' by Schrader, in Germany, and De Candolle in France. He founded Mount Auburn Cemetery, in Cambridge, the first garden cemetery established in the United States. He was professor of materia medica in Harvard College in 1815–55, and Rumford professor there in 1816–27. His works include 'Useful Arts Considered in Connection with the Applications of Science' (1840); 'Florula Bostoniensis' (1824); 'American Medical Botany' (1817–20); 'Nature in Disease' (1854); 'A Brief Exposition of Rational Medicine,' 'The Paradise of Doctors, a Fable' (1858); 'History of Mount Auburn' (1860); 'Modern Inquiries,' and 'Remarks on Classical Studies' (1867).

Bigelow, John, American author: b. Malden, N. Y., 25 Nov. 1817. He graduated at Union College in 1835, and became first a lawyer and afterward a journalist. In 1845–6 he was inspector of Sing Sing prison; in 1849–61 one of the editors of the New York *Evening Post;* in 1861–4, United States consul-general at Paris; and in 1864–7, minister to France. He was secretary of state of New York 1875–7. In his will Samuel J. Tilden appointed him his biographer and one of the three trustees of the bulk of his estate set apart for the establishment of a public library in New York. On 22 Feb. 1895 a joint committee, representing the Tilden Trust Fund and the Astor and Lenox libraries, agreed on a plan for the consolidation of those interests and the establishment of a great public library to be known as the New York Public Library, Astor, Lenox, and Tilden Foundations. The agreement was ratified by the several interests, an act of incorporation was obtained from the legislature, and on 27

May Mr. Bigelow was elected president of the consolidated board of trustees, and appointed chairman of the executive committee. His works include 'Molinos the Quietist'; 'France and the Confederate Navy'; 'Life of William Cullen Bryant'; 'Life of Samuel J. Tilden'; 'Some Recollections of Édouard Laboulaye'; 'The Mystery of Sleep'; 'A Life of Franklin.' In 1885 he published 'The Writings and Speeches of Samuel J. Tilden,' and in 1888, 'The Complete Works of Benjamin Franklin.'

Bigelow, John, Jr., American military officer, son of the preceding: b. New York, 12 May 1854. He was educated in Paris, Bonn, Berlin, Freiburg, and Providence, R. I.; graduated at the United States Military Academy in 1877; and was assigned to the 10th United States Cavalry. In 1887–9 was adjutant-general of militia in the District of Columbia; and in 1894–8, professor of military science at the Massachusetts Institute of Technology. During the war with Spain he was wounded in the attack on San Juan, Cuba, 1 July 1898. He published 'Principles of Strategy, Illustrated Mainly from American Campaigns' (rev. ed., 1894).

Bigelow, Marshall Train, American printer and proof-reader: b. South Natick, Mass., 5 Oct. 1822; d. Cambridge, Mass., 28 Dec. 1902. In 1843 he became associated with the University Press in Cambridge, the firm name of which from 1859 to 1879, was Welch, Bigelow & Company. He was long classed as one of the most competent of American proof-readers. He published 'Punctuation and Other Typographic Matters' (1881); 'Mistakes in Writing English and How to Avoid Them' (1886).

Bigelow, Melville Madison, American lawyer: b. Eaton Rapids, Mich., 2 Aug. 1846. He graduated at the University of Michigan in 1866, and engaged in practice in Boston. His works include 'The Laws of Bills, Notes, and Checks'; 'English Procedure in the Norman Period'; 'The Law of Fraud on Its Civil Side'; 'Elements of Equity'; 'Elements of the Law of Torts'; 'Placita Anglo-Normannia'; 'The Law of Wills'; 'The Law of Estoppel'; 'Leading Cases in the Law of Torts,' etc.

Bigelow, Poultney, American author: b. New York (son of John Bigelow), 10 Sept. 1855. He graduated at Yale University, and at the Columbia Law School in 1882, and was admitted to the bar. In 1875–6 he took a voyage around the world in a sailing-ship which was wrecked on the coast of Japan. He traveled in China, Africa, the West Indies, and Demerara. He has made canoe voyages on the principal waters of Europe, and was the first person to take a canoe through the Iron Gates of the Danube. Emperor William II. has been his personal friend since they were students together in Germany. He wrote 'The German Emperor and His Neighbors'; 'Paddles and Politics Down the Danube'; 'The Borderland of Czar and Kaiser'; 'History of the German Struggle for Liberty'; 'White Man's Africa,' etc. He edited the 'Outing' magazine, 1885–7, and has also been correspondent of 'Harper's Weekly' and the London *Times*.

Bigelow, Robert Payne, American biologist: b. Baldwinsville, N. Y., 10 July 1863. He graduated at Harvard in 1887, and studied at Johns Hopkins 1891–3. In 1893 he became instructor in biology, and in 1895 librarian in the Massachusetts Institute of Technology. He has written a number of papers on zoological subjects.

Bigelow, Timothy, American military officer: b. Worcester, Mass., 12 Aug. 1739; d. there, 31 March 1790. On 23 May 1775 he led a company of minute-men to Cambridge, and became major in Ward's regiment. He was under Arnold in the expedition to Quebec in 1775, and was there captured, remaining a prisoner till 1776. He became colonel in 1777, and assisted in the capture of Burgoyne. He also saw service at Valley Forge, Monmouth, West Point, and Yorktown.

Bigelow, Timothy, American lawyer (son of the preceding): b. Worcester, Mass., 30 April 1767; d. 18 May 1821. He graduated at Harvard College in 1786, was admitted to the bar, and settled in practice at Groton, Mass., in 1789. He took an active part in politics as a Federalist, was for 20 years a member of the State legislature, and 11 years speaker of the House of Representatives, and a member of the Hartford Convention. In 1807 he removed to Medford, and kept an office in Boston. His legal standing and practice were at the head of his profession in his time; and in the course of 32 years, he was supposed to have argued 10,000 causes.

Biggar, Hamilton Fisk, Canadian physician: b. Oakville, Ont., 15 March 1839. He was educated at Victoria University, and pursued his medical studies at the University of Medicine and Surgery, Cleveland, Ohio. In 1866 he began practice in Cleveland, and in 1867 was made professor of anatomy and clinical surgery in the Homœopathic Hospital College there. Later he was for 10 years professor of clinical surgery, with operations in the same college. In 1900 he held the chair of surgical diseases of women and clinical surgery. Dr. Biggar founded the Cleveland Training School for Nurses, where he was dean for 10 years. He wrote 'Twelve Months of Surgery'; 'Loiterings in Europe,' etc.

Biggar, Joseph Gillis, Irish politician: b. Belfast, 1828; d. London, 19 Feb. 1890. He succeeded his father in mercantile business in 1861; entered politics in 1869; and was elected to Parliament for county Cavan in 1874. He was a member of the Supreme Council of the Irish Republican Brotherhood. When Charles Stewart Parnell entered Parliament in 1875 Biggar ranged himself on the side of that leader. He took an active part in the Land League movement. In 1877 he was expelled from the Fenian organization, and in 1880 delivered aggressive speeches in Ireland. He was one of the few prominent Irish members who were never in prison.

Bigge, bĭg, **Sir Arthur John,** English soldier: b. Stamfordham, 18 June 1849. He entered the Royal Artillery in 1869; served in the Zulu war, 1878–9, with distinction, and in 1879 was appointed aide-de-camp to Maj.-Gen. Sir Evelyn Wood. In 1880 he became groom-in-waiting to the queen and assistant private secretary; in 1881 equerry in ordinary, and in 1895, private secretary and equerry to the queen.

Biggs, Asa, American jurist: b. Williamston, N. C., 4 Feb. 1811; d. Norfolk, Va., 6 March 1878. He received an academical education, and was admitted to the bar in 1831. He was a member of the North Carolina Constitutional Convention in 1835; was elected to the State legislature in 1840, 1842, and 1844; was a member of the commission appointed to revise the State statutes in 1850, and was again sent to the legislature in 1854. In 1854 he was elected United States senator; resigned in 1858, and was appointed judge of the United States District Court of North Carolina.

Big'low, William, American educator and poet: b. Natick, Mass., 22 Sept. 1773; d. Boston, 12 Jan. 1844. He was first established as a teacher in Salem, and in 1799 delivered a poem on education before the Phi Beta Kappa Society at Cambridge. He then took charge of the Latin School, Boston, preaching occasionally, writing for different periodicals, and publishing educational text-books. Here he fell a victim to intemperate habits and was compelled to retire to his home in Natick. In this state of his fortunes it was his habit to lounge about the newspaper offices at Boston, write poetry for his friends, the editors, while the humor lasted, and then return to his rural retreat. He taught, also, a village school in Maine, and in the latter part of his life was employed as a proof-reader in the university printing office at Cambridge. He had a genial and pleasant humor, and was a ready versifier, as well as an agreeable prose-writer. His 'Cheerful Parson' and others of his songs, were much admired by his contemporaries and are well worthy of remembrance. He also published, in 1830, a 'History of the Town of Natick,' and one of Sherburne, Mass. But his best and most numerous writings were in periodicals, the 'Village Messenger,' of Amherst, N. H., which he edited in 1796, the 'Federal Orrery,' and 'Massachusetts Magazine.'

Biglow Papers, two series of satirical poems written by James Russell Lowell, the first appearing in 1848; the second in 1866. They were written in "Yankee" (New England) dialect, and attracted much attention by their humor. The first series was directed against the Mexican war and slavery; the second dealt with the Civil War.

Bignon, Louis Pierre Edouard, bēn-yŏń, loo-ē pē-ār ā-doo-ār, French historian and statesman: b. La Meilleraye, 3 Jan. 1771; d. Paris, 5 Jan. 1841. He entered the National Assembly in 1817; became a peer of France in 1837, and wrote a 'History of France' (7 vols., 1827–38). He received from Napoleon I. a bequest of $20,000.

Bigno'nia, the type-genus of the natural order *Bignoniaceæ*, consisting of more than 100 species of mostly South American tropical climbing shrubs, many of which are raised in greenhouses for their ornamental foliage and handsome tubular flowers of various colors. Some species are used as cordage in South America and are said to be employed in making mats, baskets, etc. The cultivated species are generally of easy management if given good soil, plenty of light, and space for both roots and tops. *B. capreolata,* which has numerous orange-red flowers, is a common climber throughout the South and as far north as Maryland. In favorable soils and situations it often attains heights exceeding 50 feet. It is known as "trumpet-flower" from the shape of its blossoms, and "cross-vine" and "quarter-vine" from the appearance of the cross-section of its stem. It is sometimes confounded with its near relative, *Tecoma radicans,* trumpet-vine (q.v.).

Bigordi, Domenico, bē-gôr-dē, dō-mĕn-ē-kō, Italian painter: b. Florence, 1449; d. Florence, 11 Jan. 1494. He was nicknamed GHIRLANDAJO; teacher for a time of Michael Angelo and Granacci; founder of a new school of painting; painted chiefly sacred subjects; and executed notable frescoes in Rome, Florence, and other cities. His 'Adoration of the Magi,' a panel in the Church of the Innocents, and the 'Annunciation,' on a cathedral entrance in Florence, are among his best works.

Bihacs, or **Bihatch,** bē-hätch', a fortress of Bosnia, on an island of the Unna, about 50 miles east of the Adriatic. It has a low and unhealthy site, but is remarkable for its strength. The possession of it has often been keenly contested during the Turkish wars.

Bihé, bē-hā', South Africa, a fruitful district lying east of Benguela, and under Portuguese influence. It is an important caravan centre, as the only route across the Continent passes through it. Area, 3,900 square miles. Pop. 95,000.

Bijanagur, bē-ją-nä-goor', or **Vijayanagara,** otherwise HAMPI, India, an ancient city, now in ruins, in Bellary district, Madras, 30 miles northwest of Bellary. It stands in a plain, surrounded by enormous masses of granite, and covers an area nearly eight miles in circuit. On the north and west it is washed by the Tungabhadra, and in other directions is enclosed partly by natural precipices and partly by strong stone walls. Among its edifices are a magnificent temple of Vishnu, with a pyramidal portico about 160 feet high, divided into 10 stories; another temple, also entered through a painted pyramidal portico; and one of Rama, with pillars of black hornblende covered over with elaborate mythological sculptures. These buildings, and many others besides, are in the purest style of Hindu architecture. Its ruin was effected by a confederation of Mohammedan rajahs, who took and sacked it in 1564.

Bijapur, bē-jē-pör', India, a decayed city in the Bombay presidency, 160 miles southeast of Poona. It was for centuries the flourishing capital of a powerful kingdom, but fell therewith under various dynasties in succession, Hindu and Mussulman, till in 1686 it was captured by Aurungzebe. It passed, during the early part of the 18th century, into the hands of the Mahrattas, and became British in 1848. Now that a gradual decay has done its worst, Bijapur presents a contrast perhaps unequaled in the world. Lofty walls of hewn stone, still entire, enclose the silent and desolate fragments of a once vast and populous city. With the exception of an ancient temple, the sole relic of aboriginal domination, the ruins are Mohammedan, and consist of beautiful mosques, colossal tombs, a fort, with an inner citadel, a mile in circuit. The British government has done everything to prevent further decay.

Bijns, bīnz, **Anna,** Flemish poet: b. Antwerp, 1494; d. there, 10 April 1575. Much admired for her melodious verses, full of metaphors and showing great technical skill, she was styled the «Brabantine Sappho» by her contemporaries. The first of her volumes of collected verse bore the title 'This Is a Beautiful and Truthful (or Sincere) Little Book,' while a second is known as 'Spiritual Refrains.'

Bikanir, bē-kä-nēr', India, a native state of Rájputána, under the superintendence of a political agent and the governor-general's agent for Rájputána, lying between lat. 27° 12′ and 30° 12′ N. and lon. 72° 15′ and 73° 50′ E.; area, 23,173 square miles; pop. 831,955. In the whole country there is not a constant stream, the main dependence of the people being on wells of poor brackish water which is drawn from depths of 250 feet and upward, yet large flocks of sheep are kept. The country is subject to extremes of temperature in each 24 hours.

Bikanir, India, capital of the above state, an irregularly built city surrounded by a fine wall three and a half miles in circuit. It has a fort, containing the rajah's palace, and manufactures blankets, sugar candy, pottery, etc. Pop., including suburbs, 56,252.

Bikelas, Dimitrios, bē-kā'las, dē-mē'trē-ōs, Greek poet and essayist: b. Hemopolis, island of Syra, 1835. After completing his studies he went to London, where his parents had settled, and since 1874 he has lived in Paris. After having published a collection of his poems in London in 1862, he devoted himself to the task of making Shakespeare's dramas known in Greece through excellent metrical translations. As a prose-writer he has won wide reputation with his tale, 'Lukis Laras' (1879), which was translated into 13 languages.

Bilbao, bēl-bä'o, Spain, capital of the province of Biscay (q.v.) or Bilbao, situated on the navigable Nervion, in a plain surrounded with high mountains, a few miles from the sea. The river is crossed by four bridges. The town is picturesque, and well built, and contains several good churches, two fine promenades, a theatre, a marine school, etc. Bilbao carries on an important trade and manufactures (the latter consisting chiefly of sailcloth, ropes, and leather), and possesses large shipyards and iron-foundries, iron and steel works, etc. It is one of the most flourishing seaports of Spain, though its accommodation for shipping is defective, and it is the seat of a United States consul. Various harbor improvements, however, have recently been carried out, including a breakwater and mole. Bilbao exports much iron ore (especially to the United Kingdom), also pig-iron, wool, wine, etc.; the imports are manufactured goods, dried fish, timber, coal, etc. Its supply of water and sanitary arrangements are not good. Pop. (1896) 66,205.

Bil'berry. See HUCKLEBERRY.

Bil'bilis, Spain, an old Iberian city, two miles east of the modern town of Calatayud, in the province of Saragossa, chiefly celebrated as the birthplace of the poet Martial, but also famed for its highly tempered steel blades.

Bilderdyk, bĭl'dėr-dik, **William,** Dutch poet: b. Amsterdam, 7 Sept. 1756; d. Haarlem, 18 Dec. 1831. He studied at Leyden, and in 1776 obtained from the learned society of Leyden the first prize for a poem on the influence of poetry upon governments. In 1780 he obtained another prize for a poem on the connection of poetry and eloquence with philosophy. Bilderdyk, besides, devoted himself to law, at The Hague, with great success. On the invasion of the Netherlands by the French he left his country and removed to Brunswick, where he studied the German language and poetry, and afterward to London, where he delivered, in French, lectures on literature and poetry. In 1799, after the new order of things was firmly established in Holland he returned, and soon afterward published some of his principal works. Among these are a didactic poem on astronomy, and masterly imitations of Delille's 'L'Homme des Champs,' and Pope's 'Essay on Man.' Louis Bonaparte, on his accession to the throne, appointed him his teacher of Dutch, and one of the first members of the national institute founded by him. Bilderdyk produced a number of war-songs, which are considered to be among the best in Dutch poetry.

Bile, the most important secretion of the liver. It is formed directly by the liver cells, largely from the blood, is collected by the bile ducts, and discharged through the hepatic ducts. Most of the bile is stored in the gall-bladder, from which it is discharged in man by the cystic duct and the common duct into the upper portion of the duodenum, four inches below the lower end of the stomach. As first secreted in man it is a clear limpid fluid, but in the gall-bladder it is mixed with mucin and becomes darker, varying from dark brown to greenish, according to the amount of oxidation of the bile pigments. The bile of the carnivora is usually yellowish in tint, that of the grass-eaters greenish, but the colors vary widely, dependent on the oxidation. Bile is an alkaline fluid with a bitter taste, and contains water, alkaline salts of bile acids, bile pigments, traces of lecithin, cholesterin, soaps and fats, and mineral salts. The proportions of these are very variable. The acids are known as glycocholic acid, yielding glycocoll and cholalic acid, and taurocholic acid, yielding taurine and cholalic acid. The pigments are two, bilirubin and biliverdin, and the color is a compound of the colors of these two and varies with the proportion of each from reddish-brown to grass-green. They are thought to be derived from the hemoglobin of the blood. The functions of bile are not clearly understood, but it seems to aid in the digestion of fats; it is an important organ of excretion, getting rid of many broken down products of metabolism, notably the cholestrin and lecithin. It is an efficient antiseptic, reducing the amount of excessive fermentation in the intestines, it aids in peristalsis and thus overcomes constipation, and perhaps has other functions connected with proteid digestion. The amount of bile secreted daily varies from 25 to 50 ounces, its secretion is more or less uniform, but at the digestive periods the stored bile of the gall-bladder is added to the intestinal contents. Gall-stones result from concentration of the bile in the gall-bladder. They are also formed as a process of infection of the gall-bladder that creeps up from the duodenum. Gall-stones following typhoid fever are very common, and are probably formed in this manner. As a result of inflammation of the stomach and duodenum the common duct sometimes is inflamed and its walls

swollen. This prevents the escape of bile into the intestines and the bile pigments are taken up by the blood and cause the familiar symptom of jaundice (q.v.). Biliousness, so called, is rarely an affection of the liver, but much more often a mild inflammation of the stomach and intestines with catarrhal obstruction of the common duct that is not severe enough to dam back the bile entirely. Clayey stools are usually indicative of deficient bile-elimination. The best-known stimulants of bile-formation and bile-elimination are heat and the biliary acids themselves. The vast majority of the numberless patent liver-pills on the market have no influence on the liver whatever; they are simply cathartics and empty the bowels. Consult Schaefer, 'Physiology' (1898). See Digestion; Glycogen; Jaundice; Liver.

Bilfinger, Georg (gā-orh') **Bernhard,** German philosopher and mathematician: b. Canstadt, Würtemberg, 23 Jan. 1693; d. Stuttgart, 18 Feb. 1750. He was born with 12 fingers and 12 toes, and submitted to an operation which removed the deformity. He studied with Wolf at Halle and became a disciple of the school of Wolf and Leibnitz. In 1725 he received an invitation from Peter the Great to the chair of logic and metaphysics in the new college at St. Petersburg. He now solved the problem of the cause of gravity proposed by the Academy of Sciences at Paris, and gained the prize. Being recalled by Duke Charles Edward of Würtemberg he returned to Tübingen and proceeded to lecture on theology; here his originality in style and ideas soon made him popular, and in 1735 he was appointed a privy councilor. Here he displayed great administrative ability, and by severe study soon became as celebrated for his political and statistical knowledge as for his scientific attainments. He afterward paid particular attention to agriculture and promoted the culture of the vine. He was the author of numerous theological and philosophical works.

Bilguer, Paul Rudolf von, bĭl'gwĕr, powl roo-dŏlf fŏn, German chess-player: b. Schwerin, 1808; d. Berlin, 6 Oct. 1840. He entered the Prussian army in 1833, and shortly afterward was promoted lieutenant. On 18 March 1840 he performed at Berlin the curious feat of playing three games at once with as many different opponents, conducting two of the contests without seeing the boards and men. This intense mental effort is supposed to have been the primary cause of the illness which resulted in his death. His 'Chess Handbook' (Berlin, 1843 and 1852), completed after his death by his friend T. Heydebrandt von der Lasa, made an epoch in the history of chess, and is still the best practical work on that game.

Bilharzia, a parasitic worm, *Bilharzia hematobium,* very common in Egypt and South Africa, but rare in the United States. The symptoms are usually those of cystitis, or inflammation of the bladder, with bloody urine. The diagnosis is usually made by finding the ova of the worm in the blood, by the microscope. See Parasites.

Bilim'bi. See Blimbing.

Bilin, bē-lēn', Bohemia, a town and health resort seven miles south-southwest of Teplitz. It contains a fine old castle built in 1680, and one of more modern date; several churches, chapels, mills, etc. Within one mile of the town are much-frequented mineral springs, from which much water is exported. The salts and magnesia obtained from the water form important articles of commerce. It is an alkaline water, and is used with advantage in certain concretionary disorders. Here is also the singular basaltic rock called Biliner Stein. Pop. (1900) 7,808.

Bilious Fever, an old name given to a variety of conditions, but in all of which there was characteristic low-grade fever associated with a certain amount of jaundice, clayey stools, headache, foul tongue, etc. It probably represents no one disease, but a complication of many diseases. See Biliousness; Gastritis; Influenza; Malaria.

Bill, or Beak. See Beak.

Biliousness, a popular term to express some affection of the liver, but in all probability a condition of disturbed gastric and duodenal digestion, and having nothing whatever to do with the liver. In the article on bile (q.v.) the passage of this liver secretion into the hepatic duct and storage in the gall-bladder and subsequent emptying into the duodenum, is described. When the stomach is inflamed, this usually extends a certain distance into the intestines and as a consequence the mucous membrane of the common ducts also becomes inflamed and swollen. This prevents the free passage of bile into the intestines and therefore its important function in digestion is stopped or diminished. This results in further indigestion, and causes constipation, and increased putrefaction of the intestinal contents results. Thus there is a chain of many links formed that results in headache, heaviness, bloating, constipation, foul tongue, foul breath, dark urine, and in severe cases mild jaundice. The entire series may have been set in motion by overeating, or drinking alcoholic liquors, or deficient exercise, eating excessively of fatty (so-called rich) food, or other hygienic misbehavior. Any or all have started the mild inflammation of the stomach or intestines, and the biliary flow has been diminished. The trouble thus has nothing to do with the liver. The treatment should take into consideration the cause. Rest, careful dieting, plenty of water, some mild laxatives, heat over the pit of the stomach, and hot water enemas, will usually right the condition. The free washing of the bowels and the laxative will usually cure the symptoms of poisoning, headache, and heaviness. Dosing with patent pills and teas are to be condemned. They usually contain violent cathartics that irritate the stomach and intestines. While they empty the bowels and thus get rid of the poisoning symptoms, they leave behind or increase the conditions which permit of further trouble. See Auto-intoxication; Bile; Constipation; Digestion; Liver.

Bill, Brownbill, Glaive, Voulge, or **Gisarme,** all names for nearly the same instrument, which, with some slight modification, was the standing weapon of the English infantry at close quarters, as was the long-bow their weapon at distant range, from the days of the battle of Hastings, at which the Saxons used the bill and the Normans the bow, until those of Queen Elizabeth. The original brownbill was a ponderous cutting weapon with two edges, that

forward of the shaft having a concave or sickle blade, that to the back, a sort of angular cutting face, the upper part projecting before the base, so as to give a drawing blow. This terrible instrument was nearly three feet long, and 10 or 12 pounds in weight, set erect on a shaft of three or four feet. It was wielded with both hands, and could sever a horse's head or a man's thigh or shoulder, through the strongest mail or plate armor, as a modern woodman's bill-hook slices off a hazel sapling. The weapon was afterward lengthened and lightened, and provided with a spear head, so that the holder could charge it like a lance, and sometimes with a cutting hook, for severing bridles or pulling men out of their saddles.

Also a cutting instrument, hook-shaped toward the point, or with a concave cutting edge; used by plumbers, basket-makers, gardeners, etc.; made in various forms and fitted with a handle. Such instruments, when used by gardeners for pruning hedges, trees, etc., are called hedge-bills or bill-hooks.

Bill, a paper, written or printed, giving a statement of the particulars of an account or action. A printed proclamation, an advertisement, an act of Congress or parliament, or a tradesman's account is a bill.

In Legislation.— A term used to signify a special act passed by the legislature in the exercise of a *quasi* judicial power. Thus, bills of attainder, bills of pains and penalties are spoken of. The draft of a law submitted to the consideration of a legislative body for its adoption or rejection. The Constitution of the United States provides that all bills for raising revenue must originate in the House of Representatives, but the Senate may propose or concur with amendments as on other bills. Every bill before it becomes a law must be approved by the President of the United States, or within 10 days returned, with his objections, to the House in which it originated. Two thirds of each House may then enact it into a law. These provisions are copied in the constitutions of a majority of the States.

Bill of Adventure.— A writing signed by a merchant, in which he states that certain goods shipped in his name really belong to another person, at whose risk the adventure is made.

Bill of Attainder.— A bill declaring that the person named in it is attainted and his property confiscated. The Constitution of the United States declares that no State shall pass any bill of attainder. During the Revolutionary War, bills of attainder and *expost facto* acts of confiscation were passed to a wide extent. The evils resulting from them, in times of cooler reflection, were discovered to have far outweighed any imaginary good.

Bill of Costs.— A statement of the items which form the total amount of the costs of a suit or action. This is demandable as a matter of right before the payment of the costs.

Bill of Credit.— A letter sent by an agent or other person to a merchant, desiring him to give the bearer credit for goods or money. It is frequently given to one about to travel and empowers him to take up money from the foreign correspondents of the person from whom the bill or letter of credit was received.

Bill of Entry.— A written account of goods entered at the custom-house, whether imported or designed for exportation.

Bill of Exceptions.— A bill of the nature of an appeal from a judge who is held to have misstated the law, whether by ignorance, by inadvertence, or by design. This the judge is bound to seal if he be requested by the counsel on either side so to do. The exceptions noted are reviewed by the court to which appeal is taken, and if the objections made to the rulings of the trial judge are well founded, the finding in the case is reversed, and usually the cause is remanded for a new trial.

Bill of Exchange.— A bill or security originally introduced for enabling a merchant in one country to remit money to a correspondent in the other. It is an open letter of request from one man to another, desiring him to pay to a third party a specified sum and put it to the account of the first.

Bill of Health.— A certificate given to the master of a ship clearing out of a port in which contagious disease is epidemic, or is suspected to be so, certifying to the state of health of the crew and passengers on board.

Bill of Indictment.— A written accusation made against one or more persons having committed a specified crime or misdemeanor. It is preferred to and presented on oath by a grand jury. If the grand jury find the allegations unproved, they ignore the bill, giving as their verdict, «Not a true bill»; if, on the contrary, they consider the indictment proved, their verdict is a «True bill.»

Bill of Lading.— A document by which the master of a ship acknowledges to have received on board his vessel, in good order and condition (or the reverse), certain specified goods consigned to him by some particular shipper, and binds himself to deliver them in similar condition,— unless the dangers of the sea, fire, or enemies prevent him,— to the assignees of the shipper at the point of destination, on their paying him the stipulated freight.

The bill of lading should contain the name of the shipper or consignor; the name of the consignee; the name of the vessel and her master; the places of shipment and destination; the price of the freight, and in the margin, the marks and numbers of the things shipped. It is usually made in three or more original parts, one of which is sent to the consignee with the goods, one or more others are sent to him by different conveyances, one is retained by the merchant or shipper, and one should be retained by the master. It is assignable by indorsement, and the assignee is entitled to the goods, subject to the shipper's right of stoppage *in transitu* in some cases, and to various liens. It is considered to partake of the character of a written contract, and also that of a receipt. In so far as it admits the character, quality, or condition of the goods at the time they were received by the carrier, it is a mere receipt, and the carrier may explain or contradict it by parol; but as respects the contract to carry and deliver, it is a contract, and must be construed according to its terms. 3 N. Y. 322; 6 Mass. 422. Under the admiralty law of the United States, contracts of affreightment entered into with the master in good faith and within the apparent scope of his authority as master, bind the vessel to the merchandise for the performance of such contracts in respect to the property shipped on board, irrespective of the ownership of the vessel, and whether the master

be the agent of the general or special owner, but bills of lading for property not shipped, and designed to be instruments of fraud, create no lien on the interest of the general owner, although the special owner was the perpetrator of the fraud. Under a bill of lading in the ordinary form, having no stipulation that the goods shipped are to be carried on deck, there is a contract implied that the goods shall be carried under the deck, and parol evidence to the contrary will not be received. 14 Wend. 26. But evidence of a well-known and long-established usage is admissible, and will justify the carriage of goods in that manner.

Bill of Rights.— A bill which gave legal validity to the claim of rights, that is, the declaration presented by the Lords and Commons to the Prince and Princess of Orange on 13 Feb. 1688, and afterward enacted in Parliament when they became king and queen. It declared it illegal, without the sanction of Parliament, to suspend or dispense with laws, to erect commission courts, to levy money for the use of the Crown on pretense of prerogative, and to raise and maintain a standing army in the time of peace. It also declared that subjects have a right to petition the king, and, if Protestants, to carry arms for defense; also that members of Parliament ought to be freely elected and that their proceedings ought not to be impeached or questioned in any place out of Parliament. It further enacted that excessive bail ought not to be required, or excessive fines imposed, or unusual punishment inflicted; that juries should be chosen without partiality; that all grants and promises of fines or forfeitures before conviction are illegal; and, that, for redress of grievances and preserving of the laws, Parliament ought to be held frequently. Finally it provided for the settlement of the Crown. In the United States, a bill of rights, or, as it is more commonly termed in this country, a declaration of rights, is prefixed to the constitutions of most of the States. See UNITED STATES — STATE CONSTITUTIONS OF THE.

Bill of Sale.— A deed of writing, under seal, designed to furnish evidence of the sale of personal property. It is necessary to have such an instrument when the sale of property is not to be immediately followed by its transference to the purchaser. It is used in the transfer of property in ships, in that of stock in trade, or the goodwill of a business. It is employed also in the sale of furniture, the removal of which from the house would call attention to the embarrassed circumstances of its owner; hence the statistics of the bills of sale act as an index to measure the amount of secret distress existing in times of commercial depression. In not a few cases bills of sale are used to defeat just claims against the nominal or real vendor of the goods transferred.

Bill of Sight.— A form of entry at the custom-house by which one can land for inspection, in presence of the officers, such goods as he has not had the opportunity of previously examining, and which, consequently, he cannot accurately describe.

Billaud-Varenne, Jacques-Nicolas, bē-yō-vä-rĕn, zhäk-nē-kō-läṙ, French revolutionist: b. Rochelle, 23 April 1756; d. 3 June 1819. He was bred to the legal profession, and having come in 1785 to Paris, political events soon began to occupy his attention, and in 1789 three treatises appeared from his pen, entitled respectively 'Despotisme des Ministres de France'; 'Dernier Coup Porté aux Préjugés et à la Superstition'; and 'Le Peintre Politique.' Another publication, 'Acéphalocratie,' which appeared in 1791, subjected him to a judicial prosecution, and he was obliged to conceal himself for a time. He emerged from his retreat on the triumph of his party in September 1791, and in 1792 was elected a member of the National Convention. On the trial of the king he voted for execution within 24 hours. He contributed to the overthrow of the Girondists, and was subsequently chosen president of the convention, and member of the Committee of Public Safety, and in that capacity framed the Bulletin des Lois and assisted in organizing the revolutionary government. In 1795, on a reaction having taken place against the ultra party, he was arrested, and along with Collot d'Herbois, banished to Cayenne. On the overthrow of the directorate he refused the amnesty offered by Bonaparte. In 1816, on the restoration of Cayenne to France, he was obliged to take refuge at Port-au-Prince, in the island of St. Domingo. Here he died in poverty.

Billaut, Adam, bē-yō, ä-däṅ, or **Maitre Adam,** French poet: b. early part of the 17th century; d. 1662. A carpenter by trade, he wrote rude but original poems, the gaiety of which, together with the contrast they afforded with his occupation, made them very popular at the time. Voltaire called him «Vergil with the Plane.» The three collections of his poems were entitled 'The Pegs'; 'The Centre-Bit'; and 'The Plane.'

Billbergia, a genus of about 40 species of evergreen epiphytes of the natural order *Bromeliaceæ*, natives of South America and often cultivated in greenhouses for their showy flowers.

Bille, bē'le, **Steen Andersen,** Danish naval officer: b. Copenhagen, 5 Dec. 1797; d. Copenhagen, 7 May 1883. He was a member of the expedition that went to South America in 1840, and had command of a scientific expedition round the world in the corvette Galatea, 1845–7. In his 'Beretning om Corvetten Galatheas Reise Omkrung Jorden, 1845–6 og 47' (1849–51) he has given an account of this expedition.

Billet, the term given to a molding frequently introduced in mediæval architecture, consisting of a torus ornamented by alternate checkers, like a staff cut into short lengths and disposed horizontally or around a molding, and of another molding, composed of a series of small projections, arranged around a curve in alternate directions, but in a consecutive manner.

Billeting of Soldiers, the compulsory lodging of soldiers with the inhabitants of a town, formerly a frequent practice whenever there was a deficiency of accommodation in barracks or regular quarters. The billeting of soldiers on private householders is now abandoned generally, and billeting is reduced as much as possible by camping out and other arrangements. In the United States the practice is regulated by the third constitutional amendment.

Billfish, any of several fishes having notably long, beak-like snouts, as a gar, needle-fish, or spearfish (qq.v.).

Billiards, the generic name of a group of games; is played in the United States usually on a 5x10 table, fitted on each side and at the ends with rubber acting as cushions. Ivory balls driven by a wooden cue and varying in size from 2 5-16 inches to 2 7-16 inches are generally used. The bed of the table is slate, from 1¼ to 1¾ of an inch in thickness, and covered, as is also the rubber, with green cloth. The body of the table and legs, and the rails, are made from various designs of wood.

The origin of the game of billiards is shrouded in mystery, but is known to have been played in a crude way since before the birth of Christ. It is mentioned in Shakespeare's 'Anthony and Cleopatra' (1607), and it is now generally agreed that the immortal bard, in his researches for facts, had read of billiards before the birth of our Saviour. Cathire More, a sub-king of Ireland, as early as 148 A.D., speaks of billiards and billiard balls of brass. In the Confessions of St. Augustine, born 430 A.D., mention is made of the game of billiards. From this time until the end of the 14th century very little is known of the game. It is mentioned in Spencer's 'Mother Hubbard Tales' (1591). About this time the French made it an indoor table game by playing it on a square table with pockets at each corner, and one in the center of each side, a little cone in the centre of the table called the "king," and an arch of ivory, known as the "port." Certain scores depended on passing the "port" and touching the "king." As early as 1734, as stated in Seymour's 'Court Gamester' these features of the game had disappeared, and cues had begun to replace the "mast" or "mace" first used. Billiards came into fashion in the time of Louis XIV., whose physicians recommended him this kind of exercise after eating. Some profess to believe the game of English origin, as the earliest and fullest description of billiards is found in Cotton's 'Complete Gamester' (1674). The bed of the table was then made of oak, sometimes marble. Slate beds were first used about 1827. The pockets of the tables at that time, called "hazards," were at first made of wooden boxes, nets being employed soon afterward.

The billiard table is said to have found its way into America through the Spaniards about 1570. At this time it was played in England, France, Germany, and other countries, but the size of the table and style of the game differed. The English style of table and game was first adopted by the Americans. Six by twelve, six-pocket tables and four balls (two reds and two whites) were used. Soon the tables were reduced in size from 6x12 to 5½x11, then to about 5 feet wide by 10 feet long. Tables vary in measurements. All match and tournament games are now played on 5x10 tables, and are very popular in all leading public rooms and clubs throughout the United States, while the so-called 4½x9 tables are almost exclusively used in private residences and in small cities and towns.

It is only in the last 50 years that billiard tables and their paraphernalia, and billiard playing itself, have made giant strides. Until the year 1855, when Michael Phelan, the father of billiards, first introduced the celebrated combination cushions, made of rubber chiefly, the tools were necessarily crude and imperfect, and greatly retarded the progress of the players up to that period. Then was played the four-ball game on a 6x12, six-pocket table. Two red balls and two white balls were used. In the 'sixties the tables were reduced in size to 5½x11, but so fast did the professionals and amateurs improve their games under the improved condition of the table and tools, and in order to avoid the seeming monotony of long runs, it was found necessary to again reduce the size of the table, from pockets to carrom, to about 5 feet wide and 10 feet long, and change the style of game from four-ball to three-ball game. This was done early in the 'seventies. Experts soon became so proficient at this style of game as to render it necessary to place restrictions on the bed of the table by drawing lines first 8 inches, then 10, 12, 14, and finally 18 inches from the edge of the cushions the entire length and width of the table — called balk-line game. This method of restricting the professionals and leading amateurs in no wise does away with the beauties of the game, as the Massè, draw, follow, and combination cushion shots are left intact. The superb play of the professionals in this country and in France, where the same style of game is played, is due in a great measure to the improved construction of the beveled table, slabs, match rubber cushions, and to the ivory balls, cue, cue tips, and chalk.

Various are the styles of billiards played now, such as "three-cushion carroms," "cushion carroms," "champions' game," "balk-line game," and the regular three-ball game.

Pool may be said to be, broadly speaking, a branch of billiards, and is very popular with the masses. It lacks the skill and variety of billiards. Pool is played on a 5x10 or 4½x9, six-pocket table, and generally with gully attachments — a new device that rather adds to the popularity of the game. This gully is so placed under the table that all balls, when pocketed will drop into a basket at the foot of the table. The most popular of the various pool games is "continuous pool," played with 15 numbered balls and one plain white one — the cue ball. These 15 balls are arranged in a triangle form at the foot of the table. The player's object is to drive as many of the numbered balls successively into one or other of the pockets as he can, subject to certain rules and regulations. There are various other kinds of pool games — "American," "pyramid," "Chicago," "forty-one," and others. For a complete list of these various styles of games, also all styles of billiards, with the rules governing them, the reader is referred to the 'Handbook of Standard Rules of Billiards and Pool.' This handbook also gives valuable hints on the care of tables, balls, cues, etc.

One of the most important parts that go to make billiard playing complete is the cue and cue-tip. The size and weight of the cue is a matter of individual judgment, but nearly all professionals and the best amateurs prefer one that weighs from 19 to 22 ounces, with the tip of the cue about a half inch full in diameter. The cue-tip is one of the leading, if not the leading, factor in billiard playing. Many public and private games are lost because of the imperfect quality of the cue-tip, and many players are wont to ascribe their defeat or bad play to the tip itself. Much depends on the manner of tipping the cue. Cue-tips are made in France and are of comparatively recent origin. They consist of two qualities of leather united, the under leather being very hard and flat, while

the upper or top leather is somewhat porous, spongy, and springy. Selecting a good leather and the tipping of billiard cues is an art in itself, and has become so important an adjunct to the success of the business that the leading billiard halls in this country find it necessary to employ a man to exclusively attend to that branch of the trade. It is an art, for instance, to hammer a tip down to the requisite firmness before it is ready to be glued to the top of the cue, over which the tip generally projects (if a new one), on all sides. Inside of an hour's time in dry weather, if the quality of the glue is good, the tip may be finished off ready for use. Turn the cue bottom side up, firmly press the leather onto a table, then using a sharp knife, cut the leather even with the top of the cue itself, and pare the upper leather as one would an apple, finish with sandpaper, size about 1½, and smooth off with single O sandpaper. A cue-tip, when ready for playing, should be about half-moon shape, but many and various are the shapes of tips. Never use sandpaper on a cue-tip after it has been played with for a while. If the tip becomes hard or greasy from frequent use of chalk, roll it lightly with a French file.

Billiards is without doubt far superior in point of skill and science to any game played, either in-doors or out-doors. Chess and checkers are purely mental and yield no exercise to the body. Golf and other out-of-door games are dependent chiefly on execution, whereas billiard playing requires and combines both knowledge and execution. As a health-giving exercise and recreation, restful to the mind, physicians are now agreed that billiards leads all other games, while divines, politicians, artists, men of letters, and women, recommend it and play it at home, in the clubs and public rooms. It is steadily gaining in popularity among merchants, bankers, and brokers, as a relief to the turmoil of a busy life. No residence is thought complete without its billiard table, and the question is often asked "Which shall we have first, the piano or the billiard table?" and the answer is — "the billiard table first." GEO. F. SLOSSON,
American Billiard Expert.

Billings, Frank, American physician. He graduated M.D. at Chicago Medical College, 1881; was interne at Cook County Hospital, 1881–2; studied in Vienna, 1885–6; professor of medicine at Northwestern University Medical School, 1891–8; professor of medicine and dean of Rush Medical College, 1898.

Billings, John Shaw, American surgeon and librarian: b. Switzerland County, Ind., 12 April 1839. He was graduated at Miami University in 1857, and at the Ohio Medical College, 1860; was demonstrator of anatomy in the last institution, 1860–1; entered the Union army as an assistant surgeon, 1861; was promoted to lieutenant-colonel and deputy surgeon-general, 6 June 1894; and was retired, 1 Oct. 1895. He was professor of hygiene in the University of Pennsylvania, 1893–6; and in the last year was appointed director of the New York Public Library (Astor, Lenox, and Tilden Foundations). After the close of the war Dr. Billings took charge of the library in the surgeon-general's office; reorganized the United States Marine Hospital Service; was vice-president of the National Board of Health, 1879–82; and had charge of the compilation of vital and social statistics in the Eleventh Census. He is a member of a large number of American and foreign scientific societies, and his numerous publications include: 'Principles of Ventilation and Heating'; 'Index Catalogue of the Library of the Surgeon-General's Office, United States Army'; 'National Medical Dictionary.'

Billings, Josh. See SHAW, HENRY W.

Billings, William, American composer: b. Boston, 7 Oct. 1746; d. there, 26 Sept. 1800. He was by trade a tanner, and his opportunities of instruction in any branch of knowledge, and particularly in the theory and practice of music, were few. A love of music and considerable vocal skill, however, led him, while still young, to become a teacher of singing and a composer of psalm-tunes, which eventually found their way into every church choir of New England and became great favorites with the people. He published no less than six collections of tunes, which, with a few exceptions, were of his own composition. They were founded upon the new style of church music, then first introduced by Tansur, A. Williams, J. Arnold, and other English composers, and their contrast to the dismal old tunes previously in use naturally gave them immense popularity, and in fact caused a revolution in musical taste in New England. They were far from being perfect in the requisites of good melody and harmony, and their author, in a quaintly worded preface to his second work, entitled 'The Singing Master's Assistant' and commonly known as 'Billing's Best,' apologizes for the errors which his first collection contains; but the melodies were generally good, and, had the composer enjoyed the advantages for musical instruction which the present age affords, his compositions would doubtless have possessed a permanent value. Billings was a firm patriot, and an intimate friend of Samuel Adams, who frequently sat with him at church in the singing-choir. Many of his tunes, composed during the war of independence, breathe the true spirit of patriotism, and were sung and played wherever New England troops were stationed. Billings may fairly claim the title of the first American composer, for before his time there is no record of any musical composition by a native of this country. He is also known as "the father of New England psalmody."

Billingsgate, a word said to have been derived from Belinus Magnus, a somewhat mythic British prince, father of King Lud, about 400 B.C. More probably it came from some unknown person called Billing. It is applied to the celebrated London fish market existent at least as early as 979 A.D., made a free market in 1699, extended in 1849, rebuilt in 1852, and finally exposed to the rivalry of another market built 1874–6. The word is also used to indicate foul, abusive language, such as is popularly supposed to be employed by fish-wives who are unable to come to an amicable understanding as to the proper price of the fish about which they are negotiating. Billingsgate is used as a synonym of coarse, vulgar abuse.

Billington, Elizabeth, English singer: b. London, 1768; d. Venice, 1818. Her father was a German oboe-player, her mother an English singer. She made her appearance as a singer at the age of 14, and at 16 married Mr. Billington, a double-bass player. She made her debut as

an operatic singer in Dublin, and afterward appeared at Covent Garden, where she secured an engagement for the remainder of the season of 1786 for $5,000, the manager giving her two benefits. She visited France and Italy, and Bianchi composed the opera of 'Inez de Castro' expressly for her performance at Naples.

Billion, in Great Britain and Germany, the term used to denote a million millions. In France, America, and elsewhere it denotes a thousand millions. A similar difference is found in the use of the terms trillion, quadrillion, etc.

Billiton, East Indies, an island belonging to Holland, lying between Banca and the southwest of Borneo, of an irregular sub-quadrangular form, about 40 miles across; area, 1,863 square miles. Pop. (1897) 41,558.

Billon, an alloy of copper and silver, in which the former predominates, formerly used in Austria and Germany for coins of low value, the object being to avoid the bulkiness of pure copper coin.

Billroth, Theodor, German surgeon: b. Bergen, on the island of Rügen, 26 April 1829; d. 6 Feb. 1894. He was educated at Griefswald, Göttingen, and Berlin; was professor of surgery at the University of Zurich in 1860, and at Vienna in 1867; in the war of 1870–1, he worked in German hospitals on the Rhine. He was one of the foremost surgeons of the day, not only as an operator, but as an authority on microscopic work, pathology, and military surgery.

Billy-boy, a flat-bottomed, bluff-bowed vessel rigged as a sloop, with a mast that can be lowered so as to admit of passing under bridges. They generally belong to the Humber ports.

Bilney, Thomas, «Little Bilney»: b. probably at Norwich, about 1495; d. Norwich, 19 Aug. 1531. He studied at Trinity Hall, Cambridge, and was ordained in 1519. He was opposed to the formal «good works» of the Schoolmen, and denounced saint- and relic-worship; and to these plain Protestant views he converted Hugh Latimer and other young Cambridge men. In 1527 he was arraigned before Wolsey, and on recanting absolved, but was confined in the Tower for over a year. Stung by remorse, after two years of suffering, he began to preach in the fields of Norfolk, but was soon apprehended and condemned; and although reconciled once more to the Church, he had to suffer the penalty of heresy, and was burned to death.

Biloxi, bĭl-oks'ĭ, Miss., a city in Harrison County, on Biloxi Bay, opening into the Gulf of Mexico, and the Louisville & N. R. R.; 80 miles northeast of New Orleans. It is principally engaged in the canning of oysters, fish, fruit, and vegetables, and has also considerable manufacturing and shipping interests. Biloxi is the site of the first settlement made upon the Mississippi by white men, under the direction of Pierre Le Moyne d'Iberville, in 1699. Pop. (1900) 5,467.

Biloxi Indians, one of the 10 groups of tribes into which the Siouan stock of North American Indians is divided. In 1669 they had one village on Biloxi Bay near the Gulf of Mexico. Thirty years later there were three villages, Biloxi, Paskagula, and Moctobi. A few survivors of the tribe are still to be found near Lecompte, Rapides Parish, La.

Bilson, Thomas, English divine: b. Winchester, 1547; d. 1616. He was educated at Winchester School, and after completing his studies at New College, Oxford, became successively head master of the school and canon of the cathedral of Winchester. In 1585 he published a work, entitled 'The True Difference Between Christian Submission and Anti-Christian Rebellion,' intended mainly to defend the government and policy of Elizabeth; and in 1593 another work, entitled 'The Perpetual Government of Christ's Church,' still considered one of the ablest defenses of episcopacy. In 1596 he was made bishop of Worcester, and was transferred in the following year to Winchester. In 1603 Bilson preached the coronation sermon before James I., and in 1604 he took a prominent part in the celebrated conference at Hampton Court. The translation of the Bible, executed during the reign of James, was partly submitted to his revision. He was buried in the south side of Westminster Abbey.

Bilsted. See Liquidambar.

Bilston, England, a town in Staffordshire, three miles southeast from Wolverhampton. Pop. (1901) 24,034.

Bimetallism. Gold and silver have been used as money for thousands of years, both the Old Testament and profane history making frequent reference to such use of the precious metals. See Numismatics.

As time went on the metals were coined into convenient pieces, and the weight and fineness of the coins guaranteed by the government. Finally, a legal ratio between the metals was fixed and the coins made a tender in payment of debts.

The term bimetallism is employed to describe a financial system wherein gold and silver are used as standard money and coined without limit at a fixed ratio. Bimetallism proper implies, first, that the money unit shall rest upon two metals; second, that these metals shall enjoy equal and unlimited coinage privileges; third, that they shall be connected by a fixed and definite legal ratio; and fourth, that the coins made from them shall be a full legal tender.

The term «limping bimetallism» has been applied to systems wherein gold and silver were used as standard money, but in which one of the metals was not coined at all, or not coined on equal terms with the other. The term, free coinage, has sometimes been used to mean unlimited coinage and sometimes to mean gratuitous coinage. Unlimited coinage is necessary to a complete bimetallic system. When coinage is limited the volume of standard money is regulated by law; when coinage is unlimited the volume depends, first, upon the total accumulation of coin, and, second, upon the annual production of the money metals. This sum is further augmented by the coinage of gold and silver plate when money becomes scarce, or lessened by an increased demand for gold and silver in the arts when money becomes plentiful.

Gratuitous coinage is not necessary to bimetallism, although it usually accompanies it. A charge can be made for mintage without destroying the bimetallic character of the system, but such a charge necessarily creates a differ-

ence between the coinage and the bullion value of the metal. When coinage is gratuitous melted coin can be recoined without loss; when there is a mint charge melted coin loses an amount equal to the cost of coinage. The "melting pot test" is, therefore, not a test of honest money.

Bimetallism does not rest upon any particular ratio; the coinage ratio is fixed by law, and can be changed by law. The ratio simply states the proportion existing between the silver dollar and the gold dollar when measured by weight — that is, at the ratio of 16 to 1, the silver dollar weighs 16 times as much as the gold dollar. While the legal and commercial ratios between the metals have fluctuated from time to time the legal ratio has, as a rule, caused the change in the commercial ratio, and from the beginning of history down to 1873 the fluctuations in the commercial ratio were never as sudden or as great as they have been since 1873. During the 400 years which elapsed between 1473 and 1873 the extreme variation in the commercial ratio was from 14 to 1 to 16 to 1, although during that period there were greater changes in the relative production of the metals than have occurred since. For instance, between 1800 and 1840 the world's production of silver was about 4 to 1 in value, compared with the production of gold; after the new discoveries of gold in 1849 the production of that metal so increased that the annual output of gold was soon more than 3 to 1 in value, compared with the output of silver, and yet during this tremendous change in relative production the commercial ratio was comparatively stable, owing to the fact that all the gold and all the silver could go through the mints into the world's currency. Hostile legislation has driven the metals widely apart since 1873 and it is the contention of bimetallists that friendly legislation will bring the metals together.

The ratio of 16 to 1 is the one advocated by American bimetallists, first, because it was the ratio existing when the crusade against silver began; second, because it is the ratio now existing between the silver and gold coins in circulation in the United States; and, third, because an increase in the ratio, made by increasing the size of the silver dollar, would to the extent that it was joined in by other nations require the recoinage of silver coins into larger coins, and thus reduce the world's volume of standard money. If, for instance, the ratio were changed to 32 to 1 by international agreement, and the silver money of the world, approximating $4,000,000,000, were recoined into $2,000,000,000, it would cause a shrinkage of about 25 per cent in the total volume of metallic money and, as contracts would still call for the same number of dollars, such a change in the ratio would transfer billions of dollars in value from the wealth producers to the holders of fixed investments.

It will be noticed that bimetallism relates to the legal status of the metals rather than to their commercial value, and does not necessarily imply the simultaneous or concurrent circulation of both metals, although American bimetallists contend that the restoration of free coinage at the ratio of 16 to 1 would result in the concurrent circulation of both metals in this country. When the ratio was 15 to 1 in this country gold went to a premium of about 3 per cent because the French ratio was 15½ to 1; when our ratio was changed to 16 to 1, silver, being undervalued at our mint as compared with its value at the French mint, rose to a premium of about 3 per cent.

The Gresham law has often been quoted against bimetallism. That law is merely a statement, made by a master of the English mint of that name, who announced as his observation that the bad coins ran the good coins out of the country — the explanation being that while, to a majority of the people, one coin was as good as another so long as it would pass current, the jewelers would melt and the dealers in money would collect and export the heaviest coins (coins passing by weight rather than by legal tender outside of their own country). It can readily be seen that the Gresham law was not intended to apply to the use of two metals, and that it can apply to the use of two metals only when there is difference between government ratios. When, for instance, we had a ratio of 15 to 1 in this country, and the French ratio was 15½ to 1, there was a tendency to send American gold to France and bring French silver to the United States, and yet this tendency did not cause the exportation of all American gold to France or of all French silver to the United States. France, being at that time the stronger nation commercially, fixed the ratio and our gold rose to a premium. In the payment of debts silver was the money employed, and gold, when it was used, was used at its commodity price. After 1834 the situation was reversed and silver went to a premium. Gold was then used for the payment of debts and for general transactions, and silver, when it was used, brought a premium. It is not fair to say, however, that gold went out of circulation entirely during the former period or that silver went out of circulation entirely during the latter period, for a great deal of the undervalued coin remained here and served the purpose of money, and to that extent relieved the pressure upon other kinds of money. That which left our country in exchange for another kind of metal did not reduce our circulation, and the exported coin still remained a part of the circulation of the world and helped to fix international prices.

In bimetallism the debtor always has the option. This is true, not because of a desire on the part of the government to favor the debtor, but because the parity can be maintained in no other way. If the debtor has the option the desire of all debtors to secure that metal which is the cheaper, will in itself, by increasing the demand for the cheaper metal and decreasing the demand for the dearer metal, tend to make the commercial value of the metals identical with the legal value, whereas, through the operation of the same selfishness, the metals would be driven apart if the creditor had the option, because the demand of the creditors for the dearer metal would still further increase its price, while the lessened demand for the cheaper metal would still further decrease its price.

The arguments in defense of the bimetallic system begin with the self-evident truth that stability in purchasing power is the test of virtue or honesty in money — that dollar being the best dollar which changes least from year to year in its command over all articles of merchandise. Stability would not be so important if all transactions were on a cash basis, but with

the increase in credits, especially long time credits, it is a matter of vital importance to have the purchasing power of the dollar fluctuate as little as possible. Jacobs, in his work on the precious metals, shows that an increase of 2 per cent a year in the purchasing power of the dollar would amount to an increase of 500 per cent in 100 years. It will be seen, therefore, that the burden of national debts and other long-time securities may be materially increased or decreased by a change in the purchasing power of the dollar.

That the value or purchasing power of the dollar depends upon the number of dollars has been declared to be, and correctly so, the most fundamental principal in the science of money. To illustrate: if the business of the world is adjusted to a certain volume of money, and that volume of money is afterward suddenly doubled, prices will necessarily rise, because there will be more money with which to purchase other things. If, on the other hand, the volume of money is suddenly reduced one half prices will fall because of the scarcity of money. Next to absolute stability in the purchasing power of the dollar or unit, the most desirable thing is that any necessary change in the purchasing power of the dollar shall be gradual rather than sudden, and a sudden change in the value of the dollar can only be prevented by the prevention of a sudden change in the volume of money. When it is remembered that the money changer and the owner of fixed investments profit by a rising dollar it is easy to understand why they have always led the movements in favor of scarce money.

Dr. Sturtevant in his book, entitled 'Economics, or the Science of Wealth,' illustrates the gradual change in the volume of metallic money as follows:

"Gold and silver, considered as a standard value, are an ocean flowing around the whole economic world, and very large additions at two or three points are immediately distributed to every part."

The quantity of metallic money is so great that the annual addition to it is small in comparison.

Bimetallism is theoretically better than monometallism (either of gold or silver), because under the double or bimetallic standard the volume of money changes less rapidly and less suddenly than under the single standard. Thus far history has shown no instance of a large simultaneous increase in the production of both gold and silver. There was an enormous increase in the production of silver during the 16th century; then there was a great increase in the production of gold during the year 1849 and the years immediately following. Early in the 'seventies there was another increase in the production of silver and we are just now enjoying a considerable increase in the production of gold. In each instance the increase in the production of one metal has spread itself over the entire volume of money and has, therefore, caused a less proportionate increase than it would have caused had the world been using but one metal, either gold or silver. as standard money.

The superior stability of the bimetallic system over the monometallic system has been shown by many illustrations, the most familiar being that which likens the volume of money to a body of water receiving the inflow from two rivers instead of one.

The practical argument in favor of bimetallism is that neither metal alone furnishes a sufficient quantity of money to support the world's commerce. Bimetallism is, therefore, actually necessary as well as theoretically advantageous. This phase of the question was not much considered until after 1873 because, prior to that date, there were sufficient mints open to the coinage of both metals to furnish a monetary use for every ounce produced. When all of the gold and silver available for coinage could go through the mints into the currency, each nation could consider the question from a purely theoretical standpoint, because so long as the commercial world had the benefit of the entire volume of gold and silver, it did not make so much difference how many nations used one metal, or the other, or both. When, however, the crusade against silver began and enough nations joined in it to reduce the demand for silver below the supply available for coinage, then each nation was compelled to consider not only its preference as to a standard, but whether — and it was a vital question — it was always sure of having a sufficient quantity of the chosen metal.

The advocates of bimetallism not only contend that the law of supply and demand regulates the value of the dollar — an increase in the demand, the supply remaining the same, raising the purchasing power of the dollar, and an increase in the supply, the demand remaining the same, decreasing the purchasing power of the dollar, but they also believe that supply and demand regulate the market price of the metals.

The contention of monometallists that it is impossible to fix a relation between two metals is met with the reply that the relation between two things of limited production, such as gold and silver, can be fixed by any nation or group of nations which can furnish a use for so much of both metals as is available for coinage. Gold and silver differ from agricultural products in that they must be found before they can be produced. If gold and silver could be raised from seed and cultivated practically without limit, as, for instance, corn and wheat can be, it would be very difficult if not impossible to fix a relation between them, but they are called precious metals because they are scarce.

The demand created by the government must be considered as added to the demand created by the arts. If the demand created by the government is sufficient to utilize the surplus over and above what the arts require, the commercial value can be kept up to the coinage value for the reason that each owner will seek the highest possible price, and so long as the government stands ready to convert a given amount of metal into a given amount of money, he will not have to dispose of the metal to any one else for less than the government price. If the government, instead of standing ready to convert one metal into money, stands ready to convert two metals into money, it can make the commercial ratio and the coinage ratio identical, if there is a use for the money. The changes in relative production would not affect this condition so long as the government was able to utilize all of the surplus of both metals.

The influence exerted by the legal ratio on the commercial ratio is well described by the

Royal Commission of England, which in its report of 1888 said: "Nor does it appear to us *a priori* unreasonable to suppose that the existence in the Latin Union of a bimetallic system with a ratio of 15½ to 1 fixed between the two metals, should have been capable of keeping the market price of silver steady at approximately that rate. The view that it could only affect the market price to the extent to which there was a demand for it for currency purposes in the Latin Union, or to which it was actually taken to the mints of those countries is, we think, fallacious. The fact that the owner of silver could, in the last resort, take it to those mints and have it converted into coin which would purchase commodities, at the ratio of 15½ of silver to 1 of gold, would, in our opinion, be likely to affect the price of silver in the market generally, whoever the purchaser and for whatever country it was destined. It would enable the holder of the silver to stand out for a price approximating to the legal ratio and would tend to keep the market steady at about that point."

Independent bimetallists and international bimetallists agree as to the theoretical and practical benefits of the double standard, but differ as to the ability of the United States to maintain the parity alone, the former believing, and the latter denying, that under conditions as they now exist our nation is able to utilize all the silver that could come to our mint.

If our government offered to coin into money at a fixed ratio every ounce of gold and silver presented at the mint, the supply brought to the mint would necessarily come from one of three sources — that is, from silver bullion already in existence, from silver coin of other countries, or from the annual product of the mines.

As there is no considerable quantity of silver held in the form of bullion, there could be no material increase in our coinage from that source.

Whether silver coin would come to our mint from other countries would depend entirely upon the ratio. The fear that, under bimetallism, our country would be flooded with the coined silver of the world, is entirely without foundation, for the reason that our ratio, 16 to 1, is more favorable to gold than the ratio existing between gold and silver in the nations that have a large quantity of silver coin. France, for instance, is the largest European holder of silver, but as her silver now circulates on a parity with gold at a ratio of 15½ to 1, it could only come here at a loss equivalent to about three cents on the dollar.

Whether the mines would furnish an excessive amount of silver is a question about which no one could speak positively, because no one can foresee new discoveries or estimate the possible exhaustion of mines now being worked. There is, however, nothing in the past to justify a fear of over-production.

Raising the government price of a precious metal does not necessarily increase the production of it, neither does the lowering of the price necessarily reduce the production. For instance, the law of 1834 reduced the government price of gold, and yet soon afterward there was a wonderful increase in the production of gold. The discoveries of silver following 1870 were not brought about by an increase in the price of silver, and for several years the production of silver increased, even with a falling market. The monetary use of gold and silver is the controlling use. If, by agreement among all the nations, the legal tender function was withdrawn from both gold and silver, and other money substituted for them, both would fall in value, just how much no one knows, because a fall in the price of either of the metals would develop new uses and thus increase the demand, which, in its turn, would act with the supply in determining the ultimate price. While it is probable that a higher price for silver bullion would cause the re-opening of some mines which have been abandoned because of the low price of silver, the production of silver would not be likely to be increased to any such extent as has been imagined.

It is not out of place to refer, in this connection, to another matter which has been the subject of much speculation, namely, the cost of producing gold and silver. The labor cost has less influence on the price of gold and silver than upon products of the soil. In the case of agricultural products, an attempt to raise the price of any kind of crop much above the cost of production would immediately be followed by such an increase in the crop as to at once cause a supply that would reduce the price. If, on the other hand, the cost of producing a particular kind of crop is increased out of proportion to the price, the production will fall off until the scarcity of the article raises the price. In the case of the precious metals, however, the supply cannot be increased at will, and therefore the price does not necessarily vary with the cost of production. If, for illustration, all the gold mines were to be exhausted excepting one, and this one mine began producing just the amount that all the mines now produce, but no more, the price of gold would remain the same whether it was produced at $1.00 an ounce or at 1 cent an ounce.

We have no means of ascertaining the labor cost of either gold or silver. About 10 years ago the director of the mint was asked for statistics in regard to the labor cost of producing gold and silver, and his reply was that there were no statistics in regard to gold and none of any value in regard to silver, because the statistics were gathered from the mines in operation and did not include the money expended in prospecting and in mines that had ceased to produce. No two mines in the world have produced either gold or silver at the same cost for any considerable period. If we take into account the money spent in prospecting and the money spent in the purchase of claims that have proven worthless, as well as the money invested in machinery and other appliances, it is probable that more than $1.00 has been expended for every dollar of either gold or silver taken out of the earth, and it is also probable that, dollar for dollar, it has cost less to produce gold than silver; first, because gold is often found in nuggets, while silver is found in veins, and second, because gold is often found on the surface, while silver is, as a rule, a deep-mine product.

Space does not permit a history of the conflict between the standards in Europe. England has maintained the gold standard for about a century and has exerted a controlling influence

on several other European nations. During this period France, although free coinage is now suspended, has been the most loyal supporter of bimetallism and as late as 1897 offered to join the United States in the restoration of coinage, provided England and Germany would do likewise.

After the gold discoveries of 1849, the European financiers became alarmed lest the increased production of the yellow metal would largely aid debtors, and there was quite a sentiment in favor of the demonitization of gold. Writers like Chevalier were complaining that holders of fixed investments were in danger of suffering from a cheap gold dollar. It was exactly the same argument that was made against the white metal a little later when the Comstock lode and other rich deposits of silver were discovered.

Bimetallism in the United States.— The bimetallic standard was recommended by Jefferson and Hamilton, and adopted by our government by a statute approved by George Washington 2 April 1792. This law provided for the free and unlimited coinage of silver and gold at the ratio of 15 to 1, the coins being equally a legal tender for all debts public and private. The Spanish milled dollar then in use in this country contained the same amount of pure silver as our present silver dollar and, the ratio of 15 to 1 having been adopted, the gold dollar was made to weigh one fifteenth as much. The silver dollars then coined (many of which are now in existence), are sometimes called the "unit dollars," because they have on the edge the following inscription: "Hundred Cents, One Dollar, or Unit."

In 1834 (28 June) the ratio was changed from 15 to 1 to 15.988 + to 1, which for convenience has been called 16 to 1. The change was made for the purpose of checking the exportation of gold, but as the new ratio undervalued silver it made gold the money in general use. This law, supported by Thomas H. Benton, and approved by Andrew Jackson, provided for the free and unlimited coinage of gold and silver into full legal tender money at the new ratio. In 1837 (28 January) the alloy in the dollar, both gold and silver, was changed from one twelfth to one tenth, making the weight of the standard silver dollar 412½ grains, nine tenths fine, and the weight of the standard gold dollar 25 8-10 grains, nine tenths fine.

As the law of 1834 undervalued silver and led to the exportation of considerable quantities of it, it became difficult to keep fractional currency in circulation, and to remedy this the law of 1853 was enacted. By the terms of this law subsidiary silver (that is, coins of less denomination than $1.00), were reduced from full weight to light weight and made token money, with limited legal tender, instead of standard money. This law, however, did not change the provision in regard to the standard silver dollar, the free and unlimited coinage of that dollar still continuing. The subsidiary silver coins were redeemable in the standard money, either gold or silver. Sometimes the Act of 1834 has been referred to as establishing the gold standard, but this is erroneous. It merely changed the ratio and that, too, by reducing the weight of the dearer dollar, not by increasing the cheaper dollar. Equally erroneous is the assertion that the Act of 1853 established the gold standard. That did not in the least change the law relating to the standard money, either gold or silver.

On 12 July 1873 the demonetization of silver was effected by an act entitled "An Act Revising and Amending the Laws Relative to the Mints, Assay Offices, and Coinage of the United States." (A similar law having the same purpose had just before been enacted in England, and a copy of it delivered to the director of our mint.)

When this law was passed the business of the country was being transacted with paper money, both gold and silver being at a premium — silver at a greater premium than gold. No attention was being paid to the subject of metallic money and the purpose of the law of 1873 was not generally understood. In making provision for silver coinage it omitted the coinage of the standard silver dollar, and substituted for it a trade dollar of 420 grains which was intended for use in the Orient, it being thought that the trade dollar would compete with the Mexican dollar in China and other Eastern countries. In 1874 (20 January) the Federal statutes were revised, and in this revision a clause was inserted limiting the legal tender of silver coins to $5.00. Neither the Act of 1873 nor the Act of 1874 was generally discussed, and it is only the recognition of a well-settled fact of history to say that this discrimination against silver and in favor of gold was not known among the people and not thoroughly discussed even in Congress. When the matter became known an active agitation for the restoration of silver at once began, and nearly all of those who voted for the measure denied that they knew that the Act of 1873 was intended to demonetize silver.

The suspension of silver coinage by the United States alone would not have caused a fall in the price of silver as measured with gold, but other nations joining in the demonetization of silver it soon became apparent that the mints still open could not utilize all the silver available for coinage, and the gold price of silver began to decline. The effort to reopen the mints to silver resulted in the passage of what was known as the Bland-Allison Act. The bill, as it passed the House, under the leadership of Richard P. Bland, of Missouri, restored the free and unlimited coinage of gold and silver at the ratio of 16 to 1. The opposition in the Senate was sufficient, however, to defeat the bill in its original form, and to compel the acceptance of a substitute framed by Senator Allison, whose name was thus connected with the law. This compromise measure provided that there should be "coined at the several mints of the United States silver dollars of the weight of 412½ grains troy of standard silver as provided by the Act of January 1837," and also provided that such silver dollars "together with all silver dollars heretofore coined by the United States of like weight and fineness" should be "a legal tender at their nominal value for all debts and dues public and private, except where otherwise expressly stipulated in the contract."

It will be seen that this law restored the coinage of silver dollars under the law of 1837, but did not contain the former provision in regard to the unlimited coinage of silver on private account as gold was then and is now coined. In order to secure the bullion out of

which to coin the dollars mentioned in the Act of 1878, the law provided "that the secretary of the treasury is authorized and directed to purchase, from time to time, silver bullion, at the market price thereof, not less than $2,000,000 worth per month, nor more than $4,000,000 worth, and cause the same to be coined monthly, as fast as so purchased, into such dollars."

In carrying out the provisions of the law, the Treasury Department purchased the minimum required rather than the maximum permitted.

It will be seen, also, that while the silver dollar was restored to general legal tender, a provision was inserted that permitted the exclusion of the dollar by private contract — that is, private individuals were permitted to discriminate against silver, although they were not permitted to discriminate against gold. The purchase of silver for coinage under this act retarded the fall in the price of silver, but as it did not consume the entire surplus it was not sufficient to restore the price of bullion to the coinage price of $1.29 an ounce.

The Bland-Allison Act remained on the statute books until 1890, when it was repealed by what was known as the Sherman Purchase Act, which provided for the purchase of 4,500,000 ounces of silver per month, or so much thereof as might be offered at a price not exceeding the coinage value, the bullion to be paid for by the issue of treasury notes, redeemable in coin, and after the first of July 1891 only so much of the silver was to be coined as was necessary to redeem the treasury notes presented.

This act immediately increased the demand for silver and raised the price of silver bullion, not only in the United States, but all over the world, to about $1.21 an ounce. But when it was found that even this demand was not sufficient to utilize all the surplus silver, the price again began to fall.

Secretary Rusk, in the Agricultural Report of 1890, called attention to the fact that the Sherman Purchase Law raised the price of silver and declared that that rise in price "unquestionably had much to do with the recent advance in the price of cereals," and added, "the same cause has advanced the price of wheat in Russia and India, and in the same degree reduced their power of competition. English gold was formerly exchanged for cheap silver, and wheat purchased with the cheap silver metal was sold in Great Britain for gold. Much of this advantage is lost by the appreciation of silver in those countries."

The Sherman Act was also a compromise, urged by the opponents of silver to prevent the passage of a free coinage law. Mr. Sherman, in his 'Recollections,' published in 1895, thus speaks of the strength of the free silver movement, and of the purpose of the compromise:

"A large majority of the Senate favored free silver, and it was feared that the small majority against it in the other House might yield and agree to it. The silence of the President on the matter gave rise to an apprehension that if a free coinage bill should pass both Houses he would not feel at liberty to veto it. Some action had to be taken to prevent a return to free silver coinage, and the measure evolved was the best obtainable. I voted for it, but the day it became a law I was ready to repeal it, if repeal could be had without substituting in its place absolute free coinage."

The treasury notes issued in the purchase of silver were made a legal tender for the payment of all debts public and private, except where excluded by contract, and were redeemable by the secretary of the treasury "in gold or silver coin at his discretion." It will be seen that the option as to the coin of payment was reserved to the government, but another clause in the measure which declared it to be "the established policy of the United States to maintain the two metals on a parity with each other upon the present legal ratio or such ratio as may be provided by the law," was afterward construed by the Treasury Department to deprive the secretary of the option. At any rate the department adopted the policy of paying in gold when gold was demanded, and although Secretary Carlisle afterward declared before one of the House committees that it would have been better for the government to have reserved the option, he, when he came into office, followed the precedent set by his predecessor.

This ruling of the Treasury Department was followed by the presentation of treasury notes and a demand for gold, and the drain upon gold which followed was used as an argument in favor of the repeal of the purchase clause of the law. The treasury note was declared to be an endless chain, although it only became an endless chain when the department surrendered the option which the law expressly conferred upon it. It may be added that the same endless chain argument has been made against the greenback, and can be made against the silver dollar if it is ever made specifically redeemable in gold.

What has sometimes been called "the silver movement" began with the discovery of the effect of the law of 1873, and has continued with varying force ever since. It was called the silver movement, not because of partiality to silver, but because silver was the metal discriminated against. It might better be designated as the bimetallic movement, because it was an effort to restore bimetallism, and the supporters of the movement asked for silver nothing more than was already granted to gold. The movement did not originate in the mining States, but extended over the entire country and throughout other countries, the interest being centred in silver as a money rather than in silver as a metal.

During the period that has elapsed since 1873 three international conferences have been held with a view to the restoration of silver (at Paris in 1878 and in 1881, and at Brussels in 1892), but they have been unsuccessful, largely because other European countries have hesitated to act without England, and England, being largely a creditor nation, has been unwilling to surrender the advantage which a rising dollar has given her in the increased purchasing power of her credits.

In the summer of 1893, the President, giving as his reason the suspension of the coinage of silver in India, called Congress together in extraordinary session and recommended the unconditional repeal of the purchase clause of the Sherman Law. Congressman Wilson, chairman of the Committee of Ways and Means, and leader of the administration forces in the House, introduced a bill identical in purpose and almost

identical in language with one introduced by Senator Sherman a year before. The object of this bill was to repeal the purchase clause of the Sherman Law without substituting any provision for the further coinage of silver. It was supported by all who were opposed to bimetallism, and by some who declared themselves in favor of bimetallism but criticised the purchase of silver on the ground that it was contrary to the theory of bimetallism. These insisted that as soon as the Sherman Law was repealed the remainder of the Democratic platform would be carried out and bimetallic coinage re-established. A few were induced to support the measure under the belief that the suspension of silver coinage here would force European nations to an agreement for the restoration of bimetallism throughout the world. After a prolonged contest this bill became a law 1 Nov. 1893. Following this an attempt was made to secure the coinage of the seigniorage which had accumulated in the treasury. This bill passed both Houses, receiving the support of many who voted for the repeal of the purchase clause of the Sherman Law, but the measure was vetoed by the President. The administration then attempted to secure the passage of a law authorizing the issue of gold bonds, but this was defeated in the House of Representatives.

As the Act of 1893 virtually opened the campaign of 1896, in which the silver question figured so prominently, it may be well to consider the platforms adopted just before and just after that date.

During the period extending from 1873 to 1896 the platforms of the two leading parties, while more or less ambiguous on the money question, recognized the advantages of the double standard. In 1884 the Republican platform declared in favor of an international conference to fix the relative value of gold and silver coin, while the Democratic platform declared in favor of "honest money, the gold and silver coinage of the Constitution, and a circulation medium convertible into such money without loss." In 1888 the Democratic party reaffirmed the platform of 1884, while the Republican party inserted the following plank in its platform: "The Republican party is in favor of the use of both gold and silver as money, and condemns the policy of the Democratic administration in its efforts to demonetize silver."

In 1892 the Republican platform said: "The American people from tradition and interest favor bimetallism, and the Republican party demands the use of both gold and silver as standard money," and then followed a clause demanding "that the purchasing and debt-paying power of the dollar, whether of silver, gold, or paper, shall be equal at all times."

The Democratic party that year denounced the Sherman Law (the Act of 1890) as a cowardly makeshift, and demanded its speedy repeal, and then declared the party's position as follows:

"We hold to the use of both gold and silver as the standard money of the country, and to the coinage of both gold and silver without discrimination against either metal or charge for mintage, but the dollar unit of coinage of both metals must be of equal intrinsic and exchangeable value or be adjusted through international agreement, or by such safeguards of legislation as shall insure the maintenance of the parity of the two metals, and the equal power of every dollar at all times in the markets, and in the payments of debts; and we demand that all paper currency shall be kept at par with, and redeemable in, such coin. We insist upon this policy as especially necessary for the protection of the farmers and laboring classes, the first and most defenseless victims of unstable money and a fluctuating currency."

The Populist party, which polled about 1,000,000 votes that year, demanded "the free and unlimited coinage of silver and gold at the present legal ratio of 16 to 1." This was the first national platform which specifically named the ratio, but a majority of the Democrats in Congress and many Republicans had for years been voting for bills providing for free and unlimited coinage at this ratio.

In the campaign of 1896, the money question was the paramount issue. The Democratic platform, adopted at Chicago, demanded "the free and unlimited coinage of both silver and gold at the legal ratio of 16 to 1, without waiting for the aid or consent of any other nation." The People's party, which met two weeks later, adopted a plank substantially like it, as did also the Silver Republican party.

The Gold Democrats, who withdrew from the Chicago convention, met at Indianapolis and declared in favor of the gold standard.

The Republican party said: "We are unalterably opposed to every measure calculated to debase our currency or impair the credit of our country. We are therefore opposed to the free coinage of silver except by international agreement with the leading commercial nations of the world, which we pledge ourselves to promote, and until such agreement can be obtained, the existing gold standard must be preserved."

In March 1896 a resolution was adopted in the English Parliament pledging the government to assist in restoring the par of exchange between gold and silver, and this pledge encouraged many in this country to hope for an international agreement.

The campaign of 1896 resulted in the election of the Republican ticket by a large majority, but as that party had committed itself to international bimetallism, the verdict at the polls was a victory for the double standard rather than for the single gold standard.

In pursuance of the promise contained in the Republican platform, President McKinley, immediately upon taking his seat, sent a commission to Europe to solicit co-operation in the restoration of silver to its former place by the side of gold, but this commission failed to secure any concessions from England and no formal conference was arranged.

In 1900, the Democratic party, the People's party, and the Silver Republican party adhered to the positions taken on the money question in 1896, while the Republican platform said: "We renew our allegiance to the principle of the gold standard and declare our confidence in the wisdom of the legislation of the 56th Congress, by which the parity of our money and the standard of our currency on the gold basis has been secured."

The election in 1900 resulted in an increased electoral and popular majority for the Republican ticket, but other questions over-shadowed the money question in this campaign, and the result was again undecisive as to the standards.

The large and unexpected increase in the output of gold in Alaska, the United States, South Africa, and Australia has very considerably increased the supply of money, and to some extent relieved the strain which began with the demonetization of silver in 1873, but with the white metal still furnishing nearly one half of the world's basic money there is no reason to believe from past or present indications that silver can be dispensed with as a standard money. The gold standard cannot be accepted as a finality in any country until it is accepted as a finality throughout the world, for each nation's supply of metallic money is influenced by the demand created by each other nation. It is probable, therefore, that what is called the money question, will, in so far as it relates to metallic money, increase or decrease in importance in inverse ratio to the supply of money, occupying more attention when a decrease in the volume of money reduces prices and being less considered whenever an increase in the volume of money increases prices. See Democratic Party; People's Party; Republican Party; Silver Republican Party.

William McKinley and G. A. Hobart were the Republican candidates for President and Vice-President in 1896 and William Jennings Bryan and Arthur Sewall the Democratic candidates. The People's party nominated Mr. Bryan, but substituted Thomas A. Watson for Mr. Sewall for Vice-President. The Silver Republicans endorsed both Bryan and Sewall. The Gold Democrats nominated John M. Palmer and Simon B. Buckner. In 1900 William McKinley and Theodore Roosevelt represented the Republicans; and William Jennings Bryan and Adlai E. Stevenson represented the Democrats, Populists, and Silver Republicans.

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William Jennings Bryan,
Editor 'The Commoner.'

Bin, Jean Baptiste Philippe Emile, zhŏń băp-tēst fē-lēp ā-mēl, French painter: b. Paris 10 Feb. 1825. He is a pupil of Gosse and Cogniet. In 1878 he was made a member of the Legion of Honor, and in 1881 was conspicuous as one of the founders of the Society of French Artists. Since that time he has taken an active part in politics and has been elected mayor of the 18th *arrondissement.* His 'Prometheus Chained' is in the Museum at Marseilles. Among his historic portraits are those of MM. Clemenceau, Rousseau, Deschamps, etc. He works principally in portraiture and decorative painting, in both of which lines he has been eminently successful.

Binalonan, Philippines, a town of the province of Pangasinán, Luzon, situated in the western part of the island of Luzon, about 20 miles from the coast, at the junction of several highroads. Pop. 10,295.

Binan, Philippines, a town of the province of Laguna, Luzon, situated on the Bay Luzon, about 15 miles south of Manila, on highroads connecting it with Cavite, Manila, and other important towns. Pop. 19,786.

Binary Arithmetic, a method of notation invented by Leibnitz, but which appears to have been in use in China about 4,000 years ago. As the term binary implies, there are only two characters in this notation; these are 1 and 0. By it, our 1 is noted by 1, our 2 by 10, 3 by 11, 4 by 100, 5 by 101, 6 by 110, 7 by 111, 8 by 1000, 9 by 1001, 10 by 1010, etc. The principle is that 0 multiplies by 2 in place of by 10, as on the common system. Some properties of numbers may be more simply presented on this plan than on the common one; but the number of places of figures required to express a sum of any magnitude is a fatal objection to its use. Indeed, Leibnitz himself did not recommend it for practical adoption.

Binary Logarithms, a system of logarithms devised by Euler for facilitating musical calculations. Instead of having, like the common system of logarithms, 1 as the logarithm of 10, and 43,429,448 as the modulus, it had 1 as the logarithm of 2, and the modulus 1,442,695.

Bi'nary Star. See Double Stars.

Binary Theory, in chemistry, a hypothesis proposed by Davy to reduce the haloid salts (as NaCl) and the oxygen salts (as $NaNO_3$) to the same type, the monad Cl′ being replaced by the monad radical containing oxygen $(NO_3)'$. Acids are hydrogen salts, as HCl, or $H(NO_3)'$. A radical is only part of a molecule, which can unite with or replace an element or another radical, atomicity for atomicity. Thus the dyad radical $(SO_4)''$ can replace two monad radicals,

$(NO_3)'_2$, as in the equation $Pb''(NO_3)_2 + Mg''(SO_4)'' = Pb''(SO_4)'' + Mg''(NO_3)'_2$. A radical cannot exist in a separate state.

Binbir-kilisseh, bēn'bēr-kē-lē-sā', some ruins of ancient tombs in the pashalic of Karamania, Asia Minor, 20 miles north-northwest of Karaman, supposed to occupy the site of Lystra, where the cripple was healed by Paul.

Bindraban, bĭn-drạ-bŭn', or **Brindaban,** India, a town in the Northwestern Provinces, in the district of Mattra, and 35 miles north-northwest of Agra, on the right bank of the Jumna. It is famous as the scene of the youthful sports of Krishna, who has still many temples here. Among these is a cruciform pagoda, which is one of the most massy and elaborate of Brahmanical buildings. Pop. 31,611.

Bindweed. See CONVOLOULUS.

Binet, bē-nā, **Alfred,** French psychologist: b. Nice, 8 July 1857. At first he studied law and medicine at Paris, but in 1880 took up the study of psychology, both experimental and pathological, and was later appointed director of the laboratory of physiological psychology at the Sorbonne, Paris. He has been one of the editors of 'L'Année psychologique'; has contributed numerous articles to scientific and philosophical periodicals, including 'Mind'; and has written 'Animal Magnetism' (translated into English); 'Studies in Experimental Psychology' (one part of which, on micro-organisms, was translated separately); and 'Introduction to Experimental Psychology' (with Philippe and others).

Binet, Victor Jean Baptiste Barthelemy, zhŏn băp-tēst bär-tāl-mē, French landscape painter: b. Rouen, 17 March 1849. He belongs to the realistic school, and made his debut in the Salon of 1878, showing 'The Warren.' One of the most famous of his pictures is 'The Plain at St. Aubin-sur-Quillebœuf,' in the Museum at Amiens. In 1889 he was awarded a first-class medal at the Paris Exposition.

Bingen, Germany, a town of the grand-duchy of Hesse-Darmstadt, on the left bank of the Rhine and the right of the Nahe. Bingen existed in the time of the Romans, by whom it was called Vincum or Bingium. The bridge over the Nahe is said to have been built by Drusus, and bears his name. In the neighborhood are the remains of a castle, where the Emperor Henry IV. was detained a prisoner in 1105, and the Mäusethurm or Mouse-tower, in the middle of the river, the scene of the ancient legend of Archbishop Hatto, who was devoured by rats. A dangerous passage on the Rhine, called the Bingerloch, has been opened up by the blasting of sunken rocks, leaving a channel of 210 feet wide. Bingen is the market for the sale of wines produced in the neighborhood. Pop. (1895) 8,187.

Binger, Louis Gustave, băñ-zhā, loo-ē, goos-tăv, French soldier and African explorer: b. 14 Oct. 1856. He made his way from the Upper Niger to Grand Bassam in 1887–9, thus connecting the French possessions with the Ivory Coast. In 1892 he was commissioner of the French government to settle the Ashanti boundaries with England.

Bingham, Hiram, American Congregational clergyman: b. Bennington, Vt., 30 Oct. 1789; d. 11 Nov. 1869. He graduated from Andover Theological Seminary in 1819; and was one of the first missionaries of the Congregational Church to be sent to the Sandwich Islands, where he acquired much influence with the natives.

Bingham, Joel Foote, American clergyman: b. Conn. 1827. He entered the Congregational ministry, but in 1871 exchanged it for that of the Episcopal Church. He has written 'The Christian Marriage Ceremony'; 'The Twin Sisters of Martigny,' an Italian story; 'Francesca da Rimini,' from the Italian of Silvio Pellico.

Bingham, John A., American politician: b. Mercer, Pa., 1815; d. Cadiz, Ohio, 20 March 1900. He studied at Franklin College, Ohio, and became a lawyer in 1840. He was elected to Congress as a Republican in 1854, and retained his seat 1855–63. He was chairman of the managers of the House in the impeachment of Judge Humphreys, for high treason, in 1862. President Lincoln appointed him military judge-advocate in 1864, and later in the same year solicitor of the United States Court of Claims. He was special judge-advocate in the trial of the assassins of President Lincoln. He sat in Congress again 1866–73. He was one of the managers of the impeachment trial of President Johnson. From 1873 to 1885 he was United States minister to Japan.

Bingham, Joseph, English clergyman and antiquarian: b. Wakefield, Yorkshire, 1668; d. 17 Aug. 1723. He distinguished himself as a student at University College, Oxford, and devoted his attention particularly to ecclesiastical antiquities. He graduated in 1688, and became a Fellow the following year; but had to withdraw from the university on the charge of preaching unsound doctrines. He now became curate of Headbourn-Worthy, near Winchester, and there, while possessed of a scanty living on which his numerous family could barely subsist, had the merit of composing one of the most learned works of which his church can boast. This work, 'Origines Ecclesiasticæ, or The Antiquities of the Christian Church,' was published in 10 volumes octavo (1708–22), and is still a standard on the subjects of which it treats. The best modern edition is that published at the Clarendon Press (1855, 10 vols.). It was soon translated into Latin and published in Germany. In 1712 he was collated to the living of Havant, near Portsmouth, where he died.

Bingham, Kinsley S., American legislator: b. Camillus, N. Y., 16 Dec. 1801; d. Green Oak, Mich., 5 Oct. 1861. He studied law and went to Michigan in 1833. He was a judge of probate, speaker of the State House of Representatives; member of Congress 1849–51; governor of Michigan 1855–9, and U. S. senator 1859–61.

Binghamton, N. Y., a city and county-seat of Broome County, at the junction of the Chenango and Susquehanna rivers, and on several railroads; 50 miles east of Elmira. It stands more than 850 feet above tidewater, and both rivers are here spanned by several

bridges. The city is supplied with water by the Holly system, which cost over $1,500,000; has nearly 100 miles of streets lighted by electricity, and contains over 30 churches, and chapels, public school property valued at over $425,000, a public library, two national banks, and an assessed property valuation exceeding $20,000,000. Among the attractions of Binghamton, which has been named the "Parlor City," are Ross Park, Bennett Grove, and the driving parks and fair grounds. The noteworthy buildings include the State asylum for the insane, U. S. government building, State armory, new courthouse, city hall, two orphan asylums, the Commercial Travelers' Home, an opera house, and the Casino. Binghamton ranks as the third cigar-manufacturing city in the United States, and according to the census of 1890 it then had 704 manufacturing establishments, employing $9,058,651 capital and 10,191 persons; paying $4,349,162 for wages, and $7,659,207 for material, and having a combined output valued at $15,040,152. Other important manufactures are scales, chemicals, furniture, sheet-metal work, glass, gloves, and refined oils. An interesting feature of the city is the large number of cottages owned by the working people. Binghamton received a city charter in 1867. Pop. (1900) 39,647.

Bingley, Ward, Dutch actor: b. Rotterdam, of English parents, 1755; d. The Hague, 1818. In 1799 he made his debut on the stage of Amsterdam, and almost from the first took his place at the head of his profession, not only in the Dutch theaters, but also in those which performed French plays in Amsterdam and The Hague.

Bingley, England, a parish of the west riding of Yorkshire, containing a town of the same name, on the Aire, 5½ miles northwest of Bradford. The town contains the interesting church of All Saints (restored 1871) in the Perpendicular style, several other places of worship, an endowed grammar-school, and a mechanics' institute. The chief industry is worsted-spinning. Pop. (1901) 18,448.

Bingtang, bĭng-täng′, an island of the Rhio-Linga group, in the Malay archipelago. Mount Bingtang, its highest peak, 1,368 feet high, is in lat. 1° 4′ N., lon. 104° 28′ E.; Rhio, the Dutch free port, is in lat. 54′ 40″ N., lon. 124° 26′ 30″ E. Area of the island, 403 square miles; pop. with Rhio, situated on Tanjong Pinang, an adjoining islet, about 20,000. The geological formation is granite, overlaid with cellular clay ironstone. Iron and tin are found, but not as yet extensively mined. The gambier plant (uncaria gambier), which produces terra japonica, is the chief product of the island. A large number of gambier plantations are cultivated by Chinese colonists, who cultivate black pepper at the same time; the refuse leaves of the gambier, after obtaining the coagulated decoction of commerce, being excellent manure for the latter plant. Other productions are cocoa-palm, durian-fruit, much prized by the natives, caoutchouc, gutta-percha, and damar. Many valuable timber trees are found on the island. The native Malays, who are rude hunters and fishermen, like the Orang Benua of the Malay peninsula, are now outnumbered by the enterprising Chinese.

Binion, Samuel A., American scholar and author: b. Balvirziski, province of Suwalki, Poland, 1 May 1842. He was educated at the universities of Breslau and Padua and in King's College, London; was a reader in the British Museum and a superintendent of schools in Seville and the Balearic Islands; and was for several years connected as a post-graduate with the Johns Hopkins University in Baltimore, where he also catalogued the works on Oriental languages in the Peabody Museum. He has contributed to current encyclopedias, translated from the Polish Sienkiwicz' 'Quo Vadis,' 'With Fire and Sword,' and 'Pan Michael,' and published 'Ancient Egypt, or Mizraim.'

Binmaley, bĭn-ma-lā′ē, Philippines, a town of the province of Pangasinen, Luzon, situated on the Gulf of Lingayen, in the western part of the Island of Luzon, only a few miles east of the town of Lingayen. Pop. 13,787.

Binney, Amos, American merchant and naturalist: b. Boston, Mass., 18 Oct. 1803; d. Rome, Italy, 18 Feb. 1847. He graduated at Brown University in 1821, engaged in business with success, and devoted his leisure to natural science. He was one of the founders, and at the time of his death, president, of the Boston Society of Natural History. His writings on the land shells of America are in the 'Journal' and 'Proceedings' of that society. His chief work, 'Terrestrial and Air-Breathing Mollusks of the United States and Adjacent Territories of North America' (3 vols. 1847–51) was issued under the direction of Dr. A. A. Gould.

Binney, Hibbert, Canadian clergyman: b. Nova Scotia, 12 Aug. 1819; d. 1887. He graduated at Oxford University in 1842. He became bishop (Anglican) of Nova Scotia and Prince Edward Island in 1851, this being the first instance of England founding a bishopric in her colonies. He attended the General Convention of the Protestant Episcopal Church held in Chicago in 1886.

Binney, Horace, American lawyer: b. Philadelphia, 4 Jan. 1780; d. 12 Aug. 1875. He graduated at Harvard in 1797; and for many years was at the head of the Pennsylvania bar. He had a number of distinguished cases in his career; the most noted one being the defense of the city of Philadelphia against the executors of Stephen Girard. He was a member of the 23d Congress; and a director in the United States Bank. He wrote many valuable papers, and was the author of 'The Leaders of the Old Bar of Philadelphia,' 'The Privilege of the Writ of Habeas Corpus Under the Constitution,' and 'Reports of Cases in the Supreme Court of Pennsylvania' (6 vols.).

Binney, Thomas, English theologian: b. Newcastle-on-Tyne, 1798; d. 1874. He was pastor of Weigh House Chapel, London, for 40 years, and was a voluminous writer on polemical subjects, his most successful ventures as an author being the hymn 'Eternal Light! Eternal Light,' and 'Is it Possible to Make the Best of Both Worlds?' a work for young men.

Binnie, Sir Alexander R., English civil engineer: b. London, 26 March, 1839. He was educated at private schools. He worked on Welsh railways 1862-6, and for the Indian Public Works Department 1868-74; was engineer of the city of Bradford 1875-90; constructed the Nagpore waterworks, the Blackwall tunnel, the Bradford waterworks, the Barking Road Bridge, etc. In 1897 he was made chief engineer of the London County Council. His publications include articles and reports on professional subjects, lectures on waterworks, papers on rainfall, etc.

Binns, Charles Fergus, Anglo-American ceramic expert: b. Worcester, England, 4 Oct. 1857. A son of the director of the Royal Porcelain Works in his native city, he was superintendent of various departments there, 1872–97. Leaving England in the last named year he was principal of the Technical School of Science and Art, Trenton, N. J., 1897–1900, and since June, 1900, has been director of the New York State School of Clay Working and Ceramics. He has written 'Ceramic Technology' (1896); 'The Story of the Potter' (1897).

Binoc'ular Mi'croscope, etc. See Microscope; Opera Glass; Telescope; etc.

Binomial, in algebra, a quantity consisting of two terms or members, connected by the sign + or —. The binomial theorem is the celebrated formula which shows how to obtain any power of a given binomial, as $a + b$, from the two terms, a and b, and the exponent of the power. This theorem, frequently called the Newtonian theorem, on which the system of analysis is principally founded, was known, as far as relates to integral positive exponents, to several mathematicians before Newton. But Newton was the first who taught its application to fractional and negative exponents; and this discovery, one of the most important of those made by that great man, is engraved upon his tombstone.

Binon'do, Philippines, a native town near Manila, on the right bank of the Pasig; now a suburb of the walled European city, having been annexed to it by a magnificent stone bridge 411 feet in length. The bridge of Binondo is regarded as the most remarkable structure ever erected by Europeans in the Indian archipelago.

Binturong, a large civet of the Malay Peninsula and Islands, which spends its life in the trees, where it is assisted in climbing about by its long, bushy, prehensile tail. It passes the day asleep in the top of a tree, and travels about at night in search of small mammals, birds, etc., but also eats leaves and fruit. It is gray when young, but black when fully grown, and reaches a length of two and a half feet, exclusive of its long tail.

Binue, bĭn'wĕ, or **Benue,** Africa, the largest and most important tributary of the river Niger. See Benue.

Binyon, Laurence, English poet: b. Lancaster, 10 Aug. 1869. He has been an assistant in the British Museum from 1893. Besides editing the 'Shilling Garland' (1895-8) he has published 'Lyric Poems' (1894); 'Poems' (1895); 'London Visions' (1895–8); 'The Praise of Life' (1896); 'Porphyrion and Other Poems' (1898); 'Western Flanders' (1898); 'Odes' (1900); 'Catalogue of English Drawings in the British Museum' (1898–1902); 'Dutch Etchers of the 17th Century'; 'Lives of John Crome and John Sell Cotman.'

Biobio, bē'ō-bē'ō, Chile, an eastern province with the Argentine Republic on the east, and the province of Concepcion on the west and north. It is well-wooded, and there is a good trade in timber; the river Biobio (q.v.) flows through it, and the railroad from Concepcion to Angol crosses the western part. Capital, Los Angeles; area, 4,158 square miles; pop. 122,729.

Biobio, the largest river of Chile. It has a west-northwesterly course of about 200 miles, from near the volcano of Antuco in the Andes to Concepcion on the Pacific Ocean. It is two miles wide at its mouth, and is navigable for 100 miles.

Biogenesis, the genesis or origin of all living beings from living beings. It is opposed to abiogenesis, which implies that at the present time the simplest, lowest forms of life may arise by spontaneous generation (q.v.). Biogenesis, or biogeny, is divided into *ontogeny,* or the development of any individual organism, and *phylogeny,* or the development of the class or other group of organisms, to which the individual belongs. Biogenesis also may be extended to comprise the different modes of reproduction (q.v.) whether sexual, or asexual, or by fission or budding. The principle of biogenesis was first placed on a scientific basis by Harvey, who demonstrated that living beings arise from eggs, as stated in his famous aphorism, *omne vivum ex ovo.* As now modified all organisms are known to arise from living matter, that is, either from germs, spores, seeds, or eggs. See Embryology.

Biogenetic Law. See Recapitulation Theory.

Biograph, an apparatus that displays in rapid sequence a long series of photographs. It belongs to a class of apparatus which followed the invention of the kinetoscope, and includes the vitascope, cinematograph, phantoscope, etc. It differs from the kinetoscope in that instead of showing small pictures through an enlarging lens by reflected light, it projects them on a screen.

The biograph may be described as a stereopticon combined with such mechanism as is requisite for the precise manipulation of the celluloid picture film. When the apparatus is set in motion the long band of celluloid passes quickly, though not continuously, behind the projecting lens, between spools or bobbins which revolve at a uniform rate. While thus passing from its original spool to the winding reel the film encounters certain pulleys and toothed rollers that serve to direct its movements accurately. Along its edges are numerous small perforations into which the teeth of the rollers fit with precision, and by this means the small transparencies are made to occupy exactly similar positions when their images are projected

upon the canvas. As each picture in its turn attains this critical position it is momentarily brought to a standstill. At the same time a shutter is opened and an image of the picture flashes for an instant upon the screen. The shutter is then quickly closed, the picture resuming its motion, while its successor in the series is brought into a similar fixed situation. This temporary stoppage of the film (or rather of a portion thereof), as each picture attains its proper place behind the projecting lens, is a very essential feature of the process.

At the instant of its arrival a portion of the film on the preceding side of the picture will be in an unstrained or slack condition. The "slack" is then taken up by a continuously moving sprocket pulley, whereupon a rod or roller is quickly brought to bear against the now tightened film, pressing it to one side and as quickly releasing it. By this movement the next picture is pulled into its fixed position, while the film is made taut (or nearly so) on the following side of this picture. These operations are repeated continuously until the entire film has passed through the holding device in rear of the lens.

The camera used in taking the negative from which motion pictures are made is provided with a similar mechanism to that employed in showing the finished photographs. The picture roll is replaced by a roll of sensitized film, upon which the exposures are made at the rate of from 25 to 50 per second. The films range in length from 50 to 200 feet, and contain, when finished, from 800 to 3,000 negatives. After the film has been subjected to the usual photographic operations it is made to pass, in contact with a second sensitized film, beneath an incandescent lamp, and by this means the photographs are printed upon the sensitized surface. This second film is then in turn passed through the various photographic processes, and when complete it is wound on a spool which may then be placed in the machine used for exhibiting the pictures.

Biog'raphy, in its general sense, literature treating of the lives of individuals; in its restricted meaning the history of a person's life. When composed by the subject of the narrative it is called an autobiography. Biography has existed in one form or another from the most ancient times. In the book of Genesis there are biographies, or at least memoirs of Adam, Noah, Abraham, Isaac, Jacob, Joseph, and others. Homer's 'Odyssey' may be considered as an extended biography of Ulysses, limited, however, to the most interesting period of his life, that of his wanderings. Though the 'Iliad' may be loosely called a history of the Trojan war, yet, accurately, it is a chapter from the biography of Achilles, describing calamities he brought upon the Greeks by the revenge which he took on Agamemnon for carrying off his female captive Briseis. The most elaborate Greek biography was Plutarch's 'Parallel Lives' ('Bioi Paralleloi'), consisting of 46 memoirs of Greek, Roman, and other celebrities: it was published about 80 A.D. In 44 B.C. Cornelius Nepos had sent forth a biographical work, his 'Vitæ Imperatorum' ('Lives of Commanders'). Under the Greek and Roman civilization, however, the individual was absorbed in the state. When Cincinnatus or Coriolanus is mentioned, we recall rather an act than a person. The elder Cato wrote a history of the Roman republic, in which there was not found a single proper name. He said simply: "The consul proposed such a law, the general gained such a battle."

Biography differs from history, properly so called, in considering public and national events, if at all, only in their relations to a single personage. It assumes various forms, being sometimes most interested in the circumstances and external career, the *curriculum vitæ*, of its subject; sometimes regarding chiefly intellectual and moral qualities and development; sometimes being hardly more than a catalogue of a man's positions and changes of position; and sometimes, like the autobiography of Goethe, fit to be entitled truth and poetry; sometimes being formally narrative throughout, but often presenting the hero also by his letters and notes of his conversation. A biography may be a panegyric or a diatribe, or the life of a man may be used as only a frame on which to attach moral reflections. Its true aim, however, is to reveal the personal significance of those men who have played a distinguished part in the world, either by action or by thought. History has reference to the development of principles, biography to that of character. To observe the growth of a nation, or of any institution from the idea on which it was grounded, through its vicissitudes and conflicts, is the part of history. To trace a human life, to remark the manifold efforts, defeats, triumphs, perplexities, attainments, sorrows, and joys which fill the space between the cradle and the grave, is the province of biography. In history, Scipio at the head of the Roman legions subdued Africa, and Agesilaus struggled against the misfortunes of his country; in biography, the former is seen not only gaining victories, but also gathering cockleshells on the shore, and the latter not only fighting after defeat, but also riding on a hobby-horse among his children. Plutarch says it does not follow because an action is great, that it therefore manifests the greatness and virtue of him who did it; but on the contrary, sometimes a word or a casual jest betrays a man more to our knowledge of him than a battle fought wherein 10,000 men were slain, or sacking of cities, or a course of victories. Xenophon remarks that the sayings of great men in their familiar discourses, and amid their wine, have somewhat in them which is worthy to be transmitted to posterity.

Modern biographical literature may be considered to date from the 17th century since which time individual biographies have multiplied enormously. Dictionaries of biography have proved extremely useful, Moreri's 'Historical and Critical Dictionary' (1671), being, perhaps, the first of this class. During the 19th century there were published the 'Universal Biography' (85 vols. 1811–62); 'New General Biography' (46 vols. 1852–66); Chalmer's 'General Biographical Dictionary' (32 vols. 1812–17); Rose's 'Biographical Dictionary' (12 vols. 1848–50); Leslie Stephen's 'Dictionary of National Biography' (completed in 63 volumes, the first of which appeared in January 1885, and the last in September 1901); Appleton's 'Cyclopædia of American Biography' (7 vols.

1887–1900); White's 'National Cyclopædia of American Biography' (New York); 'Men and Women of the Time' (London); 'Who's Who' (London); 'Who's Who in America' (Chicago); Adams' 'Dictionary of American Authors' (1901); Vapereau's 'Universal Dictionary of Contemporaries' (Paris); 'Lamb's Biographical Dictionary of the United States' (8 vols. 1897, *et seq.*); and 'Canadian Men and Women of the Time.' Among works of more limited aim may be noted various 'Lives of the Saints'; Fox's 'Book of Martyrs'; various 'Lives of the Poets'; Boswell's 'Life of Johnson' (1791); the most noted of all English biographies, Lockhart's 'Scott' (1836–8); Forster's 'Dickens' (1872–4); Gaskell's 'Charlotte Bronte'; Cross' 'George Eliot' (1884); Lonsdale's 'Sister Dorothea' (1878); 'Life of Tennyson,' by his son (1897); 'Life of Huxley,' by his son (1901). Among notable autobiographies are the first Lord Herbert of Cherbury's 'Autobiography'; Benvenuto Cellini's 'Vita da lui Medesimo Scritta'; Rousseau's 'Confessions'; Gibbon's 'Memoirs'; Franklin's 'Autobiography'; Newman's 'Apologia Pro Vita Sua'; Besant's 'Autobiography' (1902); Trowbridge's 'The Story of My Life' (1903); Mrs. Oliphant's Autobiography' (1899).

Biology. The study or science of living organisms, and the phenomena of life. Its field is the whole breadth of the organic world, and it seeks to mark the boundaries which separate living from inorganic nature,—to discover the principles that unify it, the processes by which living things have developed, the nature of life itself and the future in store for it. Biology, then, is the sum of all the special departments of study which deal with plants, animals, and man in his animal relations, such as botany, zoology, anthropology, and their subordinate or associated sciences; that is, bacteriology, microscopy, physiology, and many more. In his outreaching toward the causes and principles underlying its phenomena, the philosophical biologist must therefore understand organic chemistry, and the laws of electricity, light, heat, and mechanics, as they relate to animal needs; and at the other extreme he must consider psychology as an integral part of his domain.

This array of responsibilities and of objects for investigation seems too formidable for any one mind to undertake or a lifetime to encompass, and it would be were not the realm of living nature capable of resolution into simple elements; unified in its fundamental structure; and controlled in its developmental growth by definite "laws of being," which have come more and more clearly into view as knowledge of details has increased. The classification and co-ordination of the enormous mass of facts incessantly poured into his laboratory and library by experimenters and observers, to illuminate the truth by some generalization, or to exhibit a plan, law, type of structure, or growth, is the high purpose of the thoughtful biologist; and the greatest names in the science,—Aristotle, Leibnitz, Harvey, Malpighi, Linné, Buffon, Lamarck, Treviranus (who in 1802 first used the term *biology*), Cuvier, Galvani, Goethe, Lyell, Von Baer, Owen, De Blainville, Leuckart, Agassiz, Darwin, Wallace, Kowalewsky, Müller, Haeckel, Marsh, Cope, Hyatt, Weismann, and many others,—have been those of men who had these large aims in view, and have contributed toward a solution of the great problem of life. The living world may be pictured as an enormous bundle of tangled and interlaced cords of phenomena, which, moreover, are never quite stationary and fixed, but are always slowly, invisibly, altering and forming new entanglements. Every naturalist is at work upon some part of this bundle, endeavoring to extricate his particular part. In mose cases he pays so little attention to anything else, and is so fascinated with the beauty of his single strand, that he draws but little out. In other cases men of larger view or more serious purpose, or societies of them co-operating, disentangle more. The *great* biologist is he who can perceive those who have found a clue, and is able to teach them and the others how still more surely to unravel the intricate threads of phenomena that entwine and conceal the great fact of life at the centre of the puzzle.

To drop the figure, the science of biology in its more restricted and ordinary meaning, is the co-ordination of the observed facts and manifestations of the organic world into laws, and the discovery of the principle from which all proceed; that is, its object is to find an answer to the ever-present question of existence—What is Life? To this end goes on the incessant collection of facts in natural history, and it goes on joyously because any moment the biologist may come upon some fact or suggestion which shall contribute to the grand result.

Progress has been made. The study at first was nothing but a miscellaneous gathering of specimens and records of observations. Then a crude sorting out began. Men at first failed to distinguish between what was animate and what was inert. The winds, the lightning, volcanoes, springs were things of life. Later the broad distinction of organic from inorganic was perceived, but even now it is not known whether some of the manifestations of movement and response in certain "slimes" are purely chemical, or due to the presence of actual life.

The next step was the separation of the two great branches of the organic world—plants and animals. The broad features of these groups must have been apparent to primitive man, but it is only within comparatively recent years that such groups as the sponges, the branching forms of the corals, the spreading growths of the polyzoans, have been definitely placed among the animals. The names, "sea-anemone," "moss-animal," "zoophyte," and the like, show the popular error or doubt as to these forms. The relationship of the minute or even miscroscopic hydroids and protozoans were still longer in doubt; and to this day there is a borderland in this great group (the Protozoa) of minute, unicellular objects where no one is able to draw a certain line between what should be called a plant and what an animal, or even whether some of the objects are organic at all.

As men perceived certain likenesses and unlikenesses the sorting of plants and animals went on crudely at first, on purely superficial or even fanciful grounds. This sufficed fairly well for some large and well-marked groups, as beasts, birds, fishes, insects, hardwood trees, and the like, yet led to many mistakes, such as placing whales with the fish, and the bats with birds. Meanwhile students here and there had

become interested in special groups, and each called his pursuit a science. Thus arose Ornithology — the study of birds: Conchology, the study of shells (in which for a long time little attention was paid to the animal that made them!); Anatomy and Physiology, the study of structure, at first confined wholly to the human form, and only lately to animals in general, when it was distinguished as Comparative Anatomy; Botany, the study of plants; and so on. In each men gathered and recorded specimens and facts, as a rule from a single neighborhood. Nevertheless, curiosity began to inquire beneath the surface. Plants were pulled apart, animals dissected, and resemblances and contrasts of structure were noted. Naturalists traveled, and found that the creatures of the world were more numerous than had been suspected, and varied with climate, soil, height above the sea, and diverse conditions, and when records and specimens from many localities were gradually accumulated in great museums, likenesses and contrasts appeared that had not been visible in the small local cabinet. Materials were thus obtained for more intelligent arrangement, and classification became one of the most important sciences in the scope of biology. The great service an accurate arrangement of living things would render to an inquirer as to their nature, was perceived, and scientific men everywhere searched for facts which should fill the gaps in their knowledge. The criteria were made more and more exact, and as classification was perfected it became increasingly evident that the criteria for all branches were substantially similar, and there came to be perceived certain *plans of structure*. One of the latest and most powerful aids to investigation, the result of the perfecting of the miscroscope, was the science of Embryology, or the study of the development of a plant from the seed or of an animal from the egg. It went hand in hand with Histology, the study of tissues, and both disclosed the new truth that the structure of both animals and plants was at its basis the same — a cell filled with "life substance" (protoplasm); and that the multiplication of these cells constituted the growth, and their arrangement and limit the form and bulk, of every animal and plant. It was furthermore ascertained that an egg or a seed (in which it is believed that every animal plant begins, in spite of some apparent exceptions) was simply a cell differing, so far as we can yet see, from other cells in the body only by its possession of the potentiality of independent life under the fostering of suitable conditions. Classification had already shown that its groups might be arranged in something like a series from those very simply organized (the one-celled protozoa at the foot of the list) up to the highly complex. Now embryology showed that the changes each individual passed through from egg to birth were a series of changes from simplicity to complexity and furthermore that they suggested a parallel to the features of the successive groups in classification, especially to those of the subordinate ranks of the subject's own class. Palæontology enforced this by a similar parallel, finding that the most ancient animals fossil in the rocks were of simple and generalized structure as compared with those of more modern geological formations: in other words, that structural development has also been historic development.

All these facts changed the point of view of the biologist. Instead of looking at separate animals and seeking to find differences upon which to make new species and subdivide groups, he is now seeking for likenesses — points of unity. It was long ago suggested to thoughtful minds that the world was not always as we found it, but that for a vast period there had been a slow, persistent growth and unfolding. The phenomena of the inorganic world pointed the same way, and hence arose the "nebular hypothesis" — the explanatory theory that the universe developed from a gaseous state, and the earth, as one of its parts, was slowly perfected in pursuance of the forces inherent in its origin. Biologists are only carrying this theory out in a detail when they argue that the facts in their hands can be accounted for only by the supposition that the living beings on the earth have been slowly developed from a primitive source, comparable to the germ-cell, along unequal and ramifying lines of progress under the influences of their changeable environment. This is only a detail,— a flower,— of the general unfolding of the universe which is well called its evolution; it is an *organic* evolution.

In the light of this grand generalization biology is now progressing with an organized force for investigation of the great question as to the origin and nature of life. This has not been answered by any of the fruitful hypotheses, like those of Darwin or Lamarck, which have placed so effective tools in the biologist's hands. Toward the solution of this problem all scientific men are working, consciously or unconsciously. In aid of this purpose are pushed forward the incessant and world-wide collection and preservation of preserved animals and plants — museum specimens; and the systematic and accurate observation and record of local species and their habits and instincts. Much of this seems trivial and dry as dust in the eyes of the ignorant or of those whose minds, being occupied with other thoughts, forget the reason and tendency for these ever-multiplied details of natural history. Patient students toil to the same end in laboratories of anatomy and miscroscopy, laboriously gather statistics of variation, compile lists of geographical distribution, chisel out of the rocks remains of extinct races, and sort and re-sort in experimental classifications — all this in order to provide the generalizers of the science with more and better factors for the solution of the great focal problem, What is Life, and how came it to be? What has been the net result so far? In one direction the conviction of the universal eminence and force of the principle of evolution; in another the realization of the independent life and action of each separate cell. To the study of the constitution, qualities and behavior of the cell, whether standing alone in the unfertilized egg, or as a naked monad, or one in an interdependent association of millions building up a complex organism, has biology come at last; and not until it has vanquished the difficulties presented by this atom of living and potential protoplasm, the cell, will it accomplish its full purpose.

ERNEST INGERSOLL,
Editorial Staff 'Encyclopedia Americana.'

Bi'on of Abdera, Greek mathematician: lived about 400 B.C. He belonged to the family of Democritus, and is said by Diogenes Laertius to have been the first who taught that there were countries in the world where the year consists only of a single day and a single night, each lasting for six months. He must therefore have been acquainted both with the spherical form of the globe and the obliquity of the ecliptic. Unfortunately nothing more is known of his history.

Bion of Borysthenes, Greek philosopher contemporary with Erastosthenes (born 275 B.C.), and with Zeno the Stoic. He studied philosophy at Athens, first under Crates of the Cynic school, then took lessons of Theodorus, surnamed the Atheist; and at last, considering his studies completed, set up for himself. It is not easy to ascertain what his opinions were, as only a few fragments of his numerous writings have been preserved; but he was accused of Atheism, and apparently on good grounds, as he is said to have regarded all questions relative to the nature of the gods and divine providence as indifferent. He died at Chalcis in Eubœa about 241 B.C.

Bion of Smyrna, Greek pastoral poet, who flourished in the latter part of the 3d century B.C. He was a contemporary of Theocritus whose manner he imitated. On attaining manhood, Bion emigrated to Sicily, where a conspiracy was formed against him, and he was basely poisoned. The poems of Bion were chiefly pastoral, occasionally erotic. The fragments of them that are extant fully justify the eulogies of his admirer, Moschus. Their sentiments are tender and delicate; their style is copious, graceful, and polished. Seventeen short poems and the famous 'Lament for Adonis' are preserved to us, the last-named furnishing the model for Shelley's 'Adonais.' See Smyth, 'Greek Melic Poets' (1900).

Biondo, Flavio, byŏn'dō, flä'vyō, Italian archæologist: b. 1388; d. 1463. His encyclopædias have served as the foundation for all subsequent collections of archæological knowledge. They were called 'Roma instaurata,' 'Roma triumphans,' and 'Italia illustrata.'

Bionomics, in biology, the study of the habits and modes of life, and their relations to each other, to all living beings, and to the world around them. It corresponds to "ecology" and to "biology," as used by German naturalists. Wasmann defines biology in the restricted sense of bionomics as —

> "The science of the external conditions of existence, which pertain to organisms as individuals and at the same time regulate their relations to other organisms and to the inorganic environment."

It therefore, he says, embraces in its restricted sense —

> "First, a knowledge of the mode of life of animals and plants, their nourishment, dwelling, mode of propagation, the care of offspring and their development, in so far as these present external manifestations; hence also, second, a knowledge of the life-relations that obtain between individuals of the same and different species (including all the phenomena of parasitism, symbiosis, etc.), and hence also, third, a knowledge of the conditions of existence which are essential to the life and maintenance of animals and plants."

By conditions of existence are meant the action on plants and animals of climate, soil, light, gravity, heat, the dryness or moisture in the air and soil: the nature of the water, whether salt, fresh, or brackish; currents of air, and of water; elevation above the sea, also any other physical and biological agents in causing variation in or the modification of organisms. As Wheeler states:

> "Whenever we undertake the detailed or exhaustive study of an ethological problem, we are led imperceptibly into the details of physiology, morphology, embryology, taxonomy, or chorology, according to the particular aspect of the subject under consideration."

Many of these subjects, falling under the head of bionomics, are treated under the head of evolution (q.v.), as the struggle for existence, mimicry, etc. Another department of bionomics is geographical distribution, and distribution in time, together with migration, heredity, hibernation, and seasonal dimorphism. The word "bionomics" seems preferable to "ethology," which has been used as the name of the science of ethics; it is also the more comprehensive term.

Consult papers by Bessey ('Science,' XV. p. 593); Bather ('Science' XV. p. 748); Wheeler ('Science,' XV. 20 June 1902). The writings of Réaumur, Audubon, Huber, Lubbock, Plateau, Fabre, Ford, Wasmann, Riley, Wheeler and others deal especially with the habits and economy, or bionomics of insects (bees and ants) and birds.

Bi'oplasm, that portion of the protoplasm in living bodies that possesses the physiological qualities of life. This term was first used by Prof. L. S. Beale, an English scientist; the word protoplasm had formerly been used in an analogous sense, but Prof. Beale considered that a much wider meaning had been given to this latter term by Huxley and others and therefore introduced the use of the word bioplasm with its narrower signification.

Biot, Edouard Constant, bę-ō, ā-doo-är kôñ-stäñ, French Chinese scholar of eminence: (son of Jean Baptiste Biot) b. Paris, 2 July 1803; d. 12 March 1850. After accompanying his father on a scientific tour to Italy in 1825–6, he undertook the construction of a railway from Lyons to St Étienne, the first in France. In 1833 he retired from active life, and devoted his leisure to the study of the Chinese. He was the author of 'Causes de l'Abolition de l'Esclavage Ancienne en Occident' (1840). As the result of his studies on China he published numerous articles in the 'Journal des Savants' and 'Journal Asiatique,' as well as several larger works, more especially 'Dictionnaire des Noms, Anciens et Modernes, des Villes et Arrondissements compris dans l'Empire Chinois' (1842); and 'Essai sur l'Histoire de l'Instruction Publique en Chine' (1847). Besides translations of Chinese works, — for example, the historico-chronological 'Tcheou-chou-ni-kien (Paris 1842), and the 'Astronomical Tcheou-pei,' — he wrote a 'Notice sur quelques Procédés Industriels connus en Chine, au 17me Siècle'; an 'Examen de diverses Séries de Faits relatifs au Climat de la Chine'; and 'Chine et Indo-Chine.' The printing of his translation of the Chinese Imperial Geography, 'Tcheou-li,' was interrupted for some time by his death.

Biot, Jean Baptiste, bę-ō, zhŏñ bäp-test, French mathematician and physicist of distinction: b. Paris, 21 April 1774; d. there, 3 Feb. 1862. He was educated at the Collège

Louis-le-Grand, and in 1793 entered the artillery service. Shortly afterward he entered the École Polytechnique, and thenceforth devoted himself to the study of mathematics and the natural sciences. After teaching physics for some years at Beauvais, he became professor of the same subject in the Collège de France in 1800, and in 1803 was elected a member of the Institute. In 1804 he made a balloon ascent with Gay-Lussac, and in 1806 was made a member of the Bureau des Longitudes. In 1809 he became also professor of physical astronomy in the University of Paris. With the exception of three journeys, undertaken in connection with the measurement of a degree of the meridian, — namely, to Spain in 1806–8, to Scotland, Orkneys, and Shetland in 1817, and to Spain and Italy in 1824–5,— his whole life was quietly passed in study and teaching. He published some excellent text-books, which became widely known beyond France, such as the 'Essai de Géométrie Analytique'; 'Traité de Physique Expérimentale et Mathématique'; and 'Traité Elémentaire de Physique Expérimentale,' as well as works on the astronomy of the ancient Egyptians, Indians, and Chinese. His most valuable contributions to science, however, are chiefly contained in communications to learned societies and periodicals. There are few branches of physics which were not advanced by his labors; and in optics especially he made some valuable investigations, particularly in connection with refraction and polarization. See CURVES.

Bi'otite, a mineral of the mica group, having its characteristic monoclinic crystallization and very perfect cleavage. Its chemical composition varies widely, but in general it may be said to be a silicate of aluminum, magnesium, iron, potassium; with hydrogen. On account of the presence of magnesium, it is sometimes called «magnesia mica.» In color, biotite varies from green to black. It has a hardness of from 2.5 to 3, and a specific gravity of about 2.9. It is a common constituent of granite and gneiss, and of many eruptive rocks, such as andesite and trachyte. Biotite was named for the French physicist, J. B. Biot (q.v.).

Bipen'nis, a double-headed battle-axe, mentioned in Homer. The Greek literature attributes its use to the barbarians, most especially to the Amazons. Such axes have been found in stone.

Bipelta'ta, a name given by Cuvier to a family of *Crustacea,* so called because the carapace is divided into two parts or shields; the anterior shield is large, oval in shape, and corresponds to the head; the posterior is angulated in outline, corresponds to the thorax, and bears the foot-jaws and ordinary feet. This family is one of those making up the order of *Stomopoda,* and is now very generally known under the name of Phyllosomidæ.

Bipes, bī'pēz, (1) a genus of reptiles belonging to the order *Suaria,* in which the posterior feet only are visible, though the rudiments of the anterior extremities appear under the skin. This genus is the connecting link between the lizards and the snakes. (2) The name given to a lizard from the Cape of Good Hope, which is called *Anguis bipes* by Linnæus and *Scelotes bipes* by Gray.

Bipont Editions, famous editions of the Latin classics, published in Bavaria in the city of Deux Ponts, whose name in German is Zwei-brücken, and in Latin Bipontium. The publication was begun in 1779, but after the French conquest was finished in Strasburg. The collection forms 50 volumes octavo.

Birago, bē-rä'gō, **Karl, Baron von,** Austrian military engineer: b. Cascino, d'Olmo, 24 April 1792; d. Vienna, 29 Dec. 1845. He studied mathematics at Pavia; was a teacher in a military school in Mailand, and in 1825 invented the military bridge which is named for him. He assisted at the building of the fortifications of Linz, the fortifications of the Po near Brescello, and in 1839 built a military bridge across the Po which was especially successful. Nearly all the Continental armies have since adopted his system of bridge construction. In 1844 he was in command of the newly organized Pioneer and Pontonier Corps and became commander of a brigade. He wrote 'Researches in European Bridge Construction.'

Birbhum, bēr'boom, a district of the Division Bardwan in Bengal. It is crossed by a few unimportant rivers; has hot springs, iron mines and limestone deposits. The chief agricultural product is rice; there is also a large silk-worm industry. For over 2,000 years Birbhum was the scene of the conflicts of the Aryans advancing into Bengal from Hindustan.

Biquadrat'ic Equations, in algebra, equations containing but one unknown quantity, of which, in the equation, the highest power is the fourth. An equation of this kind, when complete, is of the form $x_4 + Ax_3 + Bx_2 + Cx + D = 0$, where A, B, C, and D denote any known quantities whatever. See EQUATION.

Bir, bēr, or **Birejik,** a town in Asiatic Turkey, 80 miles northeast of Aleppo, on the side of a steep hill on the left bank of the Euphrates, which is here about 600 yards wide, and 10 to 12 feet deep. The town is surrounded on the land side by a wall, with towers at the angles, and pierced with loopholes. The streets are narrow but clean. In the centre, on a steep rock, is an old ruined fortification. Bir has long been the point where caravans and travelers from Aleppo to Orfah, Diarbekir, Bagdad, and Persia, cross the Euphrates. Pop. 8,000.

Birague, René de, bę-räg, rė-nā dė, Italian politician: b. Milan, 1507 (or 1506): d. 1588. He incurred the hostility of Louis Sforza the duke, but in France, Francis I. received him favorably, made him councilor of the Parliament of Paris, and governor of Lyonnais, and sent him to the Council of Trent. Under Charles IX. his advancement was still more rapid, and in 1570 he was made keeper of the seals. In this capacity he was a party in the secret council at which the massacre of St. Bartholomew was organized. He zealously defended the Catholic cause against the inroads of French Calvinism, both in its religious and its political aspects. He was bitterly hated by the Huguenots, who in consequence made many derogatory accusation against him. He was made a cardinal in 1578, and held the bishopric of Lavaur and several rich abbeys. He died chancellor of France.

Birch, Harvey, the principal figure in Cooper's novel, 'The Spy,' a romance of the American Revolution.

Birch, John, English soldier: b. 7 April 1616; d. 10 May 1691. A Presbyterian in religion, he took the side of the Parliament, acting as a captain of volunteers at the siege of Bristol by the Royalists. On the institution of the «new model» he was ordered to join the army of Fairfax and Cromwell in the west of England, and had Bath entrusted to his care. He commanded a body of horse and foot at the storming of Bristol, an affair in which he so highly distinguished himself as to receive special commendation from Cromwell in his report to the Parliament. In 1645 he was sent against Hereford, and by a stratagem succeeded in gaining possession of the city, and with this the special thanks of Parliament. He objected to many of the proceedings of the party of Cromwell, and was repeatedly thrown into prison. He took an active part in bringing about the restoration of Charles II., and in the latter part of his life was a prominent member of Parliament. He was a man of great personal strength and stature, a rough but most effective public speaker, and had remarkable talents for business and practical affairs.

Birch, Samuel, distinguished English Egyptologist: b. London, 3 Nov. 1813; d. there, 27 Dec. 1885. At the age of 23 he was appointed an assistant in the department of antiquities in the British Museum. He gradually rose to higher positions in the museum, and latterly became keeper of the department devoted to Egyptian and Oriental antiquities, a post which he retained till his death. His whole life was devoted to studies and work connected with his official duties, and was naturally uneventful. His labors did much to advance the study of Oriental archæology, and his eminence in his own province was duly recognized by learned bodies and institutions. In 1870 he assisted in founding the Society of Biblical Archæology, and became its first president, frequently contributing to its 'Proceedings' and 'Transactions.' In 1874 he successfully presided over the International Congress of Orientalists that met in London in that year. His studies ranged over a wide field, but it is on his eminence as an Egyptologist that his reputation chiefly rests. It has been said that "he found the language of Egypt a puzzle, and left it at his death in the position of one of the most important philologies of the world." Among his works, exclusive of contributions to learned societies, encyclopædias, etc., are: 'Introduction to the Study of the Egyptian Hieroglyphs' (to accompany Gardiner Wilkinson's work on Egypt; 1857); 'History of Ancient Pottery, Egyptian, Assyrian, Greek, Etruscan, and Roman' (1857; 'Himyaritic Inscriptions of Southern Arabia' (1863); 'Dictionary of Hieroglyphics and Grammar of the same in the fifth volume of the English edition of Bunsen's 'Egypt's Place in the Universal History' (1867); 'Guide to the Egyptian Galleries of the British Museum' (1874); 'New Edition of Wilkinson's Manners and Customs of the Ancient Egyptians' (1878). For full account of his life and work, see 'Transactions of the Society of Biblical Archæology' Vol. IX. (1893).

Birch, Thomas, English historian: b. London, 23 Nov. 1705; d. there, 9 Jan. 1766. His early taste for reading induced him to prefer a literary life, which he was permitted to choose on condition of supporting himself by his own exertions. He took orders in the Church in 1730, and obtained in 1732 a living in Essex. In 1734 he engaged with some coadjutors in writing the 'General Historical and Critical Dictionary,' founded on that of Bayle, and completed, in 10 volumes folio, in 1741. He subsequently obtained various preferments in the Church, and for about 20 years before his death held the rectories of St. Margaret Pattens, London, and Depden, in Suffolk. Birch had formed very extensive manuscript collections, which, together with his library of printed books, he bequeathed to the British Museum. He produced a large number of historical and biographical works in the course of his laborious life, and served as one of the pioneers of literature. He collected fully and faithfully, but without much discrimination, materials relating to the various subjects of his research, which are calculated to afford important assistance to writers possessed of more taste and judgment. Among his works are: 'Life of the Right Honorable Robert Boyle'; 'Historical View of the Negotiations Between the Courts of England, France, and Brussels,' 1592–1617; 'Life of Archbishop Tillotson'; 'Memoirs of the Reign of Queen Elizabeth, from 1581 till Her Death'; 'History of the Royal Society of London'; 'Life of Henry, Prince of Wales.'

Birch, Thomas, American painter: b. London, England, 1779; d. Philadelphia, Pa., 3 Jan. 1851. Coming to the United States in 1793, he settled in Philadelphia, and painted chiefly portraits until 1807, when he took up marine painting, in which he achieved a high reputation. A number of his works represent naval battles of the War of 1812, and of these the paintings representing the engagements between the United States and the Macedonian, and between the Constitution and the Guerrière, are the best known. Both are in the Harrison collection at Philadelphia.

Birch-Pfeiffer, Charlotte, bērH'pfīf-ĕr, shär-lŏt'tā, German actress and dramatic writer: b. Stuttgart, 23 June 1800; d. 24 Aug. 1868, her maiden name being Pfeiffer. She first appeared on the stage in her 13th year at Munich, and soon acquired a great reputation, her special role being that of the heroines of tragedy. In 1825 she married Christian Birch, a writer of some note. After playing with success at places as far apart as St. Petersburg, Amsterdam, and Budapest, in 1837 she took the management of the theatre at Zürich, and remained in this capacity till 1843. Next year she was engaged for the Theatre Royal, Berlin, and here she remained till her death. Her plays, mostly founded on novels, became well known on almost every stage in Germany, and give evidence of real dramatic talent, as well as of a knowledge of stage effects and what would suit the taste of the theatre-going public. Victor Hugo's 'Notre Dame' and Charlotte Brontë's 'Jane Eyre' furnished her with materials for two of her dramas. She also wrote novels and tales. Her collected dramatic works appeared at Leipsic in 23 volumes (1863–80); her narrative writings in three (1863–5). Her daughter has become well known as a novelist under the name Wilhelmine von Hillern.

Birch (*Betula*), a genus of trees belonging to the natural order (or sub-order) *Betulaceæ,*

which comprises only the birches and alders. The principal habitats of the trees of this order are North America, Europe, northern Asia, and the Himalayas. The common birch is indigenous throughout the north, and on high situations in the south of Europe. It is extremely hardy, and only one or two other species of trees approach so near to the North Pole. There are two varieties natives of Great Britain, *Betula alba,* and *B. alba pendula,* or weeping-birch; the latter by far the more valuable and ornamental. When young it may readily be distinguished by the touch, its bark being covered over with rough exudations, while that of the common tree is soft and velvety. Each variety is found exclusively in some districts, but frequently they are interspersed. Throughout the most remote parts of the Highlands of Scotland the birch is often found covering extensive tracts or rocky elevations, where no other ligneous plant is to be met with. It also grows in glens and ravines, adorning the margins of lakes and rivers, where the silvery whiteness of its trunk and the light and airy habit of its spray form beautiful and interesting pictures, even in the absence of every other tree. Though often found associated with the alder on swampy ground, yet few trees more successfully resist drought. Adapting itself to various soils and situations, it possesses a wider range than any other tree. It is well suited to form a cover on ground from which Scotch pine timber has been recently removed; the exuviæ, which always overspreads such places, though hostile to plants in general, are favorable to the birch, which commonly springs up and becomes the successor of the pine. The common tree, where it grows wild, attains a height of about 30 feet, and the weeping variety about 40 feet; but both sorts rise to a much greater height when formed into plantations, particularly when interspersed with other trees. Although the birch is considered by no means a valuable tree, yet its wood, which is light in color, and firm and tough in texture, is used for a variety of purposes. Not long ago, in many parts of the Highlands, the birch may be said to have been the universal wood, and was used by the Highlanders for every purpose. They made their beds, chairs, tables, dishes, and spoons of it, and even manufactured ropes and horse-harness by heating and twisting its spray. The brushwood is used in forming wicker fences to prevent the inroads of cattle and sheep, in thatching cottages, and in forming brooms or besoms. The wood is largely used for fish-casks and hoops, and for smoking hams and herrings. Turners use it for trenchers, bowls, ladles, and other wooden ware. Ox-yokes, small screws, women's shoe-heels, pattens, and in France wooden shoes are made of it. Birch-trees are not unfrequently planted along with hazels, for the purpose of procuring wood to be converted into charcoal for forges. This charcoal is much esteemed, and the soot which is formed on burning the wood constitutes a good black substance for printers' ink. Nearly all the other parts are applicable to useful purposes. The bark is employed in the tanning of leather; and by fishermen for preserving their nets and cordage. In America, northern Europe, and Asia it is utilized for a great variety of purposes. The North American Indians use it for canoes, boxes, buckets, baskets, kettles, and dishes, curiously joining it together with threads made of roots of the cedar-tree. It is serviceable in dyeing a yellow color. In Norway it is dried, ground, mixed with meal, and boiled with other food for swine. The houses or huts in many parts of the north of Europe are covered with the outward and thicker part of the bark, instead of slates or tiles. It is spun into a coarse kind of cordage, woven into shoes and hats, and in some places even made into drinking cups. The Laplanders fasten together large pieces of it to keep off the rain. Abounding in resinous matter, slices of the bark are sometimes tied together to make torches. During a scarcity of corn it has, in several instances, been ground with bread corn, and successfully used as food for men. The leaves afford a yellow dye. The sap, from the amount of sugar it contains, affords a kind of agreeable wine. Birch-wine is produced by the tree being tapped by boring a hole in the trunk, during warm weather, in the end of spring, or beginning of summer, when the sap runs most copiously. It is recorded that during the siege of Hamburg, in 1814, many birch-trees in that vicinity were destroyed in this manner by the Russian soldiers. The dwarf birch, *Betula nana,* is a low shrub, a native of parts of the Highlands of Scotland and of Arctic regions generally. It is never more than two or three feet high, and is generally much less; a full-grown plant being thus a very tiny example of a tree. It is used as fuel, and as stuffing for beds, and its seeds furnish food for ptarmigan and other birds. A similar species is a native of the Antarctic regions. Among others the black or river birch of North America (*B. nigra*), grows to the height of 70 feet, and produces hard and valuable timber. It is also known as the red birch, from the redness of the bark in the young trees. Another American species, the cherry birch or sweet birch (*B. lenta*), is also called the black birch. It grows to a similar height with the preceding, and yields even more valuable timber, used in making furniture, etc., being tough, fine-grained, and taking on a good polish. It has been introduced into Great Britain though not much known there. The paper birch (*B. papyracea*) is another American species which also attains a large size, and by some is regarded as a mere variety of the white or common birch. Its habitat extends within the Arctic Circle, but it becomes rare and stunted in the extreme north. It receives its name from the fact that thin strips of the brilliant white bark are sometimes used as a substitute for paper. The bark of this species is put to perhaps a greater variety of uses than that of any other, its wood and sap being also utilized. Another American birch is the yellow birch (*B. excelsa*), so named from the golden color of the outer bark. It is a large-leaved species, yielding timber used for shipbuilding, etc., and is a native of the eastern parts of Canada and the northeast of the United States. Of Himalayan species may be mentioned *B. bhojputtra,* the Indian paper birch. Its thin papery bark has been used as paper from a remote period, and is still commonly used for packing purposes, for lining the flexible tubes of hookahs, and in other ways, while the wood is tough, and is employed in making articles of various kinds. In its native mountains it may be found at an altitude of 10,000 to 13,000 feet. Several of the pigmy species deserve mention. *B. pumila,* which is generally

1. Spray with *a*, male and *b*, female flowers.
2. Twig with *c*, fruit.
3–6. Various views of a single male flower.
7. Female catkin.
8–10. Various views of a single female flower.
11–12. Details of fruit case.
13. The fruit.
14. Twig with leaf and male flower buds.
15. Section through a branch, three years old.
16. Dwarf Birch (Betula Nana).

less than 8 feet tall, but sometimes reaches a height of 15 feet, is found from Newfoundland to Minnesota, and south to Ohio. *B. glandulosa,* which extends from Labrador to Alaska and south to Michigan and in the mountains to Colorado, seldom exceeds 4 feet. *B. nana,* an Arctic species, common to all three continents, rarely reaches a height of four feet. Throughout its range it is an important fuel and its seeds form one of the principal foods of ptarmigan upon which the natives depend to a large extent for flesh food. Like the two other dwarf species mentioned, it is a favorite shrub for planting among rocks. Other species, natives of Europe and Asia, resemble the preceding more or less in appearance and uses. See Bailey and Miller, 'Cyclopædia of American Horticulture' (1900–2); Regel, 'Monographische Bearbeitung der Betulaceæ' (1861); DeCandolle, 'Prodromus 16' (1869).

Birchard, Isaac James, Canadian educator: b. Uxbridge, Ont., 11 Oct. 1850. He was principal of a public school in Toronto, 1874–80; master of mathematics at Brantford College Institute in 1882–93; and in 1900 was master of mathematics in the Toronto College Institute. He is best known as the author of the text-book, 'Plane Trigonometry for Schools and Colleges,' and as the joint author of 'High School Algebra.'

Birchenough, bêrch'ẹ-nō, **Mabel** (Bradley), English novelist, third daughter of the late H. G. Bradley, dean of Westminster, and wife of Henry Birchenough, a writer on statistics. She has written: 'Disturbing Elements'; 'Potsherds'; 'Private Bobs.'

Bird, Arthur, American musician: b. Cambridge, Mass., 23 July 1856. He conducted the Milwaukee Musical Festival in 1886 and since that date has lived in Berlin. In addition to a symphony and various pianoforte numbers he has composed a comic opera, 'Daphne' (1897) and a ballet, 'Rübezahl.'

Bird, Charles, American military officer: b. Delaware, 17 June 1838. He entered the volunteer service in 1861, as first lieutenant, 1st Delaware Infantry; was promoted lieutenant-colonel, 9th Delaware Infantry, in 1864; and was commissioned colonel of the 1st United States Veteran Infantry, 24 Dec. 1865. On 2 March 1867 he was brevetted first lieutenant and captain in the United States army for gallantry in the battle of Fredericksburg, major for Spottsylvania, and lieutenant-colonel for Petersburg, Va. He was appointed a second lieutenant, 14th United States Infantry, in 1886; promoted to major and quartermaster in 1895; and commissioned a colonel and quartermaster of United States Volunteers for the war with Spain in 1898. He became brigadier-general in the regular army 16 April 1902 and was retired 17 June 1902.

Bird, Edward, English painter of note: b. Wolverhampton, 12 April 1772; d. Bristol 1819. He took up art as a profession, without any regular training, and carried on a school of drawing at Bristol. In 1807 he exhibited some pictures at Bath, and had the good fortune to find purchasers for them. In 1809 he had a picture, 'Good News,' in the exhibition of the Royal Academy, and so successful was this work that his name at once became known. He was elected an associate of the Academy in 1812, and his reputation was increased by such paintings as the 'Surrender of Calais,' the 'Death of Eli,' and the 'Field of Chevy Chase' — the last considered his greatest work. The 'Death of Eli' was sold for 500 guineas, and was awarded a premium of 300 by the British Institution. In 1815 he became a full member of the Royal Academy, and he was also appointed court painter to Queen Charlotte. Among his last pictures were the 'Crucifixion'; 'Christ led to be Crucified'; the 'Death of Ananias and Sapphira'; and the 'Burning of Ridley and Latimer.' His talents, however, were considered to be rather for genre than for historic or sacred subjects.

Bird, Frederic Mayer, American Episcopal clergyman, son of R. M. Bird (q.v.): b. Philadelphia, 28 June 1838. He was rector at Spotswood, N. J., 1870–4; chaplain and professor of psychology, Christian evidences, and rhetoric, at Lehigh University, 1881–6; and acting chaplain there, 1893–8. He is noted as a hymnologist, and as the collector of one of the most complete and valuable musical libraries in the United States. He edited several collections of hymns; was associate editor of 'Chandler's Encyclopædia'; editor of 'Lippincott's Magazine' (1893–8); and published 'The Story of Our Christianity' (1893).

Bird, Golding, English medical and scientific writer: b. Downham, Norfolk, 1814; d. 27 Oct. 1854. In 1838 he took the degree of M.D. at St. Andrew's, and in 1840 that of M.A. In the latter year he became a licentiate of the Royal College of Physicians, London, and in 1845 was elected a Fellow. In 1843 he was appointed assistant physician at Guy's Hospital, where he also lectured on materia medica; and in 1847 he entered on a three years' course of lectures on the same subject at the College of Physicians. He took an active interest in natural history, chemistry, and other subjects more or less connected with medicine; and his multifarious occupations overtaxed his strength and undermined his health, so that he died at a comparative early age. He had by this time acquired a very large practice, and had made his name well known in his profession, more especially by his researches in scientific medicine. A work by which he was more generally known was his 'Elements of Natural Philosophy,' for many years a text-book. A well-known work on 'Urinary Deposits' was also published by him, as also 'Lectures on Electricity and Galvanism in their Physiological and Therapeutical Relations'; 'Lectures on Oxaluria'; etc.

Bird, Isabella. See Bishop, Isabella Bird.

Bird, John, English mathematical instrument maker: b. in the county of Durham, 1709; d. 31 March 1776. He set up in London about 1745 as a maker of scientific instruments, having previously received instructions from Graham, the greatest mechanician of the time. In 1749 he received an order to construct a new brass mural quadrant of eight feet radius for the Royal Observatory. This was used by Bradley and by Maskelyne, and continued serviceable for 62 years. Duplicates of it were soon ordered for St. Petersburg, Cadiz, and the École Militaire, Paris — the last employed by D'Agelet and Lalande in determining the declinations of 50,000 stars. He also furnished Bradley with a

new transit instrument and a 40-inch movable quadrant. Bird's marked superiority to all other makers of the day is strikingly exemplified by the fact that in 1767 the Board of Longitude paid him £500 on his agreeing to take an apprentice for seven years, instruct other persons as desired, and furnish upon oath descriptions and plates of his methods. A result of this arrangement was the publication of two treatises, named respectively 'The Method of Dividing Astronomical Instruments' (1767), and 'The Method of Constructing Mural Quadrants' (1768), each with a preface by Maskelyne, the astronomer-royal.

Bird, Robert Montgomery, American novelist: b. Newcastle, Del., 1803; d. Philadelphia, 22 Jan. 1854. He qualified as a physician, but soon gave up the practice of medicine for literature. He first became known as a dramatist, having written three tragedies,— 'The Gladiator'; 'Oraloosa'; and 'The Broker of Bogota',— the first of these often acted by Edwin Forrest. His first novel was 'Calavar' (1834), his second 'The Infidel' (1835)— both of them having their scene in Mexico, at the time of the Spanish conquest. Then followed the 'Hawks of Hawk Hollow'; 'Sheppard Lee'; and 'Nick of the Woods, or the Jibbenainosay' (1837); the last probably the most popular of all his fictions. Its scene is laid in Kentucky soon after the close of the Revolutionary War, and in it we have a lively picture of pioneer life at this date, and the relentless hostilities between the Indians and the early settlers. He also wrote: 'Peter Pilgrim,' a collection of tales and sketches; and 'Adventures of Robin Day,' a novel.

Bird, Birde, or **Byrd, William,** English composer: b. 1538; d. London, 4 July 1623. He was trained in music under Thomas Tallis, and was appointed organist of Lincoln about 1563. In 1575 the two composers obtained the monopoly for 21 years of printing and selling music and music paper; and on the death of Tallis in 1585 Bird became sole patentee. His first work of importance was 'Psalms, Sonnets, and Songs of Sadness and Piety, Made into Music of Five Parts' (1588). In 1589 he published a collection of songs, and also a collection of sacred pieces for five voices; a second collection of similar pieces appeared also in 1591. In 1607 he published two books of 'Gradualia,' being a collection of motets for the ecclesiastical year of the Roman Catholic Church; and in 1611 'Psalms, Songs, and Sonnets.' He continued all his life a Roman Catholic, but notwithstanding this held a lease from the Crown of lands confiscated from a Roman Catholic recusant, and never lost the appointment which he held in the Protestant Chapel Royal. Bird was the composer of the first English madrigal. He wrote a large number of pieces for the virginals, and also three masses. He was the author of a celebrated canon, 'Non nobis, Domine,' often sung in England by way of grace after meat at public banquets, and which has never ceased to be popular.

Bird-catching. See TRAPPING.

Bird-catching Spider, a name applied to gigantic spiders of the genera *Mygale* and *Epeira,* which catch birds and suck their blood. The species to which the name was originally given was *Mygale avicularia,* a native of Surinam and other parts of tropical South America. The body of this insect is about two inches long, very hairy, and almost black; when the legs are stretched out it measures about a foot across. It lives in holes or crevices and does not spin a net proper, but makes a tubular nest for itself in which it lurks during the day, seeking its prey by night. Other species of Mygale belong to the Malay Archipelago, as *M. javanica* and *M. sumatrensis.* In experiments made with these spiders small birds have been known to dies in a few seconds after being bitten. Some of the web-spinning spiders make webs strong enough to entangle small birds, which thus become their prey.

Bird-cherry, in America, the wild, red, pin, or pigeon cherry (*Prunus pensylvania*) of the natural order *Rosaceæ,* a tree 20 to 40 feet high of little use except occasionally for ornamental purposes, as fuel and as a stock for grafting garden cherries upon. Its red, thin-fleshed fruit is sour and somewhat astringent. The name is also given to European, the hagberry of Scotland (*Prunus padus*), whose many varieties are often cultivated for ornament. It sometimes attains a height of 20 feet, bears racemes of flowers larger and a week earlier than the choke-cherry (*Prunus virginiana*), which it somewhat resembles. The fruit, which is black, is smaller than the common cherry and has a disagreeable taste, but is greedily eaten by birds. The wood, which resembles mahogany, and takes a good polish, is used in cabinet-making.

Bird-lice, minute wingless insects parasitic under the feathers of birds and hair of certain mammals, to which they are very annoying. They belong to the sub-order *Mallophaga,* a group of wingless degraded insects allied to the death-tick (*Psocidæ*), stone-flies (*Perlidæ*), and the white ants, altogether constituting the order *Platyptera.* They differ from true lice in having free jaws adapted for biting, and not a sucking beak. The flattened body is corneous, hard above, and the head is horizontal, with three- to five-jointed antennæ; the eyes are small and simple; the mandibles are small, like a hook, and the maxillary palpi, when present, for they are sometimes wanting, are four-jointed, while the labial palpi are two-jointed. The thorax is small and but two-jointed apparently, as the meso- and meta-thorax are united. The abdomen is from nine- to ten-jointed, while the short, thick limbs have two-jointed tarsi and one or two claws.

Bird-lime, a viscous substance used for entangling small birds so as to make them easily caught, twigs being for this purpose smeared with it at places where the birds resort or to which they are attracted by a call-bird. It is often prepared from the middle bark of the holly, which is stripped off in June or July, boiled in water for six or eight hours, and the water being strained off, is then left to ferment. This process may take two or three weeks, during which it is watered if necessary. At the end of this time it assumes a mucilaginous form, and after being pounded in a mortar and worked with the hands in water, is fit for use. This substance, when prepared, is of a greenish color and very tenacious. Mice are sometimes caught with it as well as birds.

Bird-tick, one of the horse-tick or forest-fly family (*Hippoboscidæ*) of the order *Diptera*. Like the horse-tick the body is much flattened; unlike the *Hippobosca,* or horse-tick, it has ocelli, but in the short proboscis it resembles the latter fly. In the wings there are six costal veins. There are numerous species, all of which are bird-parasites. *Olfersia americana* lives on the owl and other birds. Certain species of *Lipoptera* live on birds, but afterward migrate to mammals, finally losing their wings through disuse.

Bird of Paradise Flower. See STRELITZIA.

Birds. The birds form that class (*Aves*) of warm-blooded vertebrate animals most distinctive, most easily defined, and most popularly known and interesting. They are at once distinguished by their covering of feathers, which is possessed by no other sort of animal; and by the modification of their fore-limbs into instruments for flight (wings). Their aërial existence, from which few have wholly departed, requiring great activity and exertion, has called forth a high perfection of organization, especially in the respiratory and circulatory systems of the body, and has led to the characteristic spindle-shaped form, narrowing from the full chest and shoulders toward a pointed head, which will cleave the air easily, and diminishing toward the rudder-like tail. The graceful form, to which the beauty of birds is largely due, has been brought about by the enlargement of the shoulder-girdle, and its great pectoral muscles, and by the necessity of an increased capacity of chest to contain the comparatively great heart and lungs. In birds such as ostriches, cassowaries, moas, and the like, which have ceased to fly, and have developed very strong legs; or in those like the penguins, which have become swimmers and divers, the changes of structure are degenerations from the type, which is a bird with powers of flight.

Flight, as well as clothing, is due to the presence of the complicated horny appendages growing from the skin, called feathers, which are peculiar to the class. Their structure is described under FEATHERS. Those of the body are usually small, grow in certain definite tracts (see PTERYLOGRAPHY), varying in the different groups, and form a close jacket, not easily pervious to moisture and a poor conductor of heat, thus conserving the vital warmth and protecting the body against sudden changes of temperature. It is shed (molted) and renewed semi-annually. This body-coat is ordinarily nearly uniform in length and character, but often is varied by ornamental plumes, erectile crests, ruffs, and other modifications, such as are seen in birds of paradise, herons, and many others. The feathers are also variously colored in patterns varying with the groups and more minutely with the species, whereby they may recognize each other and be distinguished by us. These colors are usually those of pigments incorporated in the web of the feather itself, but may be due to minute scales on the surface, which break up the light, giving it an iridescent or metallic sheen, conspicuous in humming birds and certain pheasants. The plumage often varies, according to age, sex, season, or all three conditions; and these colors play an important part in bird-life (see COLORATION PROTECTIVE; NATURAL SELECTION). The bones of the wing and tail support very large, strong «quill» feathers, which, when outspread, support the bird in the air, and when moved in the proper manner carry it forward — enable it to fly, the mechanism and phenomena of which method of locomotion are explained under FLIGHT. The wing power of most birds is very great, but the speed of their flight is often exaggerated. Few exact facts are at hand, but it is apparent that the highest speed is nearer 50 than 100 miles an hour, although the latter figure is often stated. Endurance on the wing is more remarkable. Many sea-birds seem tireless, and swallows, among land birds, are almost incessantly in the air. During migrations a large variety of birds, including some of the smallest and feeblest, undertake rapid and extensive journeys, reaching in some cases almost half around the world; and some regularly pass over spaces of ocean as much as 2,000 miles in width, while a flight of 500 miles from land to land is accomplished by many species. This is the more notable as a feat because in many cases they are birds which during nine tenths of the year only flit from bush to bush. In these migratory journeys (see MIGRATION) birds often fly very high; but this is the regular custom of certain ones, especially vultures, which soar beyond human sight, yet will swoop to the earth in a swift dash, betraying great adaptability to sudden changes in atmospheric density. Other notable qualities are the power (largely residing in the tail) to suddenly change speed and direction, helping them to dodge and elude winged pursuers, and to catch the agile aërial insects, upon which many of the smaller species depend for subsistence. The sharpness and quick adjustability of eyesight also involved in this is noteworthy.

These abilities in flight have led to the very wide distribution of birds, which occur in every part of the world yet seen by man; and are the most numerously represented of all terrestrial branches of animal life in the oceanic islands. Nevertheless very few are cosmopolitan, and not many range beyond the confines of a single continent, while many are more narrowly restricted, so far at least as their habitat in the breeding season is concerned. Thus the geographical distribution of birds has been found perhaps the best criterion for the mapping out of zoögeographical regions (see ZOÖGEOGRAPHY). The greater number of families of birds is tropical, and both variety of kinds and numbers of individuals decrease toward the poles. A striking fact is the great difference between the birds of the northern and the southern hemispheres — a difference much more decided than exists between Europe and North America, or South America and Australasia.

Birds in every case reproduce their kind by means of eggs protected by a calcareous, often highly-colored shell, laid by the mother a considerable time before they are ready to hatch, which consummation is brought about by the application of warmth. This may be arranged for in two ways. A few birds bury their eggs in rotting vegetation, or in hot sand, and let the chemical heat evolved by the ferment in the former case, or the sun's rays in the latter, accomplish the desired result. The great majority, however, place their eggs in some sort of a receptacle (sometimes a mere hollow on

the ground, or hole or niche in a cliff or tree, sometimes in a burrow or nest of more or less elaborate construction (see NESTS), and there brood upon, or "incubate" them until the chick matures and emerges. In one class of birds (*Præcoces*) incubation is so long continued, and the embryonic chick becomes so far advanced before leaving the shell, that it is well coated with feathers, and can at once begin to take care of itself. These birds are the sea-birds, water-birds, game-birds, and their allies of comparatively low organization. In another class (*Altrices*) of higher organization as a group, the chicks are permitted to break from the shell before they have acquired feathers or are able to move about or obtain food. They must therefore be shielded, defended, fed, and cared for by the parents for several days or weeks. Out of this condition have grown some of the most interesting, complicated, and delightful features, habits, and instincts of bird-life.

Birds as a class are omnivorous, but each of the various groups might be characterized by its food, which, more than anything else in the process of evolution, has determined the various types of structure, which distinguish the tribes, and which are indexed, as it were, by the form of the bill and feet. Those of lowest organization,—nearest the ancestral type,—are the sea-birds, which live upon fish varied to some extent by mussels and other small marine creatures. Many of the ducks and shore-birds share this marine diet, and numerous wading birds eat fresh-water fish, frogs, crayfish, and the like. The great body of ratite and gallinaceous birds,—ostriches, emeus, partridges, pheasants, etc., that run and nest on the ground,—are vegetable-eaters, seeking green leaves, fruits, seeds, lichens, etc., and picking up such insects as come in their way. All the foregoing are præcocial birds, and the young feed on the same things as their parents. These classes have little relation to mankind so far as their food is concerned except that they sometimes devour too much grain or spoil certain plants. Among the higher class, or altricial birds, the fare is more varied, and while there is a very numerous group (the cone-billed or fringilline birds; see FINCH; SPARROW, etc.), which live altogether upon seeds, and a few others, like the kingfishers, which catch fish, the great majority indulge themselves in a miscellaneous diet of both vegetable and animal materials. Some, called "soft-billed," and including most of our song-birds, except the finches, are mainly insect eaters, some catching them upon the wing, others digging them out of rotten wood, and the greater number picking them off the leaves of trees or searching for them among the herbage. Another large class, embracing the birds of prey, and a few others, like the shrikes, depend for food upon capturing and devouring other smaller birds, together with such small mammals, reptiles, amphibians, fish, and insects as they are able to seize and kill. These are the falcons, owls, and their relatives; but a related group varies this fare by feeding upon carrion. In the case of all of these altricial birds, however, except the birds of prey, the young are fed upon soft insect food, mainly worms, caterpillars and maggots; and the period of their nesting coincides with the time when these larval insects abound. In the feeding habits of these higher birds man has a great interest, for nearly all of the innumerable insects which they capture for themselves, or for the nourishment of their young, are such as are annoying or injurious to him; and experience in many localities has shown that the destruction of bird-life is accompanied by a distressing increase of noxious insects. In the same way the hawks and owls, by their incessant pursuit of mice, and other small animals injurious to agriculture, so reduce the numbers of these pests, as greatly to benefit the farmer; while the useful work done by the vultures, as scavengers, by removing offal and dead animals, is recognized by everyone in the tropical regions where these birds most abound.

Nor does the relative usefulness of birds to man stop here. They not only afford him great pleasure, by their pleasing colors and animated behavior, and delight his ear by their voices, but large numbers of them furnish him with excellent and even dainty food. Lastly, this group has furnished men with several varieties of domestic poultry, such as the turkey, peacock, guinea-fowl, duck, goose, and various pigeons and chickens, which are among the most valuable of his animal possessions.

Birds are extremely rare as fossils, compared with other vertebrates, and little is known about their evolution. Four or five hundred extinct species have been described, as against 12,000 living, and most of them are from very fragmentary remains. The reasons for their scarcity is partly their small size and the slight construction of their skeletons, which makes their bones less likely to be buried in sediments and preserved as fossils. At a few localities, however, as in the Oligocene strata of the department of Allier in France, and the Pleistocene deposits of Fossil Lake in Oregon, they occur abundantly. Birds have been found as far back in geological time as the Jurassic Period of the Age of Reptiles. The supposed bird-tracks of the more ancient Triassic sandstones of the Connecticut valley are now believed to be mostly, if not all, tracks of Dinosaurs (q.v.), a group of reptiles having many bird-like characters. From some ancient offshoot of this group the birds are probably descended, but the early stages of their evolution are not known. Jurassic birds (see ARCHAEOPTERYX) had teeth instead of a horny beak, a long reptilian tail and other primitive characters. In the succeeding Cretaceous Period the tail has become short and rudimentary, with its feathers springing from a small bony plate at its tip as in modern birds, but some genera (*Ichthyornis*, etc.) retain the teeth. In all later birds the teeth are replaced by a horny beak. They appear to have changed comparatively little during the Tertiary and Quaternary Periods, in marked contrast to the great evolution of the mammals during the same time, and most Tertiary birds are closely related to, or included in modern genera. There are a few remarkable extinct forms known, among which are the gigantic ground-birds of New Zealand, Madagascar, and elsewhere, more or less nearly related to the modern ostriches and the *Phorohachos* of South America.

References to books upon birds will be found under the title ORNITHOLOGY, where also the structure, and classification of birds are considered.

ERNEST INGERSOLL,
Editorial Staff 'Encyclopedia Americana.'

1. Yellow-bellied Woodpecker, or Sapsucker. 2. Black-capped Titmouse, or Chickadee. 3. Black-and-White Creeping-Warbler. 4. Wood Thrush. 5. Cedar Waxwing, or Cherry Bird. 6. Black-billed Cuckoo. 7. Tree, or Canada Sparrow. 8. Red-eyed Vireo. 9. Golden-crowned Kinglet. 10. Little Screech-owl (red phase). 11. American Redstart.

1. DIGESTIVE ORGANS.

2. FORMS OF FEET.— a, partially webbed; b, lobe-foot; c, insessorial foot; d, runner's foot; e, walker's foot; f, palmated foot; g, gressorial foot; h, web foot; i, cloven foot; j, scansorial or yoke foot; k, cloven web foot; l, staff-foot; m, cramp foot.

3. FORMS OF HEAD AND BILL.—a, flamingo; b, spoon-bill; c, yellow-hammer; d, thrush; e, hawk; f, pelican; g, avocet; h, saw-bill; i, scissor-bill; j, dove; k, shoe-bill; l, gap bill; m, arassari; n, ibis; o, song-bird; p, stork.

4. FEATHERS OF A BIRD.—a, frontal; b, crown; c, occipital; d, bill; e, cheek; f, breast; g, abdominal; h, rump; i, croup; j and k, sickle feathers; l, back; **m**, primary quills; n, secondary quills; o, coverts; **p**, pinions; q, shoulder-pinions.

Birds, The, a comedy by the Greek dramatist Aristophanes, that appeared in 414 B.C. It belongs with the writer's earlier plays, in which farcical situations, exuberant imagination, and a linguistic revel, are to be noted. The comedy is a burlesque on the national mythology; the author creates a cloudland for his fancy to sport in without restraint.

Birds of America, The, the monumental work of John James Audubon, the great American naturalist, first published in England between the years 1827 and 1830. It contained colored illustrations of 1,065 species of birds. The text is descriptive of the habits and manners of the birds observed by Audubon himself in his long wanderings over the North American continent.

Bird's-eye Limestone, the old name of a rock of the Trenton formation, now called Lowville Limestone. It is a fine-grained, dove-colored stone, in which the crystallized corals of the genus Tetradium appear as whitish points.

Bird's-foot, (*Ornithopus*), a genus of about seven species of small slender pinnate-leaved, white, pink, or yellow flowered annual herbs of the natural order *Leguminosæ.* The common and generic names were suggested by the shape of the articulated, cylindrical pods which resemble the bent claws of a bird. The principal species, *O. sativus,* is used as a forage plant.

Birds' Nests. See NESTS.

Birds' Nests, Edible, the nests of the salangane (*Collocalia fuciphaga*) and other species of swifts or swiftlets, found in the Malay Archipelago, and used as an article of luxury among the Chinese. They are particularly abundant in Sumatra and Borneo, especially near the north end of the island. The nest has the shape of a common swallow's nest, is about the size of a half teacup, is found in caves, particularly in sea-cliffs, and has the appearance of fibrous gelatine or isinglass. They appear to be composed of a mucilaginous substance secreted by special glands, and are not, as was formerly thought, made from a glutinous marine fucus or seaweed. The finest nests at present are said to bring as high a price as $12 or $13 a pound. Seventy-five or one hundred dollars' worth are said to be sent to Singapore and China annually. They are bought almost exclusively by the rich Chinese, who consider them a great stimulant and tonic, and are used in making soup. The finest are those obtained before the nest has been contaminated by the young birds; they are pure white, and are comparatively scarce. The inferior ones are dark, streaked with blood, or mixed with feathers; they are chiefly converted into glue. Some of the caverns in which these nests are built are difficult of access and dangerous to climb, so that none can collect the nests but persons brought up to the trade. The following account of the traffic in these birds' nests is extracted from Crawfurd's excellent work on the Eastern Archipelago: «The best nests are those obtained in deep, damp caves, and such as are taken before the birds have laid their eggs. . . They are taken twice a year, and if regularly collected, and no unusual injury be offered to the caverns, will produce very equally, the quantity being very little, if at all, improved by the caves being left altogether unmolested for a year or two. Some of the caverns are extremely difficult of access, and the nests can only be collected by persons accustomed from their youth to the office. The most remarkable and productive caves in Java, of which I superintended a moiety of the collection for several years, are those of Karang-bolang, in the province of Baglen, on the southern coast of the island. Here the caves are only to be approached by a perpendicular descent of many hundred feet by ladders of bamboo and rattan over a sea rolling violently against the rocks. When the mouth of the cavern is attained, the perilous office of taking the nests must often be performed with torchlight, by penetrating into recesses of the rock, where the slightest trip would be instantly fatal to the adventurers, who see nothing below them but the turbulent surf making its way into the chasms of the rock. The only preparation which the birds' nests undergo is that of simple drying, without direct exposure to the sun, after which they are packed in small boxes, usually of half a picul . . . They are consumed only by the great; and indeed the best part is sent to the capital for the consumption of the court. The sensual Chinese use them under the imagination that they are powerfully stimulating and tonic; but it is probable that their most valuable quality is their being perfectly harmless. The people of Japan, who so much resemble the Chinese in many of their habits, have no taste for the edible nests; and how the latter acquired a taste for this foreign commodity is no less singular than their persevering in it.»

Birds of Passage, any migratory birds. See MIGRATION.

Birds of Paradise, a family of birds of New Guinea, northern Australia, and the neighboring islands, which contains a large number of species, notable for splendid plumage, although they are most nearly allied to the plainly dressed crows. The name «bird of paradise» is a translation of the native name in the Island of Batchian, «manukdewata,» meaning birds of the gods. About 50 species of these birds are known, varying in size from that of a crow to that of a sparrow; all are forest birds, spending their lives in the tree-tops, where many of them go about in small flocks, active and noisy, but are inclined to hide themselves in the thickest foliage, as though aware that their plumage rendered them easily conspicuous to their enemies. None are singers, and in most cases the voice is a loud, harsh cry, or a sharp whistle, or in some species, strange mewing notes. It is related that on some of the islands certain species were called «birds of the sun,» because of their habit of joining in loud choruses at sunrise. Their diet consists mainly of fruit, and especially of berries and seeds; the fig and the nutmeg are especially eaten, and some species suck honey from the large tropical flowers. Insects are captured by all species, as also are the numerous snails inhabiting the trees and bushes of that region, and the larger forms devour frogs and lizards. In pursuit of insects, worms, and snails, several species spend much of their time scrambling about the trunks of trees, and searching the bark, like creepers. The breeding habits of these birds vary extensively, and the nests and eggs of many have not

yet been discovered. The typical paradise-birds construct rather loose, careless platforms of sticks and leaves, moss, etc., placed in trees or bushes, and lay eggs which are much streaked and spotted, and vary in color and patterns. The very extraordinary nests and play-grounds of that section of the family which is terrestrial, and inhabits Australia, are described under bower-birds (q.v.).

Interest in the birds of paradise centres in their marvelous displays of plumage. These are exhibited in most species by the male alone, the female being comparatively plain and simple in her attire, as also are the young of both sexes, until the young males arrive at maturity. This dissimilarity between the females and males of birds in which the latter are highly adorned, is a protective arrangement, designed to keep the females from observation while they are sitting defenseless upon their nests, where they would easily be discovered, and often killed, did they wear the conspicuous colors and ornaments of their brilliant mates. Natural selection, by keeping their colors, and those of the inexperienced and comparatively helpless young ones plain, has tended to preserve the species; and at the time when the females are brooding their mates remain at a discreet distance from the nests, so as not to betray their position to the monkeys, lemurs, civets, serpents, and other searchers for eggs and fledglings. The same influence, acting through sexual selection (q.v.), has developed in the males the bright colors and eccentric adornments which distinguish this group of birds as a means of increasing their attractiveness in the eyes of the females. The theory is that the most beautiful male will be chosen first as a mate, and will transmit to its offspring its tendency toward ornamentation or high color, and that thus, by constant rivalry between the males, the excessive ornamentation in this group has slowly arisen. A justification for this view is found in the fact that in the courting season, which occurs at the opening of the rainy season, numbers of males of each species gather in certain spots, sometimes on the ground, but more usually on the limbs of the forest trees, and go through a great variety of movements and strange antics, lifting their wings, spreading their tails, erecting their crests, and apparently doing everything in their power to display their finery in the eyes of the females, and thus solicit them to make a choice. Natives call these assemblages, which usually occur at sunrise, and always in the same place, "dancing parties," and it is during this time that they secure specimens for the trade, by shooting them from ambush with blunt arrows. So persistent has been the demand for their skins and feathers, chiefly for millinery purposes, that many of the species have been nearly exterminated. This may easily occur from the fact that the range of most of the birds of paradise is very limited, several species being confined to a single island. Their increase, too, is slow, as most of them lay only two or three eggs, a condition which has arisen from the fact that their natural enemies are comparatively few. They have occasionally been captured alive, and kept for a time in captivity, even in the zoological gardens of Europe, but they do not thrive in confinement. The best-known of the birds of paradise, is the great emerald paradise bird (*Paradeisea apoda*) of the Moluccas which was brought to Europe first in 1523, by the members of Magellan's company, on their return from the first circumnavigation of the world. They brought two dead specimens which had been given to them in the island of Batchian as a mark of royal favor. From these skins the natives, as was their custom, had cut off both the wings, and the feet; and this gave rise to the absurd stories of the early books, that the paradise birds were naturally footless and wingless, never perched, suspended themselves by the tail-feathers, etc. It was also said that they gazed perpetually at the sun, and that the hen laid her eggs on the back of her spouse. This species is as large as a crow. The male is rich brown, becoming purplish beneath; the head and neck are pale yellow, the forehead, cheeks, and throat, metallic green. From the sides of the body, beneath the wings, spring thick tufts of delicate, loosely-webbed, golden-orange feathers, which, when the wings are lifted, may be lifted and spread out so as to seem to fall like a shower over the whole bird; and the two middle tail-feathers are like long wires, each with a very slight flag-like web at the tip. It would be impossible to describe at length the great variety and splendor of the plumage of these eccentrically ornate birds, only a few of which may be further alluded to. In the red bird of paradise (*Paradisea sanguinea*) the plumage is like velvet in a variety of gorgeous colors, and the tufts at the sides are rich crimson, while the elegantly curling central tail-shafts are 21 inches in length. A genus of New Guinea (*Cincinnurus*) includes a number of species, only about six inches long, called the king birds of paradise, which are distinguished by large tufts of fan-like plumes on each side of the breast. Another genus (*Parotia*) has as its especial ornament a group of three long feathers springing from behind each eye, which are in the form of metallic wires, with a racket-like web at the end that may be erected and moved about as the bird wishes. Otherwise the plumage is black, except for some vivid steel-green and white feathers about the head. Some species have a distinct shield of metallic, scale-like feathers, upon the back or upon the breast, which may be glossy blue, or green, or violet, or glowing scarlet, or a mixture of these. The acme of this strange and gorgeous development in plumage seems to be attained by the "superb" bird of paradise (*Lophorhina superba*), which is characterized by the presence of an enormous erectile forked shield of velvety black feathers arising from the nape of the neck, and when in repose lying flatly on the back. So strange and apparently incongruous is this shield, that it might suggest to the beholder that the tail of some other bird had been stuck on to the skin, were it not that its feathers are of a different type. The ground-color of the plumage is of the deepest black, but with bronze reflections on the neck; while the feathers of the head are metallic green and blue. Spreading over the breast is a shield composed of narrow and rather stiff feathers, which extends in a pointed form, along each side, and is emarginate in the middle. In color, this is bluish-green, with a satiny sheen; the back shield, on the other hand, is velvety black, with reflections of bronze and purple, its outermost feathers exceeding the primaries of the wing in length. The natives say that the enormous crest, when displayed during the courtship

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1. The Carrion Crow (Catharista atrata).
2. The King Vulture (Sarcorhamphus papa).
3. The Turkey Buzzard (Catharista aura).
4. The Pileated Vulture (Neophron pileatus).
5. The Condor (Sarcorhamphus gryphus).

1. Hobby (Falco subbuteo).
2. Ruppell's African Vulture (Gyps Ruppellt)
3. Carancho (Polyborus Brasiliensis).
4. Common Buzzard (Buteo vulgaris).
5. Sparrow Hawk (Accipiter Nisus).
6. Bataleur Eagle (Helotarsus ecaudatus).
7. South American Buzzard-Hawk (Asturina polyzona).
8. East Indian Pigeon-Hawk or Turumti (Falco chiquera)

of the female, is not only raised, but spread widely out, in a fan-like manner, while the chest shield is similarly expanded. Hence the head of the bird forms a circle of irregular feathers of velvety black and emerald, completely concealing the rest of the body when viewed from the front.

General information as to the birds of paradise will be found in books of East Indian travel, especially in 'The Malay Archipelago' (1869), by Alfred Russel Wallace, the first naturalist to study these birds attentively in their native haunts. As early as 1873, Daniel Elliot completed a magnificent monograph of the family, illustrated with colored folio plates, and in 1881 was published a second monograph, by Salvadori, as a part of his general work on the ornithology of the Papuan region. Still more recently German naturalists have increased our knowledge of this family by many papers in German scientific periodicals, which have been utilized by Rothschild in the preparation of his account of these birds in 'Das Tier-reich' (Berlin 1898). The most recent sketches are those of the 'Royal Natural History' (Lond. 1895), and Evans, 'Birds' (Lond. 1900).

Birds of Prey. This group is a survival of the old-fashioned classification of animals by resemblances in appearance and function, rather than in structure. Broadly speaking, a bird of prey is merely one which subsists by attacking and devouring living creatures, and hence the name covers such birds as skuas, frigate-birds, shrikes, and fish-catching birds, as well as the eagles, hawks, and owls, to which it is restricted by popular usage. In all these cases the adaptations are for a predatory life, especially marked in the strong seizing talons of the hawks and owls, and in their hooked, sharp-edged beaks, suitable for tearing and cutting, along with which go suitable modifications of the digestive organs, characteristic of the accipiters. These adaptations bear a curious, yet natural likeness to the claws, teeth, etc., of carnivorous mammals and reptiles.

Birdsall, William W., American educator: b. Richmond, Ind., 1854. He was graduated from Earlham College, Indiana, 1873 and was a successful teacher in and head of large secondary schools until 1898. He was president of Swarthmore College, Pennsylvania, 1898–1902.

Birdwood, Herbert Mills, English lawyer: b. Belgaum, Bombay Presidency, 29 May 1837. He was educated at Edinburgh University, and was dean of arts (1868, 1881, 1888, 1890) and syndic at the Bombay University, and vice-chancellor 1891–2. He entered the Bombay civil service 1858; was made assistant collector and magistrate 1859; assistant judge 1862; under secretary to the government, judicial, political, and educational departments, and secretary of the legislative council 1863; acting registrar of the high court, Bombay 1867; district judge for Ratnagiri, Surat, and Thana 1871–80; judicial commissioner and judge of the sadar court, Sind 1881; three times acting judge of the high court, Bombay 1881–5; puisne judge of the high court of Bombay 1885–92; and member of the executive council of the governor of Bombay 1892–7. His publications include 'Catalogue of the Flora of Matheran and Mahableshwar'; 'Catalogue of Bills Introduced into the Bombay Legislative Council in 1862–5'; and papers relating to the constitution of the council, the plague in Bombay, etc.

Bireme, a Roman ship of war with two banks of oars. It was inferior, in magnitude and strength, to the trireme.

Biren, bē-rŏn, or **Biron, Ernest John von** (Duke of Courland), Russian statesman (grandson of a groom of James, Duke of Courland, and the son of a Courland proprietor of the name of Bühren): b. 1687; d. 28 Dec. 1772. He studied at Königsberg, secured the favor of Anna, Duchess of Courland, and niece of Peter the Great of Russia; but he was unsuccessful in his attempt to obtain admission among the Courland nobility. When, in 1730, Anna ascended the Russian throne Biren was loaded by her with honors and introduced at the Russian court. Here he assumed the name and arms of the Dukes of Biron in France. Fierce and haughty by nature, he indulged his hatred against the rivals of his ambition. The Princes Dolgorucky were his first victims. He caused 11,000 persons to be put to death, and double that number to be exiled. It is said that the empress often threw herself at his feet to induce him to lay aside his severity, but that neither her entreaties nor her tears were able to move him. The firmness of his character, however, introduced vigor and activity into all branches of the administration throughout the empire. In 1737 Anna forced the Courlanders to choose her favorite (who had in 1722 married a Courland lady) for their Duke. After declaring Prince Ivan her successor, she appointed Biren regent. Anna died 28 Oct. 1740. The new regent acted with prudence and moderation. But a secret conspiracy was soon formed against him. Field Marshal Münnich caused him to be arrested in his bed during the night of 19 Nov. 1740, and to be confined in the castle of Schlüsselburg. He was subjected to a trial; but the sentence of death was changed into that of imprisonment for life, and his fortune was declared confiscated. Together with his family he was transported to Pelym, in Siberia, and thrown into a prison, of which Münnich himself had furnished the plan. In the following year Elizabeth, daughter of Peter the Great, being raised to the Russian throne by a new revolution, Biren was recalled 20 Dec. 1741, and Münnich was obliged to occupy his prison. At Kasan the sledges met; the travelers recognized each other, and proceeded on their way without interchanging a word. Biren was detained at Jaroslav, and only received his full liberty in 1762 from Peter III. When Catherine II. ascended the throne the Duchy of Courland was restored to Biren in 1763. He governed with wisdom and lenity, transferring the government to his eldest son, Peter.

Biretta, a cap worn by ecclesiastics, especially those of the Roman Church, though some ritualistic clergymen of the Anglican Church also wear it. It is of considerable antiquity, though it has varied in shape and material at different times. It is at present a stiff-sided, square-shaped cap with sharp edges, a flattened top surmounted by ridges rising above it, having in the centre a sort of tuft or tassel. It is made of cloth or stuff, the color being black for priests, purple or violet for bishops, and scarlet for cardinals. See Vestments.

Birge, Edward Asahel, American naturalist: b. Troy, N. Y., 7 Sept. 1851. He graduated at Williams College 1873; studied physiology and histology at Leipsic 1880–1; became instructor of natural history in the University of Wisconsin 1875; professor of zoology 1879; dean of the College of Letters and Science in 1891; and acting president of the university 1900–1. In 1894 he became director of the Geological and Natural History Survey of Wisconsin. He has written many articles and papers on zoology.

Birge, Henry Warner, American soldier: b. Hartford, Conn., 25 Aug. 1825; d. New York, 1 June 1888. At the outbreak of the Civil War he organized the 4th regiment Connecticut Volunteers, and was commissioned its major 23 May 1861. In November 1861 his uncle, Gov. Buckingham of Connecticut, appointed him colonel of the 13th Connecticut Volunteers, which joined Butler's army at New Orleans. He took part in the siege of Vicksburg and the first Red River campaign; commanded a division in Grant's Virginia campaign; and was with Sheridan in the latter's most brilliant movements in the Shenandoah valley. In November 1865 he resigned with the rank of brevet major-general. His services were recognized by an appreciative vote of thanks from the legislature of Connecticut.

Birkbeck, George, originator of mechanics' institutes: b. Settle, Yorkshire, 10 Jan. 1776; d. 1 Dec. 1841. He studied medicine at Edinburgh and took the degree of M.D. in 1799, among his friends and fellow students being Brougham and Jeffrey. Being appointed to the chair of natural and experimental philosophy in the Andersonian University at Glasgow, in 1799, he delivered his first course of lectures. The following year he began to give gratuitous lectures to mechanics, which were soon largely attended. This was the first attempt to establish mechanics' institutes, and to Dr. Birkbeck the honor of being their founder belongs. The Glasgow Mechanics' Institution, though not established till 1823, owed its origin to these lectures delivered by him. In 1804 he settled as a physician in London, and was soon engaged in an extensive practice; but the extension of scientific knowledge to mechanics was ever in his thoughts, and in 1824 he had the happiness of being elected president of the London Mechanics' Institution, for which that at Glasgow had led the way. Similar institutions soon arose and prospered in all the larger towns of the kingdom. Dr. Birkbeck was also connected with the founding of University College, London, advocated the repeal of the tax on newspapers, and was active as a lecturer and promoter of various educational movements. The London Mechanics' Institution still exists, but it is now known as the Birkbeck Literary and Scientific Institution.

Birkenhead, England, a parliamentary, county, and municipal borough of Cheshire, on the estuary of the Mersey, opposite Liverpool. Its growth has been rapid. It owes its prosperity to the same causes that have made Liverpool a great seaport, and may be regarded as a suburb of that city. Its docks have a lineal quay space of over nine miles, with a complete system of railway communication for the shipment of goods and direct coaling of steamers. It has a handsome square, a town-hall; sessions court and police courts; market; modern slaughter-houses; public baths; and ranges of dwelling-houses for workmen, unusually complete in their accommodation and in all their appointments. The system of drainage and sewerage is very complete. There is a theological college of the Church of England (St. Aidan's); a free public library, schools of art, etc. The ruins of an ancient Benedictine priory founded in 1153 still exist in a good state of preservation. The ferry privileges were formerly vested in the monks of this priory. The benevolent institutions comprise an infirmary, children's and lying-in hospitals, and a dispensary. It has a large public park of 114 acres beautifully laid out, and another and smaller public park. Its magnificent docks and dock warehouses, however, which belong to the splendid Liverpool system, form the distinguishing feature of Birkenhead. The Mersey tunnel, 4½ miles long, including the approaches, 21 feet high, and 26 feet wide, and which cost $6,100,000, now connects Liverpool with Birkenhead. Communication with Liverpool is also kept up by steam ferries, the property of the corporation, which yield a handsome revenue. The corporation also owns the gas, water, and electric lighting plants, and the tramway lines, which were introduced here by George Francis Train, one of the earliest systems in Great Britain. The water-supply, which is abundant and of excellent quality, is obtained within the borough by pumping from the red sandstone strata which underlies it. Birkenhead has gained a distinguished name for ship-building, the extensive yards of Laird Bros. (builders of the famous Confederate ship Alabama) being located here. There are machine and engineering works, wagon factories, flour-mills, oil-cake mills, etc. Birkenhead has returned a member to Parliament since 1861. It received a charter of incorporation as a municipal borough in 1877. Pop. (1821) 236; (1901) 110,926.

Bir'ket-el-Keroon' ("lake of the horn"), Egypt, a lake in the Fayoom, about 30 miles long and 6 miles wide. It communicates with the Nile and had connection formerly with the artificial Lake Mœris, with which it has been confounded.

Birkett, Herbert Stanley, Canadian physician: b. Hamilton, Ont., 17 July 1864. He graduated at McGill University in 1886; was senior house surgeon to the Montreal General Hospital 1886–7; and assistant physician to the Montreal Dispensary 1887–9. He is a Fellow of the American Laryngologist Association. In 1889 he was appointed demonstrator of anatomy at McGill University, and in 1900 was laryngologist to the Montreal General Hospital, and aurist to the Mackay Institute for Deaf Mutes.

Birmingham, Ala., "the Pittsburg of the South," the industrial head of the entire South between Atlanta and New Orleans, and the chief centre of the iron and coal industry south of Pennsylvania; county-seat of Jefferson County, in the northern centre, midway between the Coosa and Black Warrior rivers, 608 feet above the sea in a valley, near where the last Appalachian spurs sink to the coast plain; 96 miles north of Montgomery, the State capital, and 168 miles west of Atlanta, on six trunk roads: the Southern, L. & N., Kansas City, M. & B., Cen-

tral of G., Alabama G. S. (Queen & Crescent), and Seaboard A. L. R.R.'s. It is situated in the heart of the greatest coal, iron, and limestone district of the South. Around it lie three huge coal fields, the Warrior, Cahaba, and Coosa, aggregating over 8,610 square miles, with some 60 seams, more than half of them workable; the nearest deposits being only 4 miles from the city. Birmingham is built partly upon the slope of Red Mountain, named from its outcrop of hematite iron ore, which extends many miles in every direction from the city, in a vein from 6 to 26 feet thick with an indefinite depth. This district produced in 1902 about 90 per cent of the State's production of 10,329,479 tons of coal, 2,210,735 tons of coke, and 1,472,211 tons of pig iron. Six hundred thousand freight cars were handled in and out of Birmingham, carrying 70 per cent of the entire tonnage of Alabama in 1902, and also hauling nearly 1,000,000 tons of limestone. This ideal equipment for the production of iron and steel at the lowest cost, is building up a great city with such rapidity that no statistics can be other than temporary.

Business Interests.— It is estimated that there are in Jefferson County more than 300 mining and manufacturing plants of various kinds, among which are 27 blast furnaces, 7,168 coke ovens, 60 coal mines, a large number of mines and stone quarries, 2 steel plants, 3 rolling mills, a wire rod and nail mill, a steel rail mill, besides other plants of various kinds. There are in Jefferson County 50,000 wage-earners who receive more than $2,750,000 per month. The gross volume of business in mining and manufacturing during the year 1902 was estimated at $60,000,000, and the gross volume of business in the general wholesale and retail trade amounted to about $42,000,000, making the total amount of business for the year 1902, $102,000,000. In 1901 alone, 124 new companies were organized with a capital of $8,955,100 and existing corporations increased their capital stock $2,650,000 and made extensions to their plants costing over $4,000,000. The record for the year 1902 will show an increase of at least 10 per cent over the year 1901 in new companies and in additional capital. The furnaces of the district (including the suburbs, practically part of the city, though not yet formerly incorporated) turned out in 1902 1,472,211 tons of pig iron, against 1,225,308 in 1901, and 68,927 in 1880. In 1900 it furnished six sevenths of the total United States' export of pig iron, but since then none of the product has been exported on account of the increased home demand. The first steel plant in the South was started in 1897 at Birmingham, two open-hearth furnaces of 160 tons a day; now the Tennessee Coal, Iron & Railroad Company has in operation at Ensley, a suburb, 10 furnaces and a 44-inch blowing mill, capacity 1,000 tons a day. This is the largest basic open-hearth plant in the world except the Carnegie works at Homestead. There is a casting plant and rail mill in connection with it. The Alabama Steel and Shipbuilding Company began in 1899 with $1,000,000 capital, and the Alabama Steel and Wire Company with $2,000,000 capital. Besides the plants already mentioned, Birmingham has a steel casting plant, a bi-product plant, a wrought pipe plant, 2 cast pipe and foundry plants, 2 soil pipe plants, 1 clay pipe plant, 2 cement factories, 1 chemical works, 1 fertilizer factory, 2 breweries, 1 corn mill, 1 flour mill, 5 ice factories, 1 gas and gasoline engine works, 1 iron and steel bridge works, 2 boiler works, 6 foundries and machine shops, 1 stove foundry, 3 railroad shops, 3 sash factories, 2 wagon factories, 1 agricultural implement works, 3 printing and bookbinding concerns, 1 hollow ware plant, 20 brick plants, 15 planing mills and wood-working plants, and 1 packing company. Birmingham is also a cotton market, the cotton receipts for 1901–2 amounting to 100,000 bales. It has 2 cotton factories, 2 cotton-seed oil mills, and 1 knitting factory. Besides the unparalleled cheapness of material, its transportation facilities are shortly to be greatly increased by the completion of the government improvements on the Warrior and Tombigbee rivers, by which coal and other products can be transported to tide water at Mobile, thence to the Atlantic seaboard, at greatly reduced cost.

Public Works and Institutions.— Birmingham is a handsome and solidly built city, with wide avenues, handsome dwellings, and imposing public buildings. It has a large government building, county court-house, new city hall, costing over $200,000, and three new 10-story steel-frame "skyscrapers," one of them costing over $600,000. Among the other notable buildings are the Jefferson Theatre, the Auditorium, St. Vincent's Hospital, Hillman's Hospital, Union Station, and Hillman Hotel. There are 16 or more public parks, the most prominent of which are the Capitol, North Birmingham, East Lake, and Lakeview. The city has an extensive waterworks system, with a reservoir on Shade's Mountain, 225 feet above the city, a Waring system of sewerage, and over 100 miles of street railroads, connecting it not only with its immediate suburbs, but with points many miles away. There are over 50 white churches, a public library, 11 hospitals and infirmaries, 13 public schools, 16 newspapers, including 3 dailies, 9 military organizations, 2 telephone companies, 13 private schools and colleges, including 1 medical college, 1 dental college, 2 business colleges, Howard College (Baptist, at East Lake, 5 miles northeast, founded 1841), Northern Alabama (Methodist) and a colored normal training school. Its charitable institutions comprise St. Vincent's Hospital, Hillman Hospital, Mercy Home, Jefferson County Alms House, and the Boys' Industrial School at East Lake.

Finances and Government.— The assessed valuation of the city property for 1902 was $18,318,408, which is on about a 50 per cent basis; tax rate for 1902, State, county, and city, $2.30; public outlay for 1902, including $39,362.60 for public schools, $463,489.69. In 1902, however, a special expenditure of $229,856 was made for cement sidewalks, street improvements, and sewers. The government of the city is in the hands of a mayor and city council, elected biennially, and an elected police commission and a nominated board of education.

The rapid development of Birmingham's business is best shown by the infallible test of the clearing house, the only one in Alabama. In 1897 the clearings amounted to $20,907,495; in 1899, to $34,469,751, and in 1902 to over $56,000,000, having nearly trebled in five years. Part of this is due to the increasing use of the Birmingham banks by territory which formerly sought those of the other large cities. The Birmingham banks furnish funds for moving

125,000 bales of cotton. Their business often exceeds $1,000,000 a day. In 4 years, 1898-1902, their deposits increased from $3,500,000 to $9,251,820. There are 9 banking institutions in the city, 2 national, with an aggregate capital of $1,848,500.

Population and History.—By the census, the population in 1880, the first after Birmingham's settlement, was 3,086; in 1890, 26,178; in 1900, 38,415. But these figures tell only part of the story and are very misleading. Birmingham is entirely the creation of the last 30 years. The future of the district was foreseen as early as 1849, but the first attempt to realize it was about 1870, by a company which bought a large tract of land around Elyton, then the county-seat, now a suburb of Birmingham, which sought to make that the centre of the new development. It failed because prices were too high, and another company bought a tract to the east, where stood a single shanty on the spot where the Florence Hotel now stands, which they named Birmingham. The next year a small iron furnace was erected and this started up coal mining. Coal had hitherto lacked a market, but in 1874, 50,400 tons were mined. The demand of the Oxmoor furnace for coal led, in 1879, to the opening of the Pratt mines, and with this began the era of great growth. The population leaped in the next decade from 3,000 to 26,000, a growth unparalleled in United States history, except by Chicago. Retarded for some years by the collapse of the boom, it still had grown 50 per cent by 1900. In fact, the increase was more than double that, for the nominal city is only the business hub of a large group of cities and towns, built up by the same interests and but little removed from each other, which will probably in the near future be annexed under the name Greater Birmingham, giving it a population of more than 200,000. The largest of these surrounding towns is Bessemer, 11 miles away; others are Ensley, Pratt City, Elyton, Gate City, Irondale, Powderly, West End, Smithfield, East Birmingham, North Birmingham, East Lake, Woodlawn, Kingston, Jonesville, and Avondale. The figures for the county are equally significant: When Birmingham was settled, it had 12,345 inhabitants; in 1900 it had 140,420, practically all the growth of the Birmingham district. The rapidity of the city's present growth is shown by the fact that in 1902 nearly 1,900 new dwellings and business buildings were erected, at a cost of over $3,250,000.

ROY MCCULLOUGH,
Secretary Board of Trade.

Birmingham, England, one of the greatest manufacturing cities of the world, situated on the River Rea, near its confluence with the Tame, an affluent in the northwest extremity of the county of Warwick, 112 miles northwest of London, and nearly in the centre of England (north lat. 52° 28′ 45″, west long. 1° 54′). The lower part of the city, consisting chiefly of old houses, is crowded with workshops and warehouses, and inhabited principally by the working classes; but the upper part has some fine streets and buildings, and there are fine suburbs westward and southward of the city.

Public Buildings.—The town hall, built of Anglesey marble in 1832, is a rectangular building, modeled after the temple of Jupiter Stator at Rome. Its large hall is 145 feet long, 65 feet wide, and 65 feet high, seating 2,250 persons, and contains a magnificent organ. In this hall a great musical festival is held once every three years the proceeds of which go to the General Hospital. It was at the Birmingham Festival that Mendelssohn's oratorio, 'Elijah,' was first performed (1846), and Gounod's 'Redemption' and Elgar's 'Dream of Gerontius' are among other famous works first heard at this festival. Among other public buildings of note are the council-house, for the accommodation of the different corporation offices, with fine reception rooms and council chamber, erected 1874-8 (cost $1,000,000); the Victoria Law Courts, a fine edifice in terra cotta (Renaissance), (cost $580,000); University buildings, municipal technical school, municipal schools of art and design, Bingley Hall (a large covered place holding 25,000 persons, wherein the late John Bright, W. E. Gladstone, and Joseph Chamberlain have addressed vast audiences), post-office, corporation baths, the stations of the L. & N. W., Midland, and Great Western R.R.'s, cavalry barracks, public libraries, the Exchange buildings, art gallery (special features, paintings by David Cox and by the Pre-Raphaelite school of artists, and valuable collections illustrative of industrial arts), Birmingham and Midland Institute, corn exchange, Masonic hall, markets, etc.

Monuments. — The public statues include those of Queen Victoria, Prince Albert, James Watt, Joseph Priestley, Lord Nelson, Sir Robert Peel, John Bright, Joseph Sturge, Thomas Attwood, George Dawson, Dr. R. W. Dale, Sir Josiah Mason, etc.

Churches, Hospitals, etc.—The mother church of Birmingham is that of Saint Martin's, or the Old Church (built about 1250, rebuilt 1875), the parish registers of which date from the year 1544; this church contains several altar tombs of the Birmingham family. Saint Philip's (recently constituted the cathedral church) was the second parish church, built 1711, palladian style, restored 1868; both churches contain fine stained-glass windows designed by Sir E. Burne Jones, a native of Birmingham. Among the more noteworthy non-anglican churches are the Roman Catholic Cathedral of Saint Chad, a noble Gothic church designed by Pugin, richly adorned with stained-glass windows, and with fine 16th century pulpit and stalls; the Oratory of S. Philip Neri (founded by Cardinal Newman); the old Meeting House of Carr's Lane (Congregational), associated with the labors of John Angell James and R. W. Dale; the Wesleyan Central Mission Hall, erected 1903, surmounted by a lofty Renaissance tower, and seating over 2,000 persons (cost $300,000); the two Unitarian churches, «Old Meeting House» and «Church of the Messiah,» the successors of the old meeting houses destroyed in the memorable riots of 1791. Among the charitable institutions the most important are the General Hospital (founded 1766, rebuilt on new site 1894-7, cost over $1,000,000); the Queen's Hospital; Free Hospital for Sick Children; Women's Hospital; Ear and Throat Hospital; Orthopædic and

Spinal Hospital; Homœopathic Hospital; Skin and Lock Hospital; Dental Hospital; Eye Hospital; Jaffray Hospital for Convalescent patients, etc.

Educational Institutions.—The principal educational institutions are the Birmingham University, incorporated 1900, a growth of Mason University College, founded by Sir Josiah Mason in 1875 (and further endowed by public subscription with about $2,000,000), which has faculties of arts, science, medicine, and commerce, and new buildings for the engineering, physics, and science sections generally are now (1907) in course of erection at a cost of over $1,500,000; Roman Catholic College at Oscott; Wesleyan Theological College at Handsworth; Saltley diocesan training college; Free Grammar School founded by Edward VI. out of the endowments of the older Birmingham town gild, which has a central and five branch schools; Blue Coat School; Protestant Dissenting Charity School (for maintaining and educating poor girls for domestic service); the municipal schools of art and design, and technical schools; industrial schools, and numerous public elementary schools, mostly erected by the now defunct School Board, and maintained by the council under the Education act, 1902.

Libraries.—There is a central free library, having 170,000 volumes in its reference library, a Shakespeare Memorial Library (11,500 volumes), and eleven lending libraries, containing over 110,000 volumes; the Birmingham Library, an old proprietary library (established 1779), contains 80,000 volumes.

Parks, etc.—There are ten public parks and several recreation grounds, and the city owns two natural beauty-spots somewhat remote from its boundaries, viz. Rednal Hill (Lickey), and Warley Abbey estate. In Aston park (one of the oldest belonging to the city) is Aston Hall, a fine Jacobean residence built by Sir Thomas Holte in 1618, which was besieged in the civil war by the parliamentary forces, December 1643. Its chief features are the long gallery, one of the finest in England, and the great staircase, which was injured during the siege. The Hall is now a public museum.

Industries.—The prosperity of Birmingham is attributable to the excellence, variety, and extent of its hardware manufactures, as well as to its geographically central situation on the border of the great South Staffordshire coal and iron district, combined with the command of a wide and ready transit by canal and railway. There is an extensive system of tramways. At Soho, in the vicinity of the city, was the earliest and one of the largest steam-engine manufactories in the world, belonging to Boulton, partner of the celebrated James Watt. The Soho works were founded in 1757 and came into the possession of Matthew Boulton in 1762. Not a vestige of the building now remains. One of the most important manufactures is that of firearms. The number of gun-barrels tested in some recent years has been between 500,000 and 600,000. The manufacture of swords is also one of the staple trades. Cast-iron articles of all kinds, and of the most beautiful patterns and workmanship, are manufactured at Birmingham to a great extent. In former years iron-founding was limited to large and heavy articles, but is now extended to the lightest and most graceful, in the finishing of which bronze is very generally employed. The manufacture of railway wagons and carriages has been very extensively developed. The quantity of solid gold and silver plate manufactured is large, and the consumption of silver in plating is very great. Electro-plating was first practised in this town in 1840. Japanning, brass-founding, glass manufacturing, and glass staining or painting, are important trades. There are also large chemical works for vitriol, sal-ammoniac, cobalt, and other substances. Steel pens, of which hundreds of millions are manufactured annually, pins, fancy seals, brooches, clasps, and other trinkets are made in immense quantities. Bicycles are now made in Birmingham in greater numbers than in any other town.

Government, etc.—The charter of incorporation dates from 1838. By the Reform Act of 1832, Birmingham was constituted a borough, sending two members to Parliament. The act of 1867 gave it a third, while that of 1885 added four others and divided the borough into seven parliamentary districts. In 1888 it was raised by order in council to the rank of a city, and by the Local Government Act of that year, it also became a county borough. A further order in council (1896) conferred upon the chief magistrate of the city the title of lord mayor. In 1891 the boundaries of the borough were extended, and its area is now 12,705 acres comprising the parishes of Birmingham and Edgbaston, and parts of others. The borough is divided into 18 wards, and has 18 aldermen and 54 councillors. The municipal and parliamentary boundaries are the same, the parliamentary divisions being North, South, East, West, Central, Bordesley, and Edgbaston. Water is now brought from the Elan Valley, Wales, a distance of 80 miles, at a cost of about $30,000,000. The corporation of Birmingham has long been recognized as in the forefront of British municipalities, a reputation which it largely owes to the work done by the Right Hon. Joseph Chamberlain (three times mayor). The corporation purchased the gasworks and waterworks in 1875, and the Electric Company's rights in 1898. In 1876 an "Improvement Act" was obtained, by which at a cost of about $10,000,000 a large area of insanitary property in the centre of the city was removed, and Corporation Street was laid out on the site thereof.

History, Populations, etc.—The city of Birmingham is supposed to have originated in a Saxon settlement formed in a clearing in the great central forest of England, the forest of Arden, near to the Icknield Street, a Roman road of which an original portion is still visible in Sutton park. It was the home of the Bermings —the young, or progeny of Berm, from whence the name is derived. It was a place of comparatively small importance at the Conquest, although it is mentioned in Domesday Book (1086) where it is called Bermingham, a name of which there were many corruptions, chiefly arising from the old pronunciation and from misspellings, wherefrom the popular local name "Brummagem" is derived. In the 14th century two gilds were founded, the more important of

which (the Gild of the Holy Cross) exercised functions akin to those of a municipal character, until the dissolution of the monasteries and religious houses. There was also a priory or hospital of Saint Thomas, and several chantries attached to the parish church, but all these were sequestrated with the religious houses. Some of the revenues of the town gild were devoted by Edward VI. to the foundation of the Free Grammar School. Birmingham was visited in 1532 by John Leland, who wrote of it in his Itinerary as having "many smiths in the town, that make knives and all manner of cutting tools, loriners that make bits, and many naylors." Camden, in 1576, found it "swarming with inhabitants and echoing with the noise of hammers and hammers." In the civil war Birmingham suffered considerably at the hands of Prince Rupert and the royalists, who encountered the inhabitants in a fierce hand-to-hand fight in the streets, and burnt a great many houses, in 1643. The plague also ravaged the town in 1665. The old market town first began to outgrow its ancient boundaries in 1700, at which date the population was about fifteen thousand. Birmingham began to assume importance as a manufacturing town about the middle of the 18th century. John Baskerville, by his fine printing, John Taylor by innumerable fancy articles, Boulton and Watt by the introduction of the steam engine, helped to make Birmingham "the toyshop of Europe" as Burke described it. In the 19th century the introduction of steel pens and electro-plated goods, gave Birmingham new fame as a manufacturing centre. It also attracted attention as the centre from whence spread the Reform agitation of 1830, which culminated in the Reform Bill of Earl Grey, which became law in 1832. Birmingham had also an unenviable reputation for rioting and disturbance at the end of the 18th century, and the Priestley Riot of July 1791 is among the memorable *émeutes* of that century.

The general healthfulness of Birmingham is probably due to the large quantity of open space which it possesses; to the general excellence of its drainage, greatly facilitated by the substratum of sand and gravel (belonging to the new red sandstone or Trias formation) on which it is built; and the circumstance that there is scarcely an underground dwelling or cellar (used as a dwelling) within its precincts. In 1905 the birth-rate was 29.2 and the death-rate 16.1 per thousand. In 1801 the population was 75,670; in 1901, 522,102, but this does not take into account the densely populated boroughs and urban districts by which the city is closely surrounded. With the inclusion of these the urban population of the midland metropolis would amount to 820,000.

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R. K. Dent,
Chief Librarian Aston Manor, and author of 'Old and New Birmingham,' etc.

Birnam, Scotland, a hill in Perthshire, in the western highlands, Scotland, rendered famous by its connection with the history of Macbeth, and immortalized by Shakespeare. It was foretold to the ambitious thane, yet guiltless, except in thought, of bloody ambition, that, until Birnam wood should come to Dunsinane, his life and power could suffer no disaster. On the approach of Malcolm with the avenging army, composed of the loyal clans, aided by Seward, Earl of Northumberland, ignorant of the prophecy, the invaders cut down the boughs and bore them as leafy screens, by which to conceal their numbers, when the report of "the moving forest" marching upon Dunsinane struck a fatal despair into the soul of the usurper.

Birney, David Bell, American military officer (son of J. G. Birney, q.v.): b. Huntsville, Ala., 29 May 1825; d. Philadelphia, Pa., 18 Oct. 1864. He was graduated at Andover, later studied law in Cincinnati and in 1848 began practice in Philadelphia where he remained for several years. In April 1861, upon the outbreak of the Civil War, he entered the Union army as lieutenant-colonel of the 23 Pennsylvania Infantry; in the summer of 1861 was commissioned colonel; in February 1862 was raised to the rank of brigadier-general of volunteers; and was promoted major-general of volunteers 23 May 1863. He served throughout the Peninsula campaign (q.v.) and with particular distinction at the battles of Yorktown and Williamsburg. He subsequently distinguished himself at the second battle of Bull Run and in the battles of Fredericksburg and Chancellorsville. He was in command of the Third Army Corps during a part of the battle of Gettysburg; from May to June 1864 was in command of a division under Gen. Hancock; and from July 1864 commanded the Tenth Corps of the Army of the James.

Birney, James G., American politician: b. Danville, Ky., 4 Feb. 1792; d. Perth Amboy, N. J., 25 Nov. 1857. He studied law, and removed early to Alabama, where he flourished in his profession and held the office of district attorney. Having had his attention turned toward the question of property in slaves, in 1833 he interested himself in the organization of a branch of the Colonization Society for the State of Alabama. Soon afterward, returning to Kentucky, he organized one there also, of which he became president. But in 1834, his views rapidly advancing, he espoused the cause of immediate emancipation in a public letter, at the same time emancipating all his own slaves, about 20 in number. This letter, the 'Letter on Colonization' (1834) was shortly afterwards followed by 'American Churches the Bulwarks of American Slavery' (1840); 'Speeches in England' (1840); and 'Examination of the Decision of the United States Supreme Court in the Case of Stroder et al. vs. Graham' (1850). Making arrangements to establish a newspaper to disseminate these views at Danville, where he resided, and where he held the situation of professor in the university, he found it impossible to have such a paper printed in Kentucky, and removed to Cincinnati, where he began to issue the *Philanthropist.* It

had not been long published before it was found no less obnoxious to public sentiment in Ohio than it had been in Kentucky, and the press was thrown into the river. The editor, however, managed to revive the paper, and, in connection with Dr. Bailey, made it a powerful instrument in acting upon the opinion of the State. About the year 1836 he went to New York as secretary of the American Anti-Slavery Society, and for many years devoted his time and strength to the furtherance of the objects of that society by letters and articles from the press and by public addresses wherever he could make an opportunity to be heard. His purpose was to build up a political party upon the single question of slavery, to act upon the government within the forms of the Constitution; and he succeeded in forming an organization in most of the northern States, under the name of the Liberty Party. During his absence in England he was nominated in 1840 by that party for the presidency, but met with little success. He was again nominated in 1844, when he received more votes. It was charged upon his friends at the time that by withdrawing their votes from Mr. Clay, especially in the State of New York, they accomplished the election of Mr. Polk, thus aiming the death-blow at their own projects. Previous to this, in 1842, Mr. Birney had become a resident of Michigan, where not long afterward he was disabled, by a fall from his horse, from taking the active part in politics to which he had been accustomed. The latter part of his life was spent at Perth Amboy, N. J.

Birney, William, American lawyer: b. Madison County, Ala., 28 May, 1819. He was educated in Paris; took part in the Revolution of 1848, and was appointed, on public competition, professor of English literature in the college at Bourges, France. In 1861 he entered the United States army as a private, and was promoted through all the grades to brevet major-general. In 1863-5 he commanded a division. His writings include 'Life and Times of James G. Birney'; 'Plea for Civil and Religious Liberty,' etc.

Biron, bē-rŏn, **Baron de** (Armand de Gontault, är-män dė gŏń-tō), French soldier: b. 1524; d. 1592. He took a prominent part in the civil wars between the Huguenots and Catholics, and served at the battles of Dreux, St. Denis, and Moncontour. He was made marshal of France in 1577 by Henry III. He negotiated the peace of St. Germain, and narrowly escaped the massacre of St. Bartholomew. He recovered Guienne and Languedoc from the Protestants, served in the Netherlands against the Duke of Parma, and was one of the first to recognize Henry IV. as king. He distinguished himself in various battles and was killed at the siege of Epernay.

Biron, duc de (Charles de Gontault, shärl dė gŏń-tō), French soldier, son of the preceding: b. about 1562; d. 31 July 1602. He served Henry IV. in the field with much zeal and courage, was raised to the rank of Admiral of France in 1592, and in 1598 was made a peer and duke. He thought himself, however, not sufficiently rewarded, and began to intrigue with the Spanish party against the king. In 1599 he concluded an agreement with the Duke of Savoy and the Count of Fuentes, by which he pledged himself to take up arms against his benefactor. Meanwhile, war being declared against the Duke of Savoy (1600), Biron saw himself reduced to the necessity of attacking him. He still continued his negotiations with the enemy, however, and at last they became known to the king, who interrogated the marshal as to his designs, with promises of pardon. Biron made a partial confession and continued his intrigues as before. Notwithstanding this, Henry sent him in 1601, after the conclusion of peace with Savoy, as envoy to Queen Elizabeth of England. In the meantime the Count of Fuentes discovered the whole plot. He was tried before Parliament, and was beheaded.

Biron, Ernest John. See Biren.

Birrell, Augustine, English essayist: b. Wavertree, near Liverpool, 19 Jan. 1850. He graduated from Cambridge and was called to the bar. In 1903 he became a Bencher of the Inner Temple; from 1896-9 was Quain professor of law in University College, London; and from 1889–1900 represented Fifeshire W. in Parliament. He is author of charming critical and biographical essays on literary subjects, collected in the two series of 'Obiter Dicta' (1884, 2d series 1887) and 'Res Judicatae' (1892); 'Men, Women and Books' (1895). In 1887 he published a 'Life of Charlotte Brontė'; in 1897 edited Boswell's 'Life of Johnson,' in 1898 published 'Life of Sir Frank Lockwood'; 'Copyright in Books' (1899); 'Collected Essays' (1900); 'Miscellanies' (1901); 'William Hazlitt' (1902). In 1905 he became President of the Board of Education in the Liberal Cabinet and in 1907 Chief Secretary for Ireland.

Birth, or **Labor,** in physiology, is the act by which a female of the class Mammalia brings one of her own species into the world. When the fœtus has remained its due time in the womb, and is in a condition to carry on a separate existence, it is extruded from its place of confinement, in order to live the life which belongs to its species independently of the mother. The womb having reached its maximum of growth with the increasing size of the fœtus, its peculiar irritability excites in it the power of contraction; it thereby narrows the space within and pushes out the mature fœtus. The period of gestation is very different in different animals, but in each particular species it is fixed with much precision. In the womb the corporeal frame of man commences existence as an embryo; after further development, appears as a fœtus; then as an immature, and finally a mature, child. With its growth and increasing size the membranes which envelop it enlarge, the womb also expanding to give room for it. At the end of the 39th or the beginning of the 40th week the child has reached its perfect state and is capable of living separate from the mother; hence follows in course its separation from her, that is, the birth.

Contractions of the womb gradually come on, which are called, from the painful sensations accompanying them, labor-pains. These are of two kinds: first, the preliminary pangs, which begin the labor, do not last long, are not violent, and produce the feeling of a disagreeable straining or pressure. When the pregnant female is attacked by these she is often unable to move from her place till the pang is over, after which

she is often free from pain for some hours. Then follow the true labor-pains; these always last longer, return sooner, and are more violent. The contractions of the womb take place in the same order as the enlargement had previously done, the upper part of it first contracting, while the mouth of the womb enlarges and grows thin, and the vagina becomes loose and distensible. By this means the fœtus, as the space within the womb is gradually narrowed, descends with a turning motion toward the opening; the fluid contained in the membranes enveloping the fœtus, as the part making the greatest resistance, is forced out, and forms a bladder, which contributes much to the gradual enlargement of the opening of the womb. It is therefore injurious to delivery if hasty or ignorant midwives break the membranes too soon. By repeated and violent throes the membranes at length burst and discharge their contents, and some time after the head of the child appears. As the skull-bones have not yet acquired their perfect form and substance, but are attached at the crown of the head only by a strong membrane, and may be brought nearer together, the head, by the pressure which it undergoes, may be somewhat diminished in size and squeezed into a more oblong form, so as to pass through the opening of the matrix and the pelvis in which it is contained, and, finally, through the external parts of generation; and when this is done, the rest of the body soon follows.

The act of birth or delivery is accordingly, in general, not an unnatural, dangerous, and diseased state of the system, as many timid women imagine. It is a natural process of development, which is no more a disease than the cutting of the teeth or the coming on of puberty, although, like them, it may give rise to important changes in the body and to various diseases. It is true that the process of child-birth requires a violent exertion of nature, but this is facilitated by many preparatives and helps adapted to the purpose. If the birth succeeds in the way described, it is called a natural birth. For this it is requisite that the pelvis should be properly formed, and that the opening should permit a free passage to the perfect fœtus; that the growth and size of the fœtus should be proportioned to the pelvis, especially that the head should have the size designed by nature, proportioned to the diameter of the pelvis; also, that there should be a proper situation of the womb, in regard to the axis of the pelvis, and a proper position of the fœtus, namely, the head down, the back of the head in front and toward the opening of the womb, so as to appear first at birth; and, finally, that the external parts of generation should be in a natural state.

An easy birth takes place without any excessive strainings and in due season. A difficult birth proceeds naturally, but is joined with great efforts and pangs, and occupies a long time — over six or eight hours. The cause of it is sometimes the stiffness of the fibres of the mother, her advanced years, the disproportionate size of the child's head, and various other causes. Nature, however, finishes even these births; and women in labor ought not to be immediately dejected and impatient on account of these difficulties. An unnatural (or properly, an irregular) birth is one in which one or more of the above-mentioned requisites to a natural birth are wanting. An artificial birth is that which is accomplished by the help of art, with instruments or the hands of the attendant. Premature birth is one which happens some weeks before the usual time, namely, after the seventh and before the end of the ninth month. Though nature has assigned the period of 40 weeks for the full maturing of the fœtus, it sometimes attains, some weeks before this period has elapsed, such a growth that it may be preserved alive, in some cases, after its separation from the mother. That it has not reached its mature state is determined by various indications. Such a child, for instance, does not cry like full-grown infants, but only utters a faint sound, sleeps constantly, and must be kept constantly warm, otherwise its hands and feet immediately become chilled. Besides this, in a premature child, more or less, according as it is more or less premature, the skin over the whole body is red, often indeed blue, covered with a fine, long, woolly hair, especially on the sides of the face, and on the back; the fontanel of the head is large, the skull-bones easily moved; the face looks old and wrinkled; the eyes are generally closed; the nails on the fingers and toes short, tender, and soft, hardly a line in length; the weight of such a child is under six, often under five pounds. The birth is called untimely when the fœtus is separated from the womb before the seventh month. Such children can be rarely kept alive; there are instances, however, of five months' children living. Some writers have contended that a seven months' child is more likely to live than one born a month later.

Late birth is a birth after the usual period of 40 weeks. As this reckoning of the time from pregnancy to birth is founded for the most part solely on the evidence of the mother, there is much room for mistake or deception. The question is one of much interest in medical jurisprudence, as the inquiry often arises whether a child born more than 40 weeks after the death of the reputed father is to be considered legitimate or not. The importance of the question and the uncertainty of the proof have occasioned a great variety of opinions among medical writers. Most of them doubt the truth of the mother's assertions about such a delayed birth, and give, as their reason, that nature confines herself to the fixed period of pregnancy; that grief, sickness, etc., cannot hinder the growth of the fœtus, etc. Others maintain, on the contrary, that nature binds herself to no fixed rules; that various causes may delay the growth of the child, etc.

Abortion and miscarriage take place when a fœtus is brought forth so immature that it cannot live. They happen from the beginning of pregnancy to the seventh month, but most frequently in the third month. The occasions, especially in those of a susceptible or sanguine temperament, are violent shocks of body or mind by blows, falling, dancing, cramp, passion, etc.

Birth Rate. See VITAL STATISTICS.

Birthmark. See NÆVUS.

Birthright, any right or privilege to which a person is entitled by birth, such as an estate descendible by law to an heir, or civil liberty under a free constitution. See PRIMOGENITURE.

Birthroot. See TRILLIUM.

Birthwort. See ARISTOLOCHIA

Biru, the name of a warlike chief of South America who flourished in the 16th century. During an exploring expedition of Gaspar de Morales in 1515 the Spaniards encountered a chief called Biru, by whom they were repulsed. His territory extended on both sides of the river Biru or Piru. All the country south of the Gulf of Panama was soon characterized as the Biru country. In 1526 this name was given to the empire of the Incas, now known as Peru.

Bisbee, Arizona, town of Cochise County, the terminus of a branch line of the El Paso and Southwestern R.R., which connects with the Southern Pacific R.R. at Benson. Bisbee lies in a cañon of the Mule Pass Mountain, about 30 miles south of Tombstone, the county capital, and is a busy copper mining and smelting centre. Pop. 3,000.

Bis'cay, (Spanish VIZCAYA, vēth-cä-yä), also called BILBAO, a province of Spain, forming one of the three Basque provinces (Provincias Vascongadas), the other two being Alava and Guipuzcoa. It lies near the northeast corner of Spain, between the Bay of Biscay and the provinces of Santander, Burgos, Alava, and Guipuzcoa. The area is 850 square miles; the population 183,098. The surface is generally mountainous; the principal river is the Nervion or Ibaizabal. In point of soil and natural productions Biscay is one of the least favored provinces of Spain; but the industry of the inhabitants has been successfully exerted in converting naturally barren tracts into fruitful fields and verdant pastures. The chief crops are maize and barley. Many fine fruits, especially nectarines, are raised; walnuts and chestnuts everywhere abound and form a considerable export to England and Germany. The cattle are of a small and inferior breed; and the rearing of sheep for wool is rendered difficult by the brushwood which covers great part of the mountain districts and tears and destroys the fleece. Fish abound along the coast, and give occupation to a great number of fishing-boats. The most important mineral is iron, which is found of excellent quality throughout the province, and is extensively worked. Lead, copper, and zinc also occur. The inhabitants of Biscay, who are called Basques, are brave, active, and industrious. The capital of Biscay is Bilbao; of Guipuzcoa, St. Sebastian; of Alava, Vittoria; of Navarre, Pampeluna.

Biscay, Bay of, that portion of the Atlantic Ocean which sweeps in along the northern shores of the Spanish Peninsula in an almost straight line from Cape Ortegal to St. Jean de Luz, at the western foot of the Pyrénées, and thence curves north along the western shores of France to the island of Ushant. Its extreme width is about 400 miles, and its length much about the same. The depth of water varies from 20 to 200 fathoms, being greatest along the northern shores of Spain. The whole of the southern coast is bold and rocky, and great parts of the French shores are low and sandy. The bay receives numerous unimportant streams from the mountains of Spain, and, through the rivers Loire, Charente, Gironde, and Adour, the waters of half the surface of France. Its chief ports are Santander, Bilbao, and San Sebastian, in Spain; and Bayonne, Bordeaux, Rochefort, La Rochelle, and Nantes, in France. Navigation of the bay is proverbially trying to inexperienced voyagers, and is frequently rendered dangerous by the prevalence of strong winds, especially westerly ones. Rennel Current sweeps in from the ocean round the northern coast of Spain.

Bisceglie, bē-shāl-yą, Italy, a seaport town in the province of Bari, 13 miles east-southeast of Barletta, on a rock on the western shore of the Adriatic, surrounded by walls, and in general badly built. It has a cathedral, two collegiate and several other churches, convents for both sexes, a seminary, and hospital. The port admits vessels of small burden only. The town being almost destitute of water, rain is collected in large cisterns cut in the solid rock. The neighborhood produces good wine. Important fairs are held here twice a year. Pop. (1901) 30,855.

Bischof, Karl Gustav Christoph, bīsh'ōf, kärl goo'stäv krĭs'tŏf, German geologist and chemist: b. Nuremberg, 18 Jan. 1792; d. Bonn, 30 Nov. 1870. He studied in Erlangen; became professor of chemistry and technology there in 1819, and professor of chemistry and mineralogy at Bonn in 1822. He devoted himself especially to geological research and advanced some entirely new opinions in regard to the formation of mountain ranges. In connection with his work in this line he wrote 'The Volcanic Mineral Springs of France and Germany'; 'Concerning Glaciers and their Relation to the Elevation of the Alps'; and 'Concerning the Formation of Quartz and Metal Ores.' His paper on internal terrestrial heat received a prize from the Scientific Society of Holland; and he also published in English 'Researches on the Internal Heat of the Globe.' His greatest work 'Text-book of Chemical and Physical Geology' is an important contribution to the development of that phase of geological research.

Bischoff, Joseph Eduard Konrad, bĭsh'ōf, yō'sĕf ĕd'oo-ärd kŏn'räd, German novelist: b. Niedergailbach, 9 Aug 1828. He was fitted for the priesthood, studying at the Catholic Seminary at Munich, and was ordained a priest, but later gave his whole attention to literary work and wrote a number of novels in which he attacks the Protestant Reformation and the modern movement in literature and science. Among his works are 'Historical Novels concerning Frederick II. and his Time'; 'Gustavus Adolphus'; 'The Free Thinkers'; 'The Social Democrats and their Fathers'; and 'Otto the Great.'

Bischoff, Theodor Ludwig Wilhelm, tā'ō-dōr lood'vĭg vĭl'hĕlm, bĭsh'ōf, German physiologist: b. Hanover, 28 Oct. 1807; d. Munich, 5 Dec. 1882. He was educated at Bonn; was lecturer in the university there in 1833; and professor at Heidelberg in 1836; in 1844 he went to the university at Giessen; and in 1855 to Munich, retiring from active work in 1878. His chief work was a series of books on the history of the development of man and some of the higher animals, and his 'Evidence of the Periodic Ripening and Detachment of the Ova, independently of Generation in Man and the Mammals.' He also established the presence of carbonic acid and oxygen in the blood, and studied the difference between man and the anthropoid apes.

Bischoff, Mount, Tasmania, a town 60 miles west of Launceston, which owes its existence to the discovery here in 1872, by James Smith, of some of the richest tin mines in the world. Between 1884–6 more than 20,000 tons of tin ore had been mined. The yield of pure tin from the ore is from 70 to 80 per cent. There is railway communication with Emu Bay, 45 miles distant.

Biscuit, a thin cake, baked until crisp and dry. In this shape it is known in the United States as a cracker; the name biscuit being applied to a soft cake made from dough raised with yeast. Plain biscuits are more nutritious than an equal weight of bread, but owing to their hardness and dryness, they should be more thoroughly masticated to insure their easy digestion. When exposed to moisture, biscuits are apt to lose their brittleness and become moldy, hence it is necessary to keep them in a dry atmosphere. Digestive biscuits consist almost entirely of bran. Charcoal biscuits contain about 10 per cent of powdered vegetable charcoal. Meat biscuits, which are very nutritious, contain either extract of meat, or lean meat which has been dried and ground to a fine powder.

In pottery, articles molded and baked in an oven, preparatory to the glazing and burning. In the biscuit form, pottery is bibulous, but the glaze sinks into the pores and fuses in the kiln, forming a vitreous coating to the ware.

Bisharrin, bē-shạ-rēn′, a tribe of northeast Africa, forming the northern division of the Beja, said to be the Kushites of the Bible. They live between the Red Sea and the Nile and between Egypt and Abyssinia; they are nomadic in habit and nominally Mohammedans. They are of Caucasian race and speak a well-developed Hamitic language.

Bishop, Anna Riviera, English singer: b. London, 1814; d. New York, 18 March 1884. She married Sir Henry Rowley Bishop, the composer, in 1831, and was married a second time to Mr. Schultz of New York in 1858. She made her first appearance as a concert singer in 1837; made a tour of the Continent in 1839; and 1847 sang in United States, Canada, and Mexico, where she was very popular. She lost her voice in 1868.

Bishop, Sir Henry Rowley, English musical composer: b. London, 18 Nov. 1786; d. 30 April 1855. He was trained to his profession under Signor Bianchi, composer to the London Opera House. In 1809 his first important opera, the 'Circassian Bride,' was produced at Drury Lane with great success; but the following evening, the theatre, with the score of Bishop's opera, was consumed by fire. Numerous operas and other musical pieces now followed of his composition, and from this period to 1826 upward of 70 works were produced by him. Among others may be mentioned the music of 'Guy Mannering'; 'The Slave'; 'The Miller and His Men'; 'Maid Marian'; 'The Virgin of the Sun,' and adaptations of 'The Barber of Seville' and the 'Marriage of Figaro.' From 1810 to 1824 he acted as musical composer and director to Covent Garden Theatre. He also arranged several volumes of the 'National Melodies,' and completed the arrangement of the music for Moore's "Irish Melodies,' commenced by Sir John Stevenson. In 1826 Bishop produced an opera called 'Aladdin,' which was not successful. He was elected Reid professor of music in Edinburgh University in 1841, was knighted in 1842, and in 1848 became professor of music in the University of Oxford. Some of his work is the most popular of all music among English-speaking people, particularly his setting of John Howard Payne's "Home Sweet Home," and "When the Bloom is on the Rye."

Bishop, Isabella (Bird), English author and traveler: b. Boroughbridge Hall, Yorkshire, 15 Oct. 1832; d. 7 Oct. 1904. She began to travel at the age of 22 and made her first trip abroad in 1855, when she visited Prince Edward's Island and the United States, and afterward circumnavigated the globe three times. In recent years she spent much time in Japan, and in 1894–5 made her third trip to Korea. She was in Seoul when the war broke out, 1894, and was the first person whose war correspondence reached London. She was a Fellow of the Royal Geographical Society. In 1892 she was elected the first lady Fellow of the Royal Geographical Society and in 1901 rode 1,000 miles in Morocco. She was married in 1881 to John Bishop, who died five years later. Her publications include: 'The English Woman in America' (1856); 'Six Months in the Sandwich Islands' (1873); 'The Hawaiian Archipelago' (1875); 'A Lady's Life in the Rocky Mountains' (1874); 'Unbeaten Tracks in Japan' (1880); 'Journeys in Persia and Kurdistan' (1892); 'Among the Tibetans' (1894); 'Korea and Her Neighbors' (1898); 'The Yangtze Valley and Beyond' (1899); 'Pictures from China' (1900), the three last-named works being the result of three years of Asiatic travel.

Bishop, John Remsen, American educator: b. New Brunswick, N. J., 17 Sept. 1860. He was graduated at Harvard University in 1882; taught Greek and English at St. Paul's School, Concord, N. H., in 1882–3; was principal of the Princeton Preparatory School in 1884–7; instructor of Greek and Latin at Hughes High School, Cincinnati, in 1888–95; principal of the Walnut Hills High School, Cincinnati, 1895–1904; and since 1904 principal of the Eastern High School, Detroit. He is the author of 'Virgil's Georgics Edited for Sight Reading,' etc.; editor of 'Cicero's Orations'; an active promoter of local and national educational organizations; and a member of the American Social Science Association.

Bishop, Louis Faugeres, American physician: b. New Brunswick, N. J., 14 March 1864. He graduated at Rutgers College in 1885, and at the New York College of Physicians and Surgeons in 1889. He was resident physician of St. Luke's Hospital, New York, in 1889–92, and secretary of the New York Academy of Medicine and chairman of its Section of Medicine in 1900. His publications include 'Theory and Treatment of Rheumatism'; 'Diagnosis and Treatment of Gout'; 'Important Points in the Treatment of Pneumonia,' etc.

Bishop, Seth Scott, American physician: b. Fond du Lac, Wis., 7 Feb. 1852. He graduated at the Northwestern University in 1876. He began practice in Chicago, and in 1900 was professor of otology in the Chicago Post-Graduate Medical School and Hospital; Profes-

sor of diseases of the nose, throat, and ear in the Illinois Medical College; and surgeon to the Illinois Hospital and the Post-Graduate Hospital. He was also consulting surgeon to the Mary Thompson Hospital, the Illinois Masonic Orphan's Home in Chicago, and the Silver Cross Hospital in Joliet. He was a member of the International Medical Congress, the Pan-American Medical Congress, the American Medical Association, etc. He has written 'Diseases of the Ear, Nose, and Throat, and Their Accessory Cavities,' besides many monographs, and is one of the editors of 'The Laryngoscope.'

Bishop, William Henry, American novelist: b. Hartford, Conn., 7 Jan. 1847. He was graduated at Yale in 1867, and became professor of Spanish language and literature in its scientific school (Sheffield), resigning in February 1902 to spend several years in travel in Spain and elsewhere. He became U. S. consul at Genoa, Italy, 1903, and was transferred to Palermo, 1 Jan. 1905. He has written several novels, including 'Detmold' (1879); 'The House of a Merchant Prince' (1882); 'A Pound of Cure: A Story of Monte Carlo' (1894); 'Fish and Men in the Maine Islands'; 'A House Hunter in Europe'; 'Writing to Rosina,' a story; 'The Golden Justice'; 'Choy Susan and Other Stories'; 'The Brown-Stone Boy and Other Queer People,' and many similar works; also a book of travel, 'Old Mexico and Her Lost Provinces.'

Bishop-Auckland, England, a market town, in the county and nine miles southwest from the city of Durham, is situated on an eminence at the confluence of the Gaunless with the Wear, and has much improved in recent times. Near it is Auckland Palace, the episcopal residence, and among its buildings are a free grammar school (founded 1605), St. Anne Chapel, Edgar Memorial Hall, Lightfoot Church Institute, and the Temperance Hall. It is almost wholly supported by the coal traffic. Pop. (1901) 11,966.

Bishop (Sax. *biscop,* from Gr. *episcopos,* a superintendent), in the Greek, Latin, and Anglican churches, the title given to those who are of the highest order of the priesthood, to the successors of the 12 apostles, in distinction from the priests who are the successors of the 72 disciples; in the Methodist Episcopal and Moravian churches, and in the Protestant churches of Sweden, Norway, and Denmark, it is the title given to the highest officers in the ministry, who are not, however, regarded as a distinct order; in Germany the office is hardly more than titular, and is conferred upon princes as well as ecclesiastics. The name was borrowed by the first Christians from the languages of Greece and Rome, in which it designated a civil magistrate. Thus, Cicero was at one time *episcopus oræ campaniæ.* In the New Testament, the words bishop and presbyter, or priest, are sometimes interchanged, as in Acts xx. 17, 28, and St. John, in his last two epistles, adopts the title of priest. Yet, as maintained by Roman Catholic writers, it does not follow because the names priest and bishop were then applied indistinctly, that there existed no distinction between the episcopate and the priesthood. «There might have been confusion in the names,» says St. Thomas, «but not in the character.» The identity of the original signification of the words «presbyter» and «bishop» was acknowledged by the Christian fathers St. Jerome and St. Augustine in the 5th century, and even by Pope Urban II. at the end of the 11th century, and it is not denied by many Episcopalians even at the present day. By the Council of Trent, however, the doctrine which placed presbyters and bishops originally on a footing of perfect equality in the early Church was declared as a heresy, the object of which was to deny to the bishops of the Church the priority of rank which they claimed.

Those who adhere to the Episcopalian form of Church government, and at the same time admit the original identity of presbyters and bishops, differ from the Presbyterians in their theory of the origin of the episcopal authority. The Episcopalians maintain that even before the words had a separate meaning attached to them the distinction between bishops and subordinate pastors existed in fact, and was a regular ecclesiastical institution, those who held a peculiar authority over others being appointed originally by the apostles. The Presbyterians, on the other hand, believe that the authority that was undoubtedly conceded to certain of the «bishops» or «presbyters» when they met to consider the affairs of the Church, was not due to any formal appointment, but merely to the mutual agreement of the assembled presbyters, and that this distinction was no more than a mark of respect paid to some member who was venerable by his age or distinguished by his piety. But, whichever of these two theories may be correct, there is no doubt of the fact that a comparatively early period in the history of the Church a position of authority was acquired by the pastors of the Christian communities belonging to certain places, and that these came to be distinguished from the others by the name of bishops. The growth of this authority was favored by the doctrine which we find stated in the beginning of the 2d century with regard to the priestly dignity being a peculiarly divine institution. The more this doctrine was affirmed the higher grew the claims of the bishops. Ignatius of Antioch, who died about 115, had already declared every bishop to be a representative of Christ, in which we have the statement of the doctrine of the apostolic succession, that is to say, the doctrine of the transmission of the ministerial authority in uninterrupted succession from Christ to the apostles, and through these from one bishop to another. By the foundation of new churches in the larger towns which were affiliated to the original churches, and by the dependence of the presbyters in the country districts upon those having urban charges, the authority of the bishops came to be gradually extended over greater or less dioceses; and at the same time the bishops began to reserve to themselves peculiar privileges. As the early Church advanced and increased in growth, the offices and jurisdiction of the bishops developed correspondingly and by the 2d century their duties are clearly marked off from the subordinate clergy.

While this then was the position of the bishops in relation to the presbyters, they at first considered themselves as standing on a footing of equality in relation to each other. But as certain of the presbyters in their assemblies had acquired a priority of rank over the others, it gradually came about in the same

way that the bishops of the chief cities (Jerusalem, Antioch, Corinth, Alexandria, Constantinople, Rome) obtained a similar precedence among the bishops, and received the title of metropolitan bishops; and very early in the history of Christianity we find the Bishop of Rome claiming to be the head of the Church as the true successor of Peter, whom Christ himself had pronounced to be the rock on which he would build his Church. Roman Catholic writers found this supremacy of Peter upon the evidence of Scriptures, upon the *a priori* argument of the necessity of one supreme head both in the matter of government and the preservation of the integrity of doctrine, and upon the testimony of early ecclesiastical writers, who witness to the tradition of the universal supremacy of the Roman see.

After the transfer of the capital of the Roman empire to Constantinople, this city rapidly rose to ecclesiastical importance and became a metropolitan see. Its bishops made claim to be the first see in the Christian world after Rome on account of the imperial dignity of the city, but this assumption was stoutly resisted by the apostolic sees of the East, whom Rome always sustained against Constantinople's claim. After the Greek schism, Constantinople assumed the primacy of the Greek Church.

The practice of solemnly investing bishops with their offices dates from the 7th century. Already in the 5th century the Popes had begun to send to the newly elected metropolitan bishops (now called archbishops) the pallium, a kind of official mantle worn by archbishops, as a token of their sanction of the choice. Two centuries later it became the custom to consecrate bishops by investing them with the ring and crosier, the former as a token of marriage with the Church, the latter as a symbol of the pastoral office. Since this investiture was what gave validity to the election of the bishops, it became the source of long-continued contests between the Popes and the temporal sovereigns in the Middle Ages. The influential position which the bishops occupied in the state caused the temporal rulers to be desirous of keeping the right of investiture in their own hands, while the Popes with equal determination claimed the right for themselves. The contest was most bitter between the Popes and the emperors of the Romans, as they were called. It began in the 11th century, but was not settled till 1122, when it was agreed in the concordat of Worms between Pope Calixtus II. and the Emperor Henry V. that the election of bishops should take place according to the laws of the Church, under the direction of the emperor, and that the spiritual investiture (with ring and crosier) should remain in the hands of the Pope, while the bishops were to be invested with the temporal rights of their office by the emperor. This is still the fundamental law of the Roman Catholic Church with regard to investiture. The election to a bishopric is for the most part in the hands of the dean and chapter of the cathedral of the diocese; but in some cases it is a right of the territorial sovereign. In any case papal confirmation is requisite before the appointment is complete. Roman Catholic bishops in England are appointed exclusively by the Pope.

When the system of the ecclesiastical rule was matured, the almost absolute authority which they exercised over the clergy of their dioceses; their intervention in the secular concerns of the governments, to which they soon rendered themselves necessary by their superior information and their elevated rank; the administration of the Church revenues; and their extensive ecclesiastical as well as criminal jurisdiction, drew them into the vortex of secular affairs, sometimes at spiritual expense. Still it continued to be the bishop's duty to teach and preach in his own diocese, to watch over purity of doctrine, to see that the people were provided with the sacraments, to visit the churches in his diocese, etc. The most distinctive functions of their spiritual office remained as they still are, the ordination of the clergy, the consecration of other bishops, the confirmation of youth, the consecration of churches, etc. In the Middle Ages they attached to themselves subordinate or assistant bishops called suffragans or coadjutors, who often had intrusted to them the performance of those functions which more especially concerned the Church. The episcopal office being such as we have described it, the nobility, and even the sons of princes and kings, strove to obtain a dignity which was as honorable as it was profitable, and was not deemed incompatible with festivities and luxurious enjoyments. The splendid establishments which they were able to maintain from the large revenues derived chiefly from rich donations to their churches by pious devotees, gave, to the bishops of Germany particularly, a high degree of dignity. They became princes of the empire, and their influence on public affairs was highly important.

The Reformation lessened the number of bishops, and though in some of the Protestant countries of the north of Europe the higher clergy have retained the title of bishop, yet they have lost the greater part of their former revenues and privileges, though in neither of these particulars have those of England any reason to complain. The English Church has left to its bishops more authority than the rest, and this is one reason why it bears the name of episcopal. To them belong ordination, confirmation, the consecration of churches, the licensing of curates, and institution to benefices. They receive their appointment from the Crown. In Prussia, though the majority of the population are Protestants, the Roman Catholic bishops receive an annual allowance from the state. Some bishops in the Roman Catholic Church are nominally in charge of dioceses in countries which do not acknowledge the Christian faith. The dioceses of such bishops are said to lie *in partibus infidelium* (in parts belonging to unbelievers), and they are chiefly those that were wrested from the Christian Church by the Mohammedans.

The appointment of bishops was one of the grievances of the American colonists; few things more exasperated them than the scheme of appointing and sending out a bishop from England. It is said that there was a project of making Dean Swift bishop of the American colonies. In 1771, at the instance of the clergy of New York and New Jersey, the plan was again urged. The clergy of Virginia generally assented, but throughout America the dissenters and the Episcopal laity opposed. After the Revolution the case was altered. The first Episcopal bishop, Samuel Seabury, of Connecticut,

was consecrated by Scotch non-juring bishops in 1784. The Methodists began to use the term bishop in 1787. The first Roman Catholic bishop, John Carroll, of Baltimore, was consecrated in 1790. See ARCHBISHOP; APOSTOLIC SUCCESSION.

Bibliography.— Baur, 'Christianity and the Church in the First Three Centuries'; Dollinger, 'The First Age of the Church'; Hatch, 'Organization of the Early Christian Churches'; Lightfoot, 'St. Paul's Epistle to the Philippians'; Moberly, 'Ministerial Priesthood.'

Bishop's Book, a handbook of instruction and doctrine compiled in 1537 by a committee of bishops and ministers of the Anglican Church. It is to be found in 'Formularies of the Faith Put Forth by Authority During the Reign of Henry VIII.'

Bishops Suffragan, a class of bishops in England appointed by the Crown to take the places of the early bishops *in partibus,* who were assistants to the active bishops of English sees, and who held their warrant at the pleasure of the bishops to whom they were assigned. They were distinguished from suffragan bishops in the Church of England, as every regular bishop was a suffragan of his superior or metropolitan.

Biskara, bĕs'kạ-rä, or **Biskra,** Algeria, a town situated at the southern base of the last spurs of the Aures Mountains, about 120 miles south-southwest of Constantine. The railway from Philippeville, on the Mediterranean, terminates here. New Biskara, or the French town, has (1903) 9,076 inhabitants. Old Biskara has a population of about 75,000.

Bismarck-Schönhausen, Herbert Nikolaus, Prince von, hĕr'bĕrt nĭk'ō-lows bēs'märk-shĕn'how-sĕn, German statesman: b. Berlin, 28 Dec. 1849; d. Friedrichsruhe, Prussia, 18 Sept. 1904; son of Otto Eduard Leopold Prince von Bismarck-Schönhausen. He served as secretary to the London Embassy, and on his father's retirement he was provisionally charged with the foreign affairs of the empire. In 1886 he was secretary of state, and in January 1889, the emperor conferred on him the first class of the Order of the Red Eagle. When his father resigned, Herbert withdrew from the diplomatic service, and remained upon his estate for several years. In 1893 and 1898 he was a member of the Conservative party in the Reichstag. His speeches are published under the title, 'Politische Reden' (1899).

Bismarck-Schönhausen, Otto Eduard Leopold, Prince, ŏt'tō ĕd'oo-ärd lā'ō-pōld bēs'-märk-shĕn'how-sĕn: b. of a noble family of the "Mark" (Brandenburg), at Schönhausen, 1 April, 1815; d. 30 July 1898. He studied at Göttingen, Berlin, and Greifswald; entered the army and became lieutenant in the Landwehr. After a brief interval devoted to his estates and to the office of inspector of dikes, he became in 1846 a member of the provincial diet of Saxony. And later he entered the diet of Prussia, when he began to attract attention as an Ultra Royalist. He opposed the scheme of a German empire as proposed by the Frankfort Parliament of 1849. His diplomatic career began in 1851, when he was appointed Prussian member of the resuscitated German diet at Frankfort. In the diet, he gave open expression to the long-felt discontent with the predominance of Austria, and demanded equal rights for Prussia. He remained at Frankfort till 1859, when he beheld in the approach of the Italian war an opportunity of freeing Prussia and Germany from the dominance of Austria. In the spring of 1862 King William, on the urgent advice of the Prince of Hohenzollern, transferred Bismarck as ambassador to Paris, in order to give him an insight into the politics of the Tuileries. During his short stay at Paris Bismarck visited London, and had interviews with the leading politicians of the time, including Lord Palmerston and Disraeli. In the autumn Bismarck was recalled, to take the portfolio of the ministry of foreign affairs, and the presidency of the cabinet. Not being able to pass the reorganization bill and the budget, he closed the chambers (October 1862), announcing to the deputies that the king's government would be obliged to do without their sanction. When the "conflict era," as it was called, approached a crisis, the death of the king of Denmark reopened the Schleswig-Holstein question, and excited a fever of national German feeling, which Bismarck was adroit enough to work so as to aggrandize Prussia by the acquisition of the Elbe duchies.

The action of France in regard to the candidature of Prince Leopold of Hohenzollern for the throne of Spain gave Bismarck the opportunity of carrying into action the intensified feeling of unity among Germans. During the war of 1870–1, Bismarck was the spokesman of Germany; he it was that in February 1871, dictated the terms of peace to France. Having been made a count in 1866, he was now created a prince and chancellor of the German empire. Following the Peace of Frankfort (10 May 1871), the sole aim of Bismarck's policy, domestic and foreign, was to consolidate the young empire of his own creating. Thus, conceiving the unity of the nation and the authority of its government to be endangered by the Church of Rome, and its doctrines of papal infallibility, he embarked on that long and bitter struggle with the Vatican, called the Kulturkampf, in the course of which the Imperial and Prussian parliaments passed a series of most stringent measures (Falk or May laws) against the Roman Catholic hierarchy. But Bismarck had underrated the resisting power of the Roman Catholic Church, and motives of political expediency gradually led him to modify or repeal the most oppressive of the anti-papal edicts, leaving the Roman Catholics virtual masters of the field. Otherwise, his domestic policy was marked, among other things, by a reformed coinage, a codification of law, a nationalization of the Prussian railways (as a preliminary step to Imperial State lines), fiscal reform in the direction of making the empire self-supporting (that is, independent of matricular contributions from its component states), repeated increase of the army and the regular voting of its estimates for seven years at a time (military septennate), the introduction of a protective tariff (1879), and the attempt to combat social democracy.

In 1884 Bismarck inaugurated the career of Germany as a colonizing power, a new departure which brought him into sharp but temporary conflict with the England of Gladstone. For the rest, his foreign policy mainly aimed at isolating France and rendering her incapable of forming anti-German alliances. On the other hand, he

gradually combined the central powers of Europe into a peace league, aiming at counteracting the aggressiveness of Russia and France, separately or combined, on the Danube or the Rhine. The nucleus of this peace league was formed in 1879 by the Austro-German Treaty of Alliance (published in February 1888) which Italy formally joined in 1886, and which entitles Bismarck to be called the "peacemaker" and the "peacekeeper" of Europe, a character he first publicly acquired when, as "honest broker" between Austria and Russia, he presided over the Berlin Congress in 1878. The phrase, "man of blood and iron," is based on the Iron Chancellor's own use of the words in a speech in 1862.

Bismarck's life was often threatened, and twice actually attempted — once at Berlin in 1866, just before the Bohemian campaign, by Ferdinand Cohen (or Blind), a crazy youth who aimed at making himself the instrument of popular dissatisfaction with Bismarck, as the champion of absolutism and the fancied apostle of a fratricidal war; and again in 1874 at Kissingen, by a Roman Catholic tinsmith named Kullmann, who was unquestionably a product of Ultramontane fury engendered by the May laws.

Emperor William died 9 March 1888. The short reign of Emperor Frederick followed and then William II. ascended the throne. On 18 March 1890 Bismarck fell. The last cause of his fall has not been told. Many explanations have been given — that Bismarck objected to the labor rescripts, that he opposed the abolition of the laws against Socialists, that he would not tolerate the emperor's direct consultation with the other ministers or the parliamentary leaders. After the war with Denmark, King William had made Bismarck a count. After the conquest of France, Emperor William had named him prince. Emperor William II. gave him the title of Duke of Lauenburg. When Bismarck's 81st birthday was celebrated in 1896, there was talk of a reconciliation between the prince and his sovereign. The emperor sent his photograph to Bismarck, the latter returned thanks, and little by little the way was paved for a meeting between the two men, and eventually for the state visit which the emperor paid to Bismarck at Friedrichsruhe, where the statesman died.

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Bismarck, N. Dak., city and capital of the State; and county-seat of Burleigh County; on the Missouri River, and the Northern Pacific R.R.; 194 miles west of Fargo. It contains the State capitol (which cost over $500,000), the State penitentiary, court-house, city hall, opera house, a State hospital for the insane, Saint Alexius' Hospital, Saint Paul's Seminary, and an immense river warehouse. The river is here spanned by a bridge that cost $1,500,000. Bismarck has improved waterworks, electric lights, several flour mills, a national bank, the State Library, and an assessed property valuation of nearly $2,000,000. The city is a supply and trade centre for an extensive agricultural section, and is also a base of supplies for Indian agencies and United States military posts. Its river traffic with stations above and below it, is very heavy. Pop. (1890) 2,186; (1900) 3,319.

Bismarck Archipelago, official name given by Germany to New Britain, New Ireland, New Hanover, and several smaller adjoining islands in the South Pacific, since in 1884, when they became a German dependency.

Bismark, Friedrich Wilhelm, frēd'rĭH vĭl'hĕlm, bēs'märk (COUNT VON), German general: b. Windheim, Westphalia, 28 July 1783; d. 18 July 1860. In 1796 he entered the army of Hanover as an ensign, and in 1804 was attached to the Hanoverian legion in the English army. The result of a duel forcing him to leave the English service, he entered that of the king of Würtemberg, in 1807, and was soon after appointed captain of cavalry. During the campaign in Russia, he served under the command of Ney, and distinguished himself at the Beresina. He was made a prisoner at Leipsic, but returned to Würtemberg in 1813. In 1815 he received the title of count; in 1819 he was appointed brigadier-general. In 1828 Count Bismark introduced his system of cavalry tactics into the Danish army, and was soon after appointed commander-in-chief of the cavalry of Würtemberg. He published several military treatises, and also a work upon Russia.

Bismuth, bĭz'mŭth, a metallic element, first accurately described by Pott in 1739. It was known before that time, but had been previously confounded with antimony and zinc, which it resembles to some extent. The origin of the word "bismuth" is not known, although several highly improbable derivations have been suggested. For example, miners often call the metal "wismuth," and Mathesius suggests that this word comes from "Wisse," or "Wiese," meaning a meadow; because, he says, in the mines it is often found covered with incrustations of various colors, resembling a meadow covered with brilliant flowers. Bismuth occurs in nature in the metallic form, and several ores of it are also known, from which the metal may be easily obtained by roasting and smelting. The principal supply comes from Saxony, but considerable quantities are obtained from Austria, Norway, Cornwall, Spain, California, New South Wales, and portions of South America. The total consumption of the metal probably does not greatly exceed 50 tons per annum, and the demand for it is so variable that the price has ranged all the way from 50 cents to $5 a pound. Bismuth is of a peculiar light-reddish color, and is highly crystalline, and so brittle that it can be readily pulverized. It melts at 510° F., and boils in the vicinity of 2300° F. Its specific gravity is about 9.82 at 54° F., that of the melted metal, just above the point of fusion, being 10.06. Its specific heat is about 0.030 at ordinary temperatures, and 0.036 just above the melting point. Its coefficient of expansion is about 0.000736 per degree Fahrenheit, its conductivity for heat is about one fiftieth of that of silver, and its electrical resistance at 32° F. is 1.15 times that of mercury at the same

BISMARCK ADDRESSING THE REICHSTAG.

temperature. Bismuth is readily recognized by the spectroscope, as it shows a large number of characteristic lines. Its chemical symbol is Bi, and its atomic weight is 208.5 for O = 16, and 206.9 for H = 1. It has a tensile strength of 6,400 pounds per square inch. According to some authorities, the specific gravity of metallic bismuth is diminished by pressure; but Spring has shown that this is not the case. He subjected a sample whose specific gravity was 9.804 to a pressure of 20,000 atmospheres, and found that the specific gravity rose to 9.856, while a second compression increased it still further, to 9.863. Bismuth expands upon solidifying, but Tribe has shown that this expansion does not take place until immediately after the congelation of the metal. Bismuth is the most diamagnetic substance known, a sphere of it being sensibly repelled by a magnet. It has marked thermo-electric properties also, on account of which it is much used in laboratories in the construction of delicate thermo-piles. In the arts, metallic bismuth is used chiefly in the preparation of alloys. By adding a small amount of it to lead, that metal may be hardened and toughened. An alloy consisting of three parts of lead and two of bismuth has 10 times the hardness and 20 times the tenacity of pure lead. The alloys of bismuth with both tin and lead are extremely fusible, and take fine impressions of casts and molds. An alloy of one part of bismuth, two parts of tin, and one part of lead, is used by pewter workers as a soft solder, and by soap-makers for molds. An alloy containing five parts of bismuth, two of tin, and three of lead melts at 199° F., and is somewhat used for stereotyping, and for the manufacture of metallic writing pencils. Thorpe gives the following proportions for the better known fusible metals, into which bismuth enters:

Newton's: Bismuth, 50; lead, 31.25; tin, 18.75. Melts at 202° F.

Rose's: Bismuth, 50; lead, 28.10; tin, 24.10. Melts at 203° F.

D'Arcet's: Bismuth, 50; lead, 25; tin, 25. Melts at 201° F. (If 250 parts of mercury are also added, the resulting alloy, or amalgam, melts at 113° F.)

Wood's: Bismuth, 50; lead, 25; tin, 12.50; cadmium, 12.50. Melts at 149° F.

Lipowitz's: Bismuth, 50; lead, 26.90; tin, 12.78; cadmium, 10.40. Melts at 149° F.

Guthrie's «eutectic» alloy: Bismuth, 50; lead, 20.55; tin, 21.10; cadmium, 14.03. Melting point not definitely stated, but said to be «very low.»

The action of heat upon some of the foregoing alloys is remarkable. Thus, Lipowitz's alloy, which solidifies at 149°, contracts very rapidly at first, as it cools from this point. As the cooling goes on, the contraction becomes slower and slower, until the temperature falls to 101.3° F. From this point the alloy expands as it cools, until the temperature falls to about 77° F., after which it again contracts, so that at 32° a bar of the alloy has the same length as at 115° F. Alloys of bismuth have been used for making fusible plugs for steam boilers, but it is found that they are altered in some unknown way by prolonged exposure to heat, so that they cannot be relied upon, after any great length of time, to melt at the proper temperature. Some of the alloys of bismuth are also used in tempering steel.

In its compounds, bismuth has an odd valency — usually three, but sometimes five. Metallic bismuth does not oxidize readily in dry air at ordinary temperatures, but it burns with a blue flame when strongly heated in presence of air, passing into the trioxid, Bi_2O_3. If the trioxid is dissolved in a solution of caustic potash, and nitric acid is subsequently added, bismuth peroxid (or pentoxid, Bi_2O_5, is precipitated. The trioxid is pale yellow, and the pentoxid is brownish-red. Both unite with acids to form salts. Bismuth trichlorid, $BiCl_3$, is formed when the metal is heated in chlorine gas; it is a white, crystalline, deliquescent substance, which is decomposed by water with the formation of hydrochloric acid and bismuth oxychlorid, BiOCl. Bismuth trisulphid, Bi_2S_3, is thrown down as a black, insoluble precipitate, when a stream of sulphuretted hydrogen gas is passed through an acid solution of a salt of bismuth. The trisulphid also occurs native as «bismuth glance,» or Bismuthinite (q.v.). Bismuth dissolves readily in nitric acid, with the formation of the nitrate, $Bi(NO_3)_3 + 5H_2O$. A peculiarity of the soluble bismuth salts, as a class, is that their solutions are rendered milky by the addition of water in considerable excess, owing to the formation of insoluble basic compounds. The nitrate, for example, becomes transformed by this process into a series of so-called sub-nitrates.

In medicine, bismuth is used in the form of some one of this metal's insoluble salts, the soluble salts of bismuth being actively poisonous. The poisoning closely resembles that caused by lead (q.v.). The insoluble salts used most frequently are bismuth subnitrate, subcarbonate, salicylate, and subgallate. These are for the most part employed as gastric sedatives, as gastro-intestinal anti-fermentatives, and locally as bland astringent dressings.

Bis'muthinite, a native sulphide of bismuth, having the formula Bi_2S_3. It commonly occurs massive, but is also found in needle-like crystals belonging to the orthorhombic system. It is opaque, and leaden in color, often with a superficial yellowish or iridescent coating. Its hardness is 2, and its specific gravity usually about 6.5. In the United States it occurs in Connecticut, California, North Carolina, and Utah. It is also found in Mexico and Canada, and in Sweden, France, England, and Bolivia. Where it can be had in quantity, it is mined as an ore of bismuth.

Bison, a form of wild cattle regarded by some naturalists as constituting a genus *Bison*, separated from the larger group *Bos*, which is represented by the American «buffalo,» the European aurochs, and some extinct species. Bisons differ from other cattle, in external appearance, mainly by their massive and shaggy forms. Their heads are exceedingly broad, and the horns curve outwardly from each side of the forehead, and are short, round, and thick. A mop of long and shaggy hair covers the forehead, nearly hiding the little eyes, and forms a great beard upon the throat and chin, especially of the bulls. In order to support this massive head, which is usually carried low, great spines rise from the vertebræ of the back over the shoulders, giving attachment to the huge muscles necessary to support the skull. This makes the neck very thick, and the fore-

quarters much higher than the haunches, which droop away from the arched contour of the back, over the withers. The massive appearance of the fore-quarters is increased by the long growth of hair on the neck, shoulders, and fore-legs, which is especially coarse and shaggy in bulls, and is of protection to them in their furious assaults upon one another in the rutting season. This hair consists mainly of a short, crisp, wool-like growth, different from that of other cattle, and capable of being woven. Internally, the bisons are peculiar in having 14 ribs, instead of 13; in the breadth and convexity of the frontal bones of the skull; in having six, instead of four nasal bones; and in the comparative slenderness of the bones of the limbs. The bisons are inhabitants of the northern hemisphere, and, in the era preceding the present, were represented by two or three species of probably circum-polar range. The race is represented in the Old World by the aurochs, now preserved only in small, protected herds in Russia (see AUROCHS); and in America, by the buffalo (*Bison americanus*), now nearly extinct.

The American bison or buffalo is somewhat smaller than the aurochs, and has shorter and thicker horns, and a shorter tail, but its hump and fore-quarters are higher, and more shaggy. The females are much inferior to the males in bulk, weighing only about 1,200 pounds, whereas an old bull in good condition will weigh 2,000 pounds. The American animal differs in one very important respect from the European species, due to the difference in their habitats. The auroch was a native of a region covered with forests, where large herds could not find open pasturage of any considerable extent, and consequently moved about only in small bands, whereas the American animal had open to it the immense, grassy prairies and plains of the interior of this continent, and was able, and in effect, forced to join into vast herds, so that it acquired gregarious habits. When North America was explored by white men, the bison was first encountered in the valleys of the Alleghanies, and scattered throughout the prairies of the Mississippi valley, north of the Tennessee River. Its principal home, however, was upon the grassy plains, between the Missouri River and the Rocky Mountains, where the herds sometimes contained hundreds of thousands of individuals, and grazed all the way from southern Texas to the shores of Great Slave Lake. They wandered through the valleys of the Rocky Mountains, to the plains of New Mexico, Utah, and Idaho, but seemed never to have crossed the Sierra Nevada. Those east of the Mississippi River were probably killed off before the beginning of the 19th century, and by 1850 none remained east of the dry plains. The building of the Union P. and Kansas P. R.R.'s, where the early trains were sometimes stopped by herds crossing the tracks, soon led to the disappearance of the animals from the central plains; and by 1875 they were divided into two distinct groups, a northern and a southern. These were rapidly slaughtered by parties of men who followed the animals at all seasons, and killed them for their hides, which, as "buffalo robes" became more and more valuable, until by 1890 the Texan herd had been utterly exterminated, and of the northern herd, none remained except such as had been gathered by the government for preservation in Yellowstone Park, and a few hundred that still survive in the remote forests beyond the North Saskatchewan. The herd in Yellowstone Park amounts to about 100 and will probably be maintained under the protection of law. Small bands are living in private parks and zoological gardens in various parts of the world. Thus, perhaps, 500 or 600 living bisons remain as the sole relic of the millions of these valuable animals, which half a century ago ranged our western plains, and which were recklessly wasted.

The buffalo herds were made up of small companies, consisting of a patriarchal old bull, several cows, and a number of young of various ages, and thousands of these companies would graze in the same region, all moving slowly in the same direction, so that travelers would never be out of sight of bisons during a whole day's journey. They were more or less nomadic, wandering from one part of the plains to the other in search of fresh pasturage. Thus on the approach of winter a general movement always took place from the high, central plains toward the warmer south, and also into the shelter of the wooded valleys of the foot-hills. In these journeys they had the habit of traveling in single file, thus forming long, narrow paths, which the plainsmen called "buffalo trails," yet traceable in many places. In spite of their weight and apparent clumsiness, they swam rivers with ease, and climbed about the mountains with remarkable agility. Nevertheless they chose the easiest places, and the well-marked buffalo-trails were the guides for explorers, and were most deeply imprinted in those mountain passes, which are now the highways of commerce. The sexes kept together throughout the year, and as is usual among gregarious animals, there was constant fighting among the bulls for the supremacy of their bands, the old leaders being overthrown by younger and more vigorous aspirants, as soon as their strength began to wane. Thus the very best sires were continually selected by the law of battle, and the race kept at its highest point. The herding was a measure of protection against the enemies which hung upon the skirts of every band. The grizzly bear was perhaps the only animal that could vanquish a bison bull in fair fight, but pumas and wolves were ever on the watch to seize any young or feeble ones that strayed from the band. When attacked the band would instantly form a close crowd with the cows and calves in the centre, protected by the bulls, forming a circle with lowered heads on the outside. The calves were born in the spring, a single one, as a rule, to each cow after a gestation of about nine months.

To the western Indians the bison was the principal resource for food and shelter, and was continually hunted. In the days before firearms, the Indians would approach them on foot, by creeping within bowshot on all fours, often disguised in the skin of a calf or an antelope; or would rush the herds upon horseback. They also had the practice in rough countries of driving the buffaloes into enclosures or small canyons, where they could easily be slaughtered; or sometimes would force them over a cliff, to be killed by the fall. Besides eating the flesh as fresh meat, vast quantities of it would be cut into strips each autumn, and dried in the sun for winter use; while the northern tribes

chopped it into fine pieces, mixed it with berries, and preserved it in skin bags, mixed with boiled fat, and so formed the highly portable and nutritious food called «pemmican.» The disappearance of the buffalo consequently meant starvation to the Indians, as well as the loss of the principal material for warm clothing and bedding, and the Indian wars which raged upon the plains, during the third quarter of the 19th century, were mainly due to the desperate efforts made by these people, to preserve their hunting-grounds.

Species of fossil bisons have been found both in Europe and America, associated with the remains of mammoths, mastodons, and other extinct animals of the Quaternary Period. Some of these extinct bisons exceeded in size any of the living species, the bony horn-cores in one being six feet from tip to tip (the length of the horns themselves must have been considerably greater); the height of this species is estimated to have been over six feet at the shoulder.

The literature relating to the American buffalo is as extensive as the story of the western States. The most complete and special accounts are: J. A. Allen's monograph, 'The American Bisons' republished by the United States Geological Survey in 1875; and W. T. Hornaday's 'Extermination of the American Bison,' in the annual report of the Smithsonian Institution for 1887. For the more picturesque and adventurous side of the animal's history, and its hunting, consult Audubon's 'Quadrupeds of America'; Catlin's 'North American Indians'; Gregg's 'Commerce of the Prairies'; Dodge's 'Black Hills'; 'Butler's 'Great Lone Land'; and the accounts of western explorations by such writers as Pike, Fremont, Marcy, Long, Emory, and Stansbury.

Bispham, bĭs'păm, **David S.,** baritone singer: b. Philadelphia, Pa., 5 Jan. 1857, of Quaker parentage. Educated at Haverford College, Pennsylvania, he later studied music and singing in England and Italy. His début was made as the Duc de Lonqueville in 'The Basoche,' London, in 1891, and since then he has been the principal baritone of the Royal Opera Company, Covent Garden, London, occasionally visiting the United States on an operatic tour. An accomplished linguist, he is equally at home in German, French, or Italian, but his greatest successes have been in Wagnerian roles, such as 'Alberich' and 'Wolfram.'

Bissagos, bĭs-sä'gōz, a group of islands, about 20 in number, near the west coast of Africa, opposite the mouth of the Rio Grande, between lat. 10° and 12° N., belonging, like the mainland opposite, to Portugal. The largest, Orango, is about 25 miles in length, and most of them are inhabited by a rude negro race. The inhabitants cultivate maize, bananas, and palms, but their chief employment is in fishing. Most of the islands are under native chiefs, who are nominally vassals of Portugal. At Bolama, or Bulama, once a British settlement, but abandoned in 1793, there is a thriving Portuguese town, which is the seat of government.

Bissão, bẹs-sä'o, an island and Portuguese station closer to the African coast than the Bissagos and opposite the Jeba's delta. Before the prohibition of slavery by the Portuguese government it was an important slave market.

Bissell, Edwin Cone, American biblical scholar: b. Scoharie, N. Y., 2 March 1832; d. Chicago, 9 April 1894. He prepared for the ministry at Union Theological Seminary, N. Y., and held Congregational pastorates at Westhampton, Mass., San Francisco, Cal., and Winchester, Mass., and was professor of Hebrew in the Hartford Theological Seminary, 1881–92, and at the McCormick Presbyterian Seminary, Chicago, 1892–4. He published: 'The Historic Origin of the Bible' (1873); 'The Pentateuch: Its Origin and Structure' (1885); 'Biblical Antiquities' (1888); 'Genesis Printed in Colors, Showing the Original Sources from which it is Supposed to Have Been Compiled' (1892); 'The Apocrypha of the Old Testament, with Historical Introductions,' his greatest work (1880).

Bissell, William Henry Augustus, American prelate of the Episcopal Church: b. Randolph, Vt., 10 Nov. 1814; d. Burlington, Vt., 14 May 1893. Entering the Episcopal ministry in 1839, he was successively rector at West Troy, Lyons, and Geneva, N. Y., and 3 June 1868 was consecrated second bishop of the diocese of Vermont.

Bissell, Wilson Shannon, American lawyer: b. New London, N. Y., 31 Dec. 1847; d. Buffalo, 6 Oct. 1903. He graduated at Yale University in 1869; and studied law in Buffalo with Lansing, Cleveland & Folsom. In 1872 he formed a partnership with Lyman K. Bass, the firm of which Grover Cleveland became a member in 1873. When Mr. Cleveland was elected governor of New York the firm was dissolved. Subsequently it was reorganized, and in 1900 consisted of Bissell, Carey & Cooke. He has been a delegate to several State conventions; in 1884 was a Democratic presidential elector; and in 1893–5, during Mr. Cleveland's second term as President, was postmaster-general of the United States.

Bissen, Hermann Wilhelm, bĭs'sĕn, hĕr'-män vĭl'hĕlm, Danish sculptor: b. Schleswig, 1798; d. Copenhagen, 10 March 1868. From 1823 to 1833 he studied in Rome under Thorwaldsen, who, in his will, commissioned him to complete his unfinished works. In 1850 he was made director of the Academy of Arts, Copenhagen. Among his masterpieces are the 'Valkyrie,' 'Cupid Sharpening His Arrow,' and 'Moses'; his 'Orestes,' and a frieze 134 feet long, perished in the burning of the Christianborg at Copenhagen (1884).

Bissex'tile, the ancient name of leap year, so called from the sixth day before the calends of March being repeated or taken twice. See CALENDAR.

Bisson, Alexandre, bẹ-sôṅ, ä-lĕks-ȧndr, French dramatist and musical composer: b. 1848. His vaudeville, 'Four Cuts with a Penknife,' won for him instant celebrity. 'The Deputy from Bombignac' is his masterpiece. Other comedies or operettas were: 'The Late Toupinel'; 'The Joys of Paternity'; 'The Pont-Biquet Family.' With Théodore de Lajarte he was joint author of a 'Grammar of Music' and of a 'Little Encyclopædia of Music.'

Bistineau, bĭs-tẹ-nō', a lake in northwestern Louisiana, dividing Bossier and Bienville parishes, about 30 miles in length from north to south and 2 in breadth. It receives the Dauchite

River from the north, and communicates with Red River by an outlet at its southern extremity. It is navigable for steamboats.

Bis'tort (*Polygŏnum Bistorta*), a perennial plant of the buckwheat family, and from its astringent properties (it contains much tannin) sometimes used medicinally. It bears a raceme of flesh-colored flowers. It is also called adder's-wort and snake-weed, from being a supposed remedy against snake bites. The American representative is a naturalized plant (*P. viviparum*), found on Alpine summits of New England and on the shores of Lake Superior and northward. It bears an erect spike of flesh-colored flowers.

Bistre, bĭs'tẽr, a reddish brown water-color, generally obtained from the soot that collects in chimney-flues. This is pulverized and washed to remove the saline ingredients. The finest sediment is then dissolved in vinegar, to which gum-water is afterward added. It was formerly much used for making painters' crayons, and also for a paint in water-color designs. Sepia, however, is now preferred to it, as it has a more agreeable color and is more easily employed.

Bithur, bẽ-thoor', India, a town 12 miles northwest of Cawnpore, on the right bank of the Ganges. In the Indian mutiny it had some notoriety conferred on it from being the residence of Nana Sahib, also styled the rajah of Bithoor. The town was long the abode of a line of Mahratta chiefs, the last of whom died without issue in 1851. His adopted son, Nana Sahib, whose proper name, however, was Dhundoo Punt, claimed the succession, but his title was ignored by the East India Company, a proceeding which is believed to have stimulated him to his subsequent deeds of atrocity. Gen. Havelock gained a brilliant victory over the rebels in the vicinity, and subsequently quantities of treasure belonging to the Nana were discovered by the troops in a well close to the palace. Pop. 7,000.

Bithyn'ia, anciently a country in Asia Minor, on the Black Sea, the Bosporus, and the Sea of Marmora, and bounded on the south by Phrygia. In early times it was called Bebrycia, from the Bebrycians who inhabited it. Before the time of Crœsus, Bithynia was an independent state, under its own princes. After the death of Prusias I., in the war against Crœsus, it fell into the power of the Lydians, 560 B.C.; into that of the Persians, 555 B.C.; and into that of Alexander, 334 B.C. The restorer of the Bithynian throne was Bias or Bas, a native prince, at the court of one of whose successors, Prusias II., Hannibal took refuge, and where he ended his life by poison, 183 B.C. Nicomedes, the last king of this race, bequeathed his kingdom to the Romans, 75 B.C. The famous cities of Nicomedia, Nicæa, and Heraclea were in Bithynia. In the 11th century Bithynia was conquered by the Seljuks. In 1298 a new kingdom was founded there by the Ottoman Turks, of which, in 1327, Prusa was the capital. See Ramsay, 'Historical Geography of Asia Minor' (1890).

Biting-lice. See BIRD-LICE.

Biton, bī'ton, Greek mathematician, of uncertain date, but supposed to have been a contemporary of Archimedes, wrote a work of some interest on warlike engines, and dedicated it to Attalus, king of Pergamos. It is to be found in the 'Mathematici Veteres' of Thevenot. (2) The son of Cyclippe mentioned in the legend of Cleobis and Biton.

Bitter, Arthur, pseudonym of SAMUEL HABERSTICH, Swiss poet and story writer: b. Ried, near Schlosswyl, 21 Oct. 1821; d. Bern, 20 Feb. 1872. Novelettes, stories, and poems proceeded from his pen for many years, all characterized by sympathy of tone and inoffensive realism, 'Tales, Romances, and Poems' (1865–6), being most pleasing.

Bitter, Karl Theodore Francis, Austro-American sculptor: b. Vienna, Austria, 6 Dec. 1867. He came to the United States in 1889 and soon acquired world-wide reputation. He executed the sculpture on the main buildings of the World's Columbian Exposition, and was appointed director of sculpture at the Pan-American Exposition at Buffalo, and the Louisiana Purchase Exposition at Saint Louis.

Bitter Almonds. In medicine the oil of bitter almonds, containing prussic acid, is used as a gastric sedative and as an antispasmodic. See PRUSSIC ACID.

Bitter Ash, the quassia tree. See QUASSIA.

Bitter-root, *Lewisia rediviva,* a plant of Canada and part of the United States, order *Portulaceæ,* so called from its root being bitter though edible, and indeed esteemed as an article of food by whites as well as Indians. From the root, which is long, fleshy, and tapering, grow clusters of succulent green leaves, with a fleshy stalk bearing a solitary rose-colored flower rising in the centre, and remaining open only in sunshine. Flower and leaves together, the plant appears above ground for only about six weeks. California bitter-root (*Echinocystis fabacea*) and Natal bitter-root (*Gerardanthus macrorhiza*) both belong to the gourd family.

Bitter Root Mountains, a range of the Rocky Mountains, in Montana, deriving its name from a plant with rose-colored blossoms, whose slender roots are used by the Indians for winter food. The chief summits are Lolo Peak and St. Mary's Peak.

Bitter Root River, a tributary of the Columbia in Montana, flowing north into Clark's River in Missoula County; length about 110 miles. Gold has been found in this region.

Bitter Root Valley, a valley on the east of the Bitter Root range, in Montana, 90 miles long and 7 miles wide, enwalled by lofty mountains, and abounding in farms and cornfields.

Bitter Spar, rhomb-spar, the crystallized form of dolomite or magnesian limestone. The name is derived from the magnesia contained in it, the taste of salts of magnesia being bitter.

Bitter-sweet, Dulcamara, or **Woody Nightshade,** *Solanum Dulcamara,* a sprawling vine of the natural order *Solanaceæ,* native of Europe and Asia, and introduced into the United States. It has purplish or blue flowers arranged in cymes which are succeeded by attractive inedible berries. The leaves have been used medicinally in the form of an extract. The name, properly false bitter-sweet, is given to *Celastrus scandens,* a handsome climber of the natural order *Celastraceæ* found from eastern Canada to South Dakota and southward to New Mexico.

It often grows 20 feet tall and is perhaps most attractive on account of its orange-yellow fruits which split open and expose the crimson seeds. Both seeds and fruits remain attached to the plants during the winter.

Bitter-Sweet, a once popular narrative didactic poem by J. G. Holland, published 1858. It contains about 3,500 lines, and is descriptive of New England rural life.

Bitter Vetch, a name applied to two kinds of leguminous plants: (1) *Ervum ervilia,* a lentil cultivated for fodder; and (2) all the species of *Orobus,* for example, the common bitter vetch *O. tuberosus,* a perennial herbaceous plant with racemes of purple flowers and sweet edible tubers.

Bittern, a bird of the heron family and genus *Botaurus,* several species of which exist in various parts of the world. The bitterns differ from the herons in their lesser size, shorter neck, comparative shortness of the legs, and superior length of toes, and in their nocturnal habits and loud voices. Otherwise their haunts, food, and manner of life closely resemble those of herons (q.v.). The only North American species is the common bittern (*B. lentiginosus*), which is spread throughout the United States and southern Canada in all suitable places, often close to towns. Its length is about 25 inches, and the plumage is tawny brown of various shades, excessively variegated everywhere; the neck is striped with dull yellow and has on each side a dark patch. Both sexes, and the young, are alike in plumage. The Old World species (*B. stellaris*) is very similar, but has more red on the upper parts, and green about the head. It is found numerously from Ireland to Japan, in India and throughout all Africa. Other species or varieties spread the range of the genus to New Zealand and the South Sea Islands. The one great peculiarity of the bitterns, to which they owe their Latin and many local names, is their extraordinary vocal utterance in spring, which in the European species is likened to booming by everyone who has heard it, and has been called "a loud and awful voice." The old fable that this sound was produced in some mysterious way by the bird while it held its beak plunged into the mud is untrue; and the flesh is no longer esteemed as a dainty, as it was some centuries ago. The voice of the American bittern is a droning, thumping noise, which has been likened to the driving of a stake with an axe, or, more often, to the working of an old-fashioned pump-handle. Hence the rural names, "stake-driver," "mire-drum," "bog-pumper," "thunder-pump," and the like. Nuttall attempted to suggest the sound of the syllables "pump-au-gah"; but Samuels succeeds better. He writes: "In the mating season, and during the first part of the period of incubation, the male has a peculiar love-note, that almost exactly resembles the stroke of a mallet on a stake; something like the syllables 'chunk-a-lunk - chunk, quank - chunk - a - lunk - chunk.' I have often, when in the forests of northern Maine, been deceived by this note into believing that some woodman or settler was in my neighborhood, and discovered my mistake only after toiling through swamp and morass for perhaps half a mile."

A genus of smaller birds, *Ardetta,* is known as that of the "least bitterns." One species (*A. exilis*) occurs over most of North America, and related species belong to South America. They are intermediate between the true bitterns and the night-herons.

Consult Coues, 'Birds of the Northwest' (1874); and Newton, 'Dictionary of Birds' (1896), and the other authorities therein cited.

Bittern, or **Salt Oil,** the name given to the syrupy residue from evaporated sea-water after the common salt has been taken out of it. The syrup contains salts of magnesium, which give it a bitter taste, and it is employed as a source of them. It is also one of the sources of bromine. Bittern procured from the salt works at Epsom, England, was formerly the source of sulphate of magnesium, hence styled Epsom salts. See SALT.

Bitternut. See HICKORY.

Bitters, a class of compounds largely employed as appetizers and digestants. They are for the most part alcoholic drinks to which some plant containing a bitter principle is added. The bitter principles are either alkaloids, as in the quinine of calisaya, or amaroids, which are widely distributed in plants. The most commonly employed bitters are quassia, gentian, angostura, cascarilla, wild cherry, and cinchona. Medicinally bitters are classed as simple and aromatic, the latter containing volatile oils in addition to the bitter principles. The simple bitters mostly used are quassia, gentian, and calumba. The aromatic bitters are cascarilla, eupatorium (boneset), angostura, serpentaria, and chamomile.

Bitterwood, various trees and shrubs of the genus *Xylopia* of the natural order *Simarubiaceæ,* noted for the bitterness of their wood which is used for funiture because of its resistance to insects. One Brazilian species (*X. sericea*) furnishes a peppery fruit and a cordage fibre. The name bitterwood is also given to *Picrœnia excelsa* (*Quassia excelsa* of some botanists) belonging to the natural order *Simarubaceæ.* This tree is a native of the West Indies and is used like quassia (q.v.).

Bit'tinger, Lucy Forney, American historical writer: b. Cleveland, Ohio, 29 Aug. 1859. She has published 'Memorials of Rev. J. B. Bittinger' (1891); 'History of the Forney Family of Hanover, Pennsylvania' (1893); and 'The Germans in Colonial Times,' (1901), a work of much value.

Bitu'men, a general term, perhaps first used by Pliny, and including various native hydrocarbons, such as petroleum, asphaltum, elaterite, and grahamite. The bitumens are probably all of vegetable origin, and while not confined to any particular geological formation, they occur most abundantly at or near the earth's surface, often in connection with rocks containing organic remains.

Bit'umen Process, the first known method of fixing the image of the camera, so as to make it permanent. The blackening action of light upon salts of silver was known in the 18th century, but no method was known for fixing the image obtained with salts of silver until about 1838. The bitumen process was perfected in 1827 by a Frenchman, Nicephore de Nièpce. He coated plates of metal with a solution of asphaltum in oil of lavender, and then, after drying them, he exposed them for a pro-

digious length of time in a camera. A very faint image was the result. The plate was subsequently immersed in a developer consisting of one part of oil of lavender and 10 parts of petroleum, which slowly dissolved the parts unaffected by light, leaving a permanent picture formed of those parts of the asphaltum that the light had rendered insoluble. Subsequently Daguerre became associated with Niépce, and together they improved the bitumen process until Daguerre said that "the time required to procure a photographic copy of a landscape is from seven to eight hours; but single monuments, when strongly lighted by the sun, or which are themselves very bright, can be taken in about three hours." See CAMERA; PHOTOGRAPHY.

Bitu'minous Coal. See COAL.

Bituminous Limestone, a limestone impregnated with asphaltum or mineral pitch. Petroleum grades insensibly into maltha, and this in turn into asphalt or solid bitumen. The term bituminous limestone is therefore applied to almost any limestone carrying hydrocarbon compounds having an asphaltic base, as distinguished from the paraffine base of many petroleums. Bituminous limestone is found at many localities in the United States, particularly in Indian Territory, California, and Arkansas. Its chief commercial use is as a paving material, but it also serves as a source of asphaltic products.

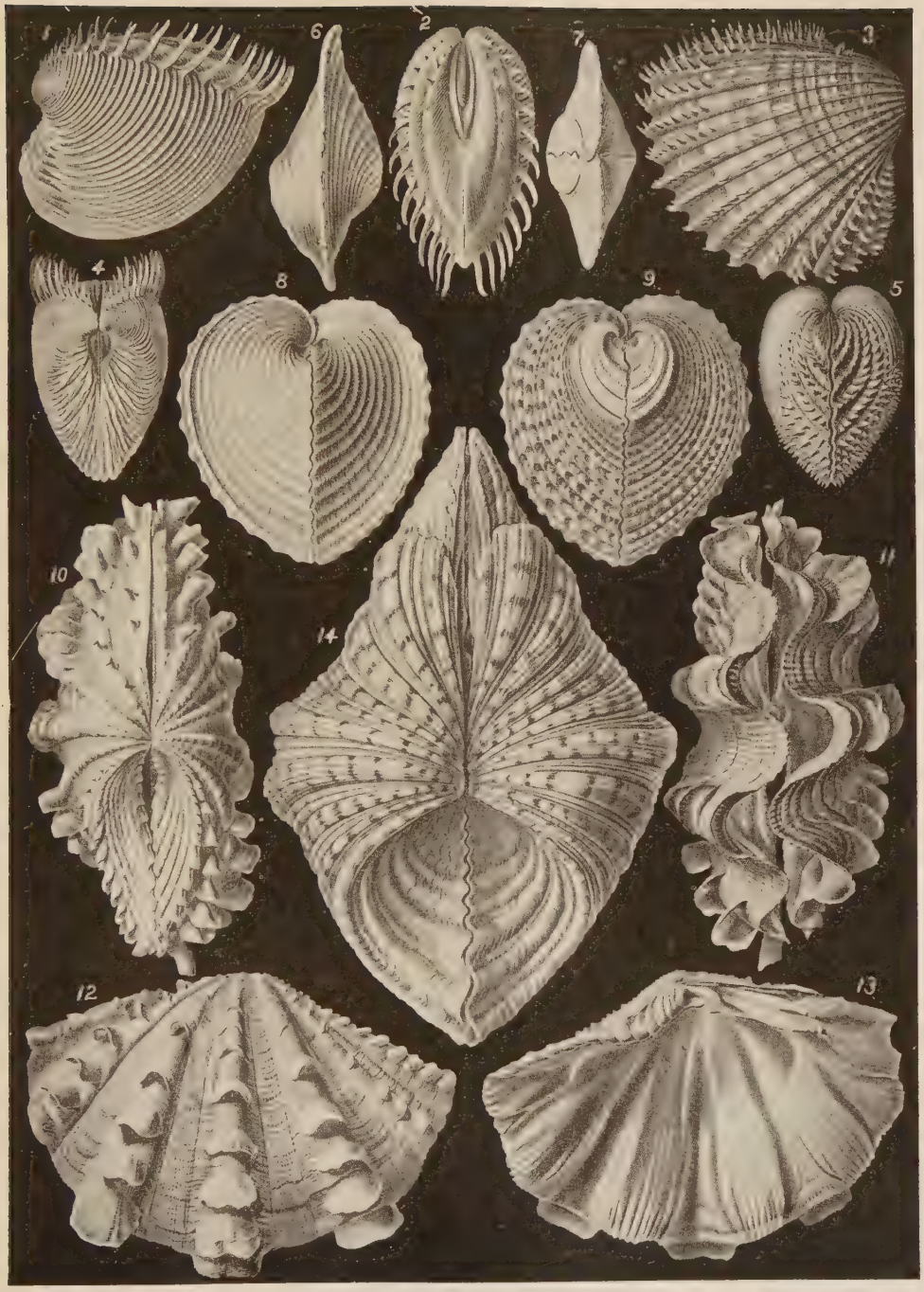
Bivalves, those mollusks of the class *Pelecypoda* (q.v.) whose coverings consist of two concave shell plates or valves.

Bivalves, (for example, the clam) are entirely protected by the valves, which are connected by a hinge, consisting of a large tooth or teeth (usually three), and a ligament. In the clam both valves are alike, in the scallop the hinge margin is eared, and the shell is marked with radiating ridges, while in most bivalves there are simple lines of growth. On the interior, which is usually lined with mother-of-pearl, are either one (in oysters and scallops) or two (clams, etc.) roundish muscular impressions made by the single or the two adductor muscles by which the valves are closed. The shell is often covered by an epidermis. The hinge is situated directly over the heart, and is therefore dorsal or "hæmal." The shell is secreted by the thickened edge of the mantle or body-walls. There is in bivalves in distinction from snails (*Gastropoda*) no head, and the mouth is not armed with teeth or a lingual ribbon, present in snails. The mouth is small with soft lips, and in each side is a pair of labial palpi. The short œsophagus opens into a small stomach which receives the contents of the liver. The long intestine is coiled in the visceral mass, the solid disk-like portion of the body in the clam and oyster; the intestine also passes through the ventricle of the heart, and then ends opposite the upper division of the siphon. This heart is three-chambered, consisting of a ventricle and two auricles. The siphon forms the so-called head of the clam, though it is situated at the posterior end of the body; it forms a double tube, ending in an excurrent and incurrent orifice surrounded by a circle of tentacles which are sensitive to the touch. The siphon is very long in the clam (*Mya*) and other bivalves which burrow in the sand or mud and live in deep holes. Locomotion is effected by the so-called "foot," which is a wedge-shaped or hatchet-shaped fleshy tongue-like mass situated at the front end under the mouth. Its hatchet-shape gives the name *Pelecypoda* to the class. This foot is enormous in the razor-fish, which burrows with extreme rapidity in the sand. In fixed bivalves, such as the oyster and mussel, the foot and siphon are reduced by atrophy or are entirely wanting. There being no head, there are usually no eyes, except in the scallops, where they are numerous, large, and situated on the thickened edge of the mantle. Bivalves breathe by one pair, more usually two pairs, of leaf-like gills; situated on each side of the visceral mass. The individuals are bisexual, each being male or female. The nervous system consists of three pairs of ganglia, connected by a nerve-thread. The supraœsophageal ganglion is the so-called "brain," being situated over the mouth; the pedal ganglion is in the centre of the foot, while the visceral ganglion is near the middle of the body. Most bivalves possess an organ of hearing or of equilibration, a very minute otocyst situated in the centre of the foot, and connected by a nerve with the pedal ganglion. The ovaries are yellowish, voluminous glands forming the larger part of the visceral mass. These mollusks are very prolific, the oyster laying about 2,000,000 eggs.

In the oyster (*Ostrea*) or in *Anomia* the shell is inequilateral, one valve, usually the left and lower one, being fixed to some object, and the intestine does not pass through the ventricle; in *Arca* the ventricle is double. In *Lucina* and *Corbis* there is but one gill on each side, and in *Pecten, Spondylus,* and *Trigonia* the gills are reduced to comb-like processes. Contrary to the habits of most bivalves, the scallop can skip over the surface of the water by violently opening and shutting its shell. *Trigonia* is also capable of leaping a short distance, while *Lima* is an active flyer or leaper. The American oyster is dicœcious, while most mollusks are monœcious or hermaphroditic. The foot varies much in form; in the mussel, *Pinna, Cyclocardia,* and the pearl-oyster it is finger-shaped and grooved, with a gland for secreting a bundle of threads, the *byssus,* by means of which it is anchored to the bottom. The foot in the quohog, *Neulinia* and *Clidiophora,* is large, these mollusks being very active in their movements. In *Glycimeris* the fringe is toothless, much as in the oyster. In *Mactra* the middle tooth of the hinge is large, the corresponding cavity large and triangular. In *Saxicava* and *Panopæa,* the pallial line is represented by a row of dots. In *Macoma* the siphons are very long.

Lithodomus, the date-shell, one of the mussels, bores into corals, oyster shells, etc.; the common *Saxicava* excavates holes in mud and soft limestone, as does *Gastrochæna, Pholas,* and *Petricola.* Certain boring lamellibranchs, such as *Pholas,* are luminous.

A very aberrant form of bivalve mollusk is *Clavagella,* in which the shell is oblong, with flat valves, the left cemented to the sides of a deep burrow. The tube is cylindrical, fringed above, and ending below in a disk, with a minute central fissure, and bordered with branching tubules. In *Aspergillum,* the watering-pot shell, the small bivalve shell is cemented to the lower end of a long shelly tube, closed below by a perforated disk like the nose of a watering-pot.



BIVALVE MOLLUSCA.

[1-3] Cytheria dione. [4, 5] Cardium aculeatum. [6-9] Hemicardium cardissa. [10-13] Tridacua squamosa. [14] Hippopus maculatus.

Bivalves, in growing, pass through a pre-swimming larval stage called a "trochosphere," resembling a top, and moved by a circlet or zone of cilia. After a while two flaps (*vela*) arise on each side of the mouth, forming the *vegliger* stage; meanwhile the shells arise, and as they become larger and heavier, the young bivalve sinks to the bottom, and begins to use its "foot" for burrowing.

Some bivalves arrive at maturity in a single year. The fresh-water mussels live from 10 to 12 years, while the giant clam (*Tridacna gigantea*) probably lives from sixty years to a century.

The bivalves began to appear in the Cambrian Period; they became more frequent in the Ordovician and Silurian, but they did not abound until toward the Mesozoic Age, since the seas during the Palæozoic Age were crowded with brachipods (q.v.). Oysters date from the beginning of the Mesozoic. The genus *Mucula* and its allies are very primitive forms, and nearly allied to the earliest known bivalves. Of about 15,000 known species of bivalves, two thirds (10,000) are fossil.

The class *Pelecypoda* (or *Lamellibranchiata*) is divided by the gill characters (see Parker and Haswell's Zoology) into five orders, namely: (1) *Protobranchia,* (2) *Filibranchia,* (3) *Pseudo-lamellibranchia,* (4) *Eulamellibranchia,* (5) *Septibranchia;* and by Dall, from the hinge-characters, into three ordinal groups: *Prionodesmăcea, Anomalodesmacea,* and *Teleodesmacea.* In Neumayr's group *Palæoconcha,* now forming a part of the *Prionodesmacea,* are included certain primitive types which appear to have given origin to certain more modern groups. For further information and the literature of the subject see MOLLUSCA.

Bixby, James Thompson, American author and clergyman: b. Barre, Mass., 30 July 1843. He graduated at Harvard in 1864, and became a Unitarian minister. He has published: 'Similarities of Physical and Religious Knowledge' (1876); 'The Crisis in Morals' (1891); 'Religion and Science as Allies' (1895); 'Ethics of Evolution' (1900); 'The New World and the New Thought' (1902).

Bizet, Alexander Cesar Leopold, be-zā, a-lĕks-ändr sā-zär lā-ō-pŏld (better known as GEORGE BIZET), French composer: b. Paris, 25 Oct. 1838; d. there, 3 June 1875. He studied with Halévy, whose daughter he married, and at the Paris Conservatory. His operas include: 'The Pearl Fishers' (1863); 'The Fair Maid of Perth' (1867); 'Djamileh' (1872); and 'Carmen' (1875), his most famous composition, which retains all its early popularity and is founded on Mérimée's novel of that name.

Bjerregaard, byĕr-re-gärd, **Carl Henry Andrew,** Danish-American writer: b. Fredricia, Denmark, 24 May 1845. He served five years in the Danish army, and came to America in 1873. He has been librarian of the Astor Library, New York, from 1879, and has written: 'Mysticism and Nature Worship'; 'Being and the Philosophical History of the Subject.'

Björnson, Björnstjerne, byĕrn'sŏn, byĕrn'-sher-ng, Norwegian novelist, poet, and dramatist: b. Kvikne, 8 Dec. 1832. He entered the University of Christiania in 1852, and he speedily became known as a contributor of articles and stories to newspapers and as a dramatic critic. From 1857 to 1859 he was manager of the Bergen theatre, producing during that time his novel, 'Arne' (1858), and his tragedy of 'Halte Hulda.' He was at Christiania part editor of the *Aftenblad* in 1860, then lived several years abroad, and in 1866 became editor of the 'Norsk Folkeblad.' In 1869–72 he was co-director of a Copenhagen periodical, and much of his later life has been passed abroad. The democratic tendencies to be found in his novels have found a practical outcome in the active part taken by him in political questions bearing upon the Norwegian peasantry and popular representation. He has been for a long period the leader of the Norwegian republicans, and the national entity symbolized by the change made in the Norwegian flag on 1 Jan. 1901 is more nearly due to him than to any one else. He is the greatest distinctively Norwegian writer of his day, and his popularity among his countrymen is very great. In 1880–1 he traveled and lectured in the United States. His dramas include: 'Sigurd Jorsalfar' (1872); 'Mary Stuart in Scotland' (1864); 'The Newly Wedded Pair' (1866); 'Sigurd Slembe' (1872); 'The Editor' (1874); 'A Bankruptcy' (1875); 'The King' (1877); 'Leonarda' (1879); 'The New System' (1879); 'A Glove' (1883); 'Beyond Our Strength' (1883); 'Geography and Love' (1885). His verse includes: 'Poems and Songs' (1870); 'Arnljot Gilline,' an epic (1870). Besides the pastoral tales: 'Arne' (1858); 'A Happy Boy' (1860); 'The Fisher Maiden' (1868); 'Synnœve Solbakken,' he has written the novels: 'The Bridal March' (1873); 'Magnhild' (1877); 'Captain Mansana' (1879); 'The Heritage of the Kurts' (1884); 'In God's Way' (1889); 'Absalom's Hair'; etc. See Boyesen, 'Essays on Scandinavian Literature' (1895); Gosse, 'An Essay on the Writings of Björnson' (1895); Brandes, 'Moderne Geister' (1897).

Bjornstjerna, byĕrn'shĕr-na, **Magnus Frederick Ferdinand,** mäg-noos frĕd'ĕr-ĭk fĕr'-de-nand (COUNT), Swedish statesman and author: b. Dresden, 10 Oct. 1779; d. Stockholm, 6 Oct. 1847. He was educated in Germany, and in 1793 proceeded to Sweden to enter the army. At the storming of Dessau he received a severe contusion from a cannon-ball, but he was able, notwithstanding, to be present at the battle of Leipsic. He afterward concluded the capitulation of Lübeck with Gen. Lallemand, and received the surrender of the fortress of Maestricht. He concluded with Prince Christian Frederick at Moss the convention which was followed by the union of Norway and Sweden. He published 'The British Rule in the East Indies' and 'Theogony, Philosophy, and Cosmogony of the Hindoos' (1843).

Blacas, Pierre Louis Jean Casimir, blä-ka, pe-ār loo-e zhŏn (DUC DE), French statesman: b. Aups, Var., 12 Jan. 1771; d. Kirchburg, Austria, 17 Nov. 1839. He was cabinet minister in the time of Louis XVIII., and a confidential adviser of the Bourbons; twice minister to Naples; ambassador to Rome to negotiate the *concordat* of 1817; went into exile upon the banishment of Charles X.; and offered the king his fortune, which was not accepted. He was so

faithful to the Bourbons as to be unpopular with the people. He was a large collector of antiquities and founded the Egyptian Museum at Paris.

Black, Adam, Scotch publisher: b. Edinburgh, 20 Feb. 1784; d. there, 24 Jan. 1874. In 1808 he began business as a bookseller, and later with his nephew, Charles B. Black, established a publishing house in Edinburgh. Their most famous publications were: 'Encyclopædia Britannica,' and the 'Waverly Novels.' Adam Black was twice lord provost of Edinburgh, and in 1856–65 represented that city in Parliament. He declined the honor of knighthood, and a statue was erected in Edinburgh in recognition of his public services in 1877.

Black, Alexander, American author: b. New York, 7 Feb. 1859. He has published 'The Story of Ohio' (1888); 'Photography Indoors and Out' (1894); 'Miss Jerry' (1895); 'A Capital Courtship' (1897); 'Miss America' (1898); 'Modern Daughters' (1899); 'The Girl and the Guardsman' (1900).

Black, Charles Clarke, American lawyer: b. Mount Holly, N. J., 29 July 1858. He studied law and was admitted to the New Jersey bar in 1881. He has since practised in Jersey City, and has published 'Proof and Pleadings in Accident Cases' (1886); 'New Jersey Law of Taxation' (1893); 'Law and Practice in Accident Cases' (1900).

Black, Frank Swett, American lawyer: b. Limington, Me., 8 March 1853. He graduated at Dartmouth College in 1875; was editor of the *Journal* in Johnstown, N. Y.; studied law at Troy in the office of Robertson & Foster, and was admitted to the bar in 1879. He won much popularity by his activity in prosecuting the men who murdered Robert Ross in the election riots in Troy in 1892. In 1895–7, he was a member of Congress, and in 1897–9 governor of New York.

Black, James, American prohibitionist: b. Lewisburg, Pa., 23 Sept. 1823; d. 16 Dec. 1893. He joined a temperance society at the age of 17, and throughout his life was a determined advocate of prohibition and legislation for its enforcement. He was the first to propose the formation of a temperance party, was one of the committee that called a national convention to organize the Prohibition party (q.v.) and was elected its president when the convention met in Chicago, 1 Sept. 1869. At the Columbus, Ohio, convention, 22 Feb. 1872, he was made the first nominee of the party for President of the United States. His ticket received 5,608 votes in the election of that year. He published: 'Is There a Necessity for a Prohibition Party?' (1876); 'History of the Prohibition Party' (1880); 'The Prohibition Party' (1885).

Black, Jeremiah Sullivan, American jurist and statesman: b. Glades, Somerset county, Pa., 10 Jan. 1810; d. York, Pa., 19 Aug. 1883. At 17 years of age he entered the law office of Chauncey Forward, in Somerset, an eminent member of the bar, and was admitted to the courts in 1830, being still in his minority. In April, 1842, he was appointed by the governor president judge of the judicial district in which he resided, and confirmed by the Senate upon a strict party vote. In 1851, when a change in the State Constitution made the judges elective, he was nominated as judge of the Supreme Court by the Democratic convention, before which he was not a candidate. Of the 10 candidates named by the two parties, he obtained the largest popular vote. Under the mode of drawing provided by the Constitution, a three years' term was assigned to him, and he became chief justice of the court. In 1854 he was re-elected to this place, by a majority of 47,000 votes, though the candidate for Governor on the same ticket was defeated by 37,000. On 5 March 1857, while engaged in the discharge of his judicial duties at Philadelphia, he received a telegraphic despatch from President Buchanan, tendering him the appointment of Attorney-General of the United States. He soon after appeared on behalf of the government, in a disputed land claim from California, involving an important principle upon which hundreds of similar cases depended. He achieved a great success, at once becoming famous as a jurist.

In December, 1860, Mr. Black succeeded Mr. Cass as Secretary of State. After the election of Lincoln, Judge Black retired to his law practice. In 1868, he was counsel for President Johnson in the famous impeachment trial. In 1877 he appeared as counsel for S. J. Tilden before the Electoral Commission. Besides a great jurist, Judge Black was a brilliant conversationalist, classical scholar, and powerful orator. His collected 'Essays and Speeches' were published in 1885.

Black, John Charles, American lawyer, soldier, and statesman: b. Lexington, Miss., 27 Jan. 1839. He entered the Union army in 1861 as colonel of the 37th Illinois Volunteers; was severely wounded in the service; and was brevetted brigadier-general. After the war he was elected Congressman-at-large from Illinois; was appointed commissioner of pensions by President Cleveland during the latter's first term, and United States attorney for the northern district of Illinois during his second term.

Black, Joseph, Scottish chemist: b. Bordeaux, France, 1728; d. Edinburgh, 6 Dec. 1799. He studied medicine, and in 1754 delivered a thesis, 'De Humore Acido a Cibis Orto et Magnesia Alba,' in which he ascribes the difference between the mild and caustic alkalies to the presence of fixed air (carbonic acid) in the former. The discovery of carbonic acid is of interest not only as having preceded the other gases made by Priestley, Cavendish, and others, but as having preceded in its method the explanation given by Lavoisier of the part played by oxygen in combustion. In 1756 he was appointed professor of medicine and lecturer on chemistry in the University at Glasgow; and in 1766 to the same chair in Edinburgh. No teacher inspired his disciples with such a zeal for study; his lectures, therefore, contributed much to make the taste for chemical science general in England. Upon Lavoisier's proposal, the Academy of Sciences in Paris appointed him one of its eight foreign members. Black did not adopt the Lavoisierian system until he was satisfied that it was more accurate than that of which he had been so long a teacher. In his later courses, however, he taught the anti-phlogistic system. His 'Lectures on Chemistry' appeared in 1803.

Black, William, Scottish novelist: b. Glasgow, 13 Nov. 1841; d. Brighton, England, 10 Dec. 1898. He first studied art, but eventually became connected with the Glasgow press. In 1864 he went to London, and in the following year joined the staff of the *Morning Star,* for which he was special correspondent during the Austro-Prussian war of 1866. His first novel, 'Love or Marriage' (1868), was only moderately successful, but his 'In Silk Attire' (1869), 'Kilmeny' (1870), 'The Monarch of Mincing Lane,' and especially 'A Daughter of Heth' (1871), gained him an increasingly wide circle of readers. For four or five years he was assistant editor of the *Daily News,* but in 1874 his connection with journalism practically ceased. His other works include: 'The Strange Adventures of a Phæton' (1872), containing descriptions of scenery much praised by Ruskin; 'A Princess of Thule' (1873); 'The Maid of Killeena' (1874); 'Three Feathers' (1875); 'Madcap Violet' (1876); 'Green Pastures and Piccadilly' (1877); 'Macleod of Dare' (1878); 'White Wings, a Yachting Romance' (1880); 'Sunrise' (1880); 'The Beautiful Wretch' (1881); 'Shandon Bells' (1883); 'Judith Shakespeare' (1884); 'White Heather' (1885); 'Sabina Zembra' (1887); 'The Strange Adventures of a House-Boat' (1888); 'In Far Lochaber' (1889); 'The New Prince Fortunatus' (1890); 'Wolfenberg' (1892); 'Highland Cousins' (1894); 'Briseis' (1896); and 'Wild Eelin' (1898) Black's novels have enjoyed much popularity especially in the United States. His subjects are drawn from many lands, but it is in dealing with the Scottish Highlands that he is at his best. He also wrote a 'Life of Goldsmith' for the English Men of Letters series. See Wemyss Reid, 'William Black, Novelist' (1902).

Black Acts. Acts of the Scottish Parliaments from 1424 to 1594, so called from their being printed in black-letter. The term "Black Act" is also applied to an act of George I. with reference to the "Blacks," a body of armed deer-stealers and poachers, who infested Epping Forest.

Black and Tan Terrier. See Terriers.

Black Art, the art or pretended art or practice of producing wonderful effects by the aid of superhuman beings or of departed spirits or the occult powers of nature. The reason why it was called black was that proficients in it were supposed to be in league with the powers of darkness. A large proportion of magical rites are connected with the religious beliefs of those using them, their efficacy being ascribed to supernatural beings. There is, however, a non-spiritual element in magic which depends on certain imagined powers and correspondences in nature, that can be utilized in various ways. In savage countries the native magician is often sorcerer and priest, and sometimes chief of the tribe. Among the ancient Egyptians magic was worked into an elaborate system and ritual, and it was regularly practised among the Babylonians and Assyrians, as well as in Greece and Rome. Alexandria, from the 2d to the 4th century, became the headquarters of theurgic magic, in which invocations, sacrifices, diagrams, talismans, etc., were systematically employed. This system, influenced by Jewish magical speculation, had a strong hold in mediæval Europe, and many distinguished names are found among its students and professors. The magic which still holds a place among the illiterate and ignorant classes has come down by tradition in popular folk-lore. The name natural magic has been given to the art of applying natural causes to produce surprising effects. It includes the art of performing tricks and exhibiting illusions by means of apparatus, the performances of automaton figures, etc. See Alchemy; Astrology; Charm; Divination; Legerdemain; Witchcraft.

Black Ash, a mixture of 25 per cent of caustic soda with calcium sulphide, quicklime, and unburnt coal, obtained in the process of making sodium carbonate. The mixture of sodium sulphate, chalk, and powdered coal is fused in a furnace, gases escape, and the residue is the black ash, which is lixiviated with warm water, and the solution, evaporated to dryness, yields soda ash, an impure sodium carbonate. See Sodium.

Black Assize, a judicial sitting of the courts held at Oxford in 1577, and rendered historical by the pestilential and deadly fever which was introduced into the court from the jail, and swept away judges, jurymen, and counsel, and extended itself into the town and neighborhood. The superstitions of the age invested it with a special character, and it was remarked that no women nor poor people died of it.

Black Bass, Duck, etc. See Bass; Duck.

Black Beauty, His Grooms and Companions, a story by Anna Sewall. It is written in the form of a horse autobiography, and is really a tract on the proper treatment of horses. The story is told with simplicity and restraint, and its vogue has been great, and its influence very wide.

Black Beetle, the English name for a cockroach, especially the Oriental cockroach (q.v.); also less commonly for the dark-colored beetles of the bad-smelling genus *Blaps.*

Black-bellied Plover, or **Black-breast,** one of the largest of the American plovers (*Charadrius squatarola*), also known throughout the northern parts of the Old World, where it is known as "gray" or "Swiss" plover, and whence it goes in winter to all parts of the southern hemisphere. It breeds in the Arctic regions, and is known in the United States only in its spring and fall migrations which are carried along the coasts, so that the bird is rare throughout the interior. Great flocks sometimes visit England in autumn, spreading over cultivated fields, and remaining until the coming of frost. It is about 11.50 inches in length, and has a large round head, and large eyes, whence the gunner's names, "bullhead," "beetlehead," and "ox-eye." In general form it resembles the golden plover (q.v.), but has a distinct though small hind toe. The general aspect is gray, dusky on the back, with the throat, breast, and a large part of the abdomen black, and the tail barred with black; bill and feet black. It is a favorite object of sport, and the young migrants in autumn are delicious eating; but it is not as easily shot as most of the shore-birds. It breeds along the shores of the Arctic Ocean.

Black Belt, an agricultural region of Alabama; 70 miles wide, extending entirely across the State, between 33° and 31° 40′; so called from the fact that the negroes greatly predominate in numbers, raising vast quantities of cotton from the richest of lands. It includes 17 counties, with over 500,000 inhabitants.

Black-cap, the name of various birds having the crown of their head black. In the United States it is given most often to the common titmouse, the chickadee (q.v.); and to a small fly-catching warbler, *Sylvania pusilla,* an olive and yellow bird with the top of the head crested with black. In England the common "black-cap" (*Curruca atricapilla*) is a small warbler, closely related to the nightingale, and one of the sweetest of European song-birds, which is frequently kept in cages.

Black Cat, an American fur-bearing animal.

Black Cockade, a badge first worn by the American soldiers during the Revolution, and later, during the hostility toward France occasioned by the X. Y. Z. Correspondence (q.v.), adopted by the Federalists as a patriotic emblem and as a rejoinder to the tri-colored cockade worn by the Republicans as a mark of affection toward France.

Black Co'hosh. See CIMICIFUGA.

Black Death, The, one of the most memorable of the epidemics of the Middle Ages, was a great pestilence in the 14th century, which devastated Asia, Europe and Africa. It was an Oriental plague, marked by inflammatory boils and tumors of the glands, such as break out in no other febrile disease. On account of these boils, and from the black spots (indicative of putrid decomposition) which appeared upon the skin, it has been generally called the Black Death. The symptoms were many, though all were not found in every case. Tumors and abscesses were found on the arms and thighs of those affected, and smaller boils on all parts of the body; black spots broke out on all parts of the skin, either single, united, or confluent. Symptoms of cephalic affection were frequent; many patients became stupefied and fell into a deep sleep, losing also their speech from palsy of the tongue; others remained sleepless, without rest. The fauces and tongue were black, and as if suffused with blood. No beverage would assuage the burning thirst. The plague spread with the greater fury as it communicated from the sick to the healthy; contact with the clothes or other articles which had been used by the infected induced disease, and even the breath of the sick, who expectorated blood, caused contagion far and near. As it advanced, not only men but animals fell sick and expired. In England the plague first broke out in the county of Dorset, whence it advanced through the counties of Devon and Somerset to Bristol, and thence reached Gloucester, Oxford and London. Probably few places escaped, perhaps not any, for the annals of contemporaries report that throughout the land only a tenth part of the inhabitants remained alive. From England the contagion was carried by a ship to Norway, where the plague broke out in its most frightful form, with vomiting of blood, and throughout the whole country spared not one third. The sailors found no refuge on their ships, and vessels whose crews had perished to the last man were often seen drifting on shore. The whole period of time during which the Black Death raged with destructive violence in Europe was (with the exception of Russia, where it did not break out until 1351) from 1347 to 1350; from this latter date to 1383 there were various pestilences, bad enough, indeed, but not as violent as the Black Death. Ireland was much less heavily visited than England, and the disease seems scarcely to have reached the mountainous regions of that land; and Scotland, too, would perhaps have remained free from it had not the Scotch availed themselves of the discomfiture of the English to make an irruption into England, which terminated in the destruction of their army by the plague and the sword and the extension of the pestilence through those who escaped over the whole country. It may be assumed that Europe lost by the Black Death some 25,000,000 of people, or about one fourth of her entire population. That her nations could recover so quickly from this terrible loss without retrograding more than they did is a most convincing proof of the indestructibility of human society as a whole. In Hungary, and afterward in Germany, rose the brotherhood of the Flagellants, who undertook to expiate the sins of the people and avert the pestilence by self-imposed sufferings. While the wanderings of the Flagellants threw society into confusion, and helped to spread the plague, the horrors of the time were further heightened by the fearful persecutions to which the Jews were subjected, from a popular belief that the pestilence was owing to their poisoning the public wells. The people rose to exterminate the Hebrew race, of whom, in Mayence alone, 12,000 were cruelly murdered. They were killed by fire and by torture wherever they could be found, and for them to the terrors of the plague were added those of a populace everywhere infuriated against them. In some places the Jewish people immolated themselves in masses; in others, not a soul of them survived the assaults of their enemies. No adequate notion can be conveyed of these horrors. To aggravate the pestilence, the poison-panic made the people shut up their wells. With terror of poison and of plague in a state of society rude at the best, but now disorganized, what means were available to mitigate or prevent the sufferings of the people were rendered altogether nugatory.

Black Duck. See DUSKY DUCK.

Black Earth, a deposit in South Russia, extending over the steppes that border on the Black Sea, and the depressed area to the north of the Caspian, with a breadth from north to south of from 200 or 300 to nearly 700 miles. It varies in color from dark brown to black, and in thickness from a foot or two up to six or seven yards, occasionally reaching, it is said, even to 60 feet. It is composed chiefly of siliceous sand (about 70 per cent), alumina and other ingredients (23 per cent), and organic matter (about seven per cent). It appears to be unfossiliferous. It bears the same relation to the glacial accumulations of Russia that the loess of the Rhine, the Danube, etc., does to those of central Europe, and is probably the fine-grained silt derived from the torrents and flooded rivers that escaped from the melting snows and glaciers of the glacial period. According to some geologists, however, it may

owe its origin to the action of the wind. It is supposed by them to be simply an accumulation of wind-blown dust — the finely sifted material being fixed by the abundant grasses of those steppe regions.

Black-eyed Susan, the name of a once popular comedy by Douglas Jerrold. It appeared in 1829 and was founded on Gay's ballad 'Sweet William's Farewell to Black-Eyed Susan.'

Black Flags, an organization of Chinese rebels who established themselves in the Red River valley in Tonquin, after the suppression of the Taiping Rebellion in southern China (1850-4). From their warlike character and desperate deeds they were called Black Flags as distinguished from the peaceable Yellow Flags. They assisted the Tonquinese and Chinese in opposing the French wars (1873, 1882, and 1885), with signal results. Their principal object was plunder. They were responsible for the appalling massacre, in 1884, of French missionaries and native Christians, to the number of 10,000.

Black Fly, a species of the genus *Simulium,* the common black fly of northern New England, Canada, and Labrador probably being *S. molestum.* In this tormenter of travelers and fishermen the body is short and thick, the labrum is free, sharp as a dagger, and the proboscis is well developed and draws blood profusely. It is black, with a broad silvery ring on the legs. The species are numerous.

The cylindrical larva is furnished with short antennæ, and near the mouth are two flabelliform appendages. The pupa has eight very long lateral filaments on the front of the thorax, and the posterior end of the body is enclosed in a semi-oval membranous cocoon, open in front, and posteriorly attached to some submerged plant such as eel-grass. The fly leaves the pupa beneath the water. She deposits her eggs on the rocks in a compact layer a few inches above the surface of the water. The eggs of the Hungarian or "Columbacz midge" are enveloped in a yellowish-white slime and deposited at the end of May or early in June upon stones or grass over which water flows, or in the brooks of the more elevated regions. The number laid is variously estimated at from 500 to 5,000. The food of the larva of the buffalo-gnat has been proved to be carnivorous, and it is supposed that the larvæ of all the species live on animal matter, though possibly in some cases on dead leaves. On hatching the larvæ become attached to plants, etc., or to each other, by a silken thread, forming long floating strings. When the fly issues from the submerged pupa-case she rises to the surface, then being protected by a fine silky covering of hairs. The adult fly in central New York issues about the first of April, and those apparently of a new brood the first of June; after this there is a succession of generations throughout the season; the development of a single brood occupying about two months. The larva hibernates.

While the black fly of Maine, and presumably of Labrador, is of the species *S. molestum,* that of the St. Lawrence valley has been named *S. invenustum,* and is said to be different from that of Lake Superior. A remarkably large species is known as *S. pictipes;* its larvæ and pupæ were found in the rapids of the Au Sable River, and also similar ones on the north shore of Lake Superior.

The black fly is mostly active in the bright sun-light, mostly disappearing on cloudy days, but it is known to crawl under one's clothes and to bite in the night. The bite is often severe, the creature leaving a large clot of blood behind it. The best preventive is oil of tar, and the use of various ointments.

Black Forest (German, *Schwarzwald*), a chain of mountains in the grand-duchy of Baden and the kingdom of Würtemberg. It runs almost parallel with the Rhine, from south to north, often only from 15 to 20 miles distant; is about 85 miles long, and from east to west in the southern part about 30 miles wide; in the northern about 18. The Danube, as well as many other rivers, rises in these mountains. Those on the west side run into the Rhine; those on the east side into the Danube. The Black Forest is rather a chain of elevated plains than of isolated peaks. The highest summit, the Feldberg, measures 4,900 English feet. Except from June to September, these mountains are generally covered with snow, and even during this period are not entirely free from it. Among the many valleys of this chain, the Murgthal is particularly celebrated for its beautiful scenery. The whole chain consists of primitive mountains: its skeleton throughout is granite; its higher points are covered with sandstone, and other layers of less consequence. On the western side, at the foot, appears gneiss. Porphyry and clay-slate are found on several heights, as likewise silver, lead, copper, iron, cobalt, and other minerals. The forests are extensive, and consist mostly of pines and similar species. The raising of cattle is the principal branch of husbandry carried on in this district. The ground is not fertile, and the inhabitants scattered over the mountains live very frugally, and are very industrious. The vast quantity of timber growing here has long been a considerable source of revenue. The timber of the Black Forest was always highly prized by the Dutch, and the export to Holland is still largely carried on, the trees being conveyed down the Rhine in the form of rafts. Many saw-mills are kept at work cutting up the timber; and the forests also give employment to charcoal-burners, potash-boilers, etc. The manufacture of the well-known wooden clocks, toys, etc., is another important branch of industry, in which many persons are employed. Watches are also made, as well as orchestrions and other musical instruments. Neustadt, Friberg, Hornberg, and Furtwangen are central points of the manufacture of wooden wares, the commerce in which embraces all Europe, and extends to America and Australia.

Black Friars, friars of the Dominican order: so called from the color of their habit. See DOMINICANS; ORDERS, RELIGIOUS.

Black Friday, the name given in the United States to two days that ushered in financial panics. First, Friday, 24 Sept. 1869, when the attempt of Jay Gould and James Fisk, Jr., to create a corner in the gold market by buying all the gold in the banks of New York city, amounting to $15,000,000, culminated. For several days the value of gold had risen steadily, and the speculators aimed to carry it from 144 to 200. Friday the whole city was in a ferment,

the banks were rapidly selling, gold was at 162½, and still rising. Men became insane, and everywhere the wildest excitement raged, for it seemed probable that the business houses must be closed, from ignorance of the prices to be charged for their goods. But in the midst of the panic it was reported that Secretary Boutwell of the United States treasury had thrown $4,000,000 on the market, and at once gold fell, the excitement ceased, leaving Gould and Fisk the winners of $11,000,000. The second was 19 Sept. 1873, when numerous failures on the New York Stock Exchange precipitated the panic of 1873.

The term was first used in England, being applied in the first instance to the Friday on which the news reached London, 6 Dec. 1745, that the young pretender, Charles Edward, had arrived at Derby, creating a terrible panic; and finally to 11 May 1866, when the failure of Overend, Gurney & Company, London, the day before was followed by a widespread financial ruin. Good Friday is also known as Black Friday in some countries, because of the use of black vestments and draperies in the churches.

Black Gum, Sour Gum, or **Pepperidge.** See TUPELO.

Black Hawk, chief of the Sac Indians: b. Kaskaskia, Ill., 1767; d. near Fort Des Moines, 3 Oct. 1838. He was made chief of the Sacs in 1788; and in 1804 repudiated the first agreement made by the Sacs and Foxes with the United States to give up their lands east of the Mississippi. The possession of the territory was disputed for a number of years; in 1823 the majority of the two tribes moved across the river, and a treaty with the United States, ceding the disputed territory, was signed in 1830. Black Hawk, however, objected to the whites occupying the vacated territory, and in June 1831, he began the Black Hawk war by crossing the Mississippi with a small force and attacking some Illinois villages. Driven off by the militia under Gen. Gaines, he returned in the spring of 1832 with a larger force and began to massacre the white settlers. The Indians were however defeated by United States troops in two battles near the Wisconsin River, 21 July 1832, and near the Bad-Axe River, 1–2 Aug. 1832. The war was brought to an end by the surrender of Black Hawk in the latter part of August. He was kept a prisoner till 1833, then rejoined his tribe on their reservation, near Fort Des Moines.

Bibliography.— Drake, 'Life of Black Hawk'; Patterson, 'Life of Black Hawk'; Snelling, 'Life of Black Hawk'; Thwaite, 'Story of the Black Hawk War' (Wisconsin Historical Society 'Papers' Vol. XII.).

Black-Hawk War. See BLACK HAWK.

Black Hills, a region in South Dakota, extending into Wyoming. It was purchased from the Indians in 1876, for whom it had been one of the finest hunting grounds in the West. In 1877–8 thousands of miners went there, and in 1880 there had already sprung into existence three towns, Deadwood, Central City, and Leadville. Around these lay also groups of smaller towns and villages. From 1880 the gold mines yielded about $4,000,000 annually, and the silver mines about $3,000,000 annually. The region is also rich in copper, lead, iron and mica. The soil is fertile and the hills have abundant facilities for the grazing of cattle. Thrifty farmers have settled there, and many of them have good farms and fine improvements. Good schoolhouses have also been built in different settlements. See SOUTH DAKOTA.

Black Hole of Calcutta, a small chamber, 20 feet square, in Fort William, Calcutta. On the capture of Calcutta by Surajah Dowlah, 20 June, 1756, the English garrison, consisting of 146 men, under the command of Mr. Holwell, were locked up for the night in the common dungeon of the fortress, a strongly barred room, 18 feet square, and never intended for the confinement of more than two or three men at a time. There were only two windows, and a projecting veranda outside and thick iron bars within materially impeded what little ventilation there might be, while conflagrations raging in different parts of the fort gave the atmosphere an unusual oppressiveness. The unhappy creatures, exhausted with previous fatigue, were packed so tightly in their prison that it was with difficulty the door could be closed. A few moments sufficed to throw them into a profuse perspiration, the natural consequence of which was a raging thirst. One of the soldiers stationed in the veranda was offered 1,000 rupees to have them removed to a larger room. He went away, but returned saying it was impossible. The bribe was then doubled, and he made a second attempt with a like result; the nabob was asleep, and no one dared wake him. By nine o'clock several had died, and many more were delirious. A frantic cry for water now became general, and one of the guards, more compassionate than his fellows, caused some to be brought to the bars, where Mr. Holwell and two or three others received it in their hats, and passed it on to the men behind. In their impatience to secure it nearly all was spilt, and the little they drank seemed only to increase their thirst. Self-control was soon lost; those in remote parts of the room struggled to reach the window, and a fearful tumult ensued, in which the weakest were trampled or pressed to death. They raved, fought, prayed, blasphemed, and many then fell exhausted on the floor, where suffocation put an end to their torments. About 11 o'clock the prisoners began to drop off fast. At length, at six in the morning, Surajah Dowlah awoke, and ordered the door to be opened. Of the 146 only 23, including Mr. Holwell (from whose narrative, published in the 'Annual Register' for 1758, the account of this event is partly derived), remained alive, and they were either stupefied or raving. Fresh air soon revived them, and the commander was then taken before the nabob, who expressed no regret for what had occurred, and gave no other sign of sympathy than ordering the Englishman a chair and a glass of water. Notwithstanding this indifference, Mr. Holwell and some others acquit him of any intention of causing the catastrophe, and ascribe it to the malice of certain inferior officers, but many think this opinion unfounded. Holwell and three others were sent prisoners to Muxadavad; the rest of the survivors obtained their liberty, and the dead bodies were carelessly thrown into a ditch. The Black Hole is now used as a warehouse, and an obelisk, 50 feet high, was erected in memory of the victims.

Black Jack. 1. A term loosely applied by miners to blende, the sulphuret of zinc, or to any other ore which resembles it in being obnoxious to them, if in no other respect.

2. One of several small oak trees of the southeastern coast, especially *Quercus Marylandica,* which has a rough, dark, scaly bark, and peculiar broadly wedge-shaped 3–5 lobed leaves, dark green and lustrous above, and somewhat rusty beneath.

Black Knight, The, a name given by romantic writers to various heroic characters. In Scott's 'Ivanhoe' Richard Cœur de Lion masquerades as the Black Knight. The Knight Esplandian, son of Amadis of Gaul and Oriana, is also so called. In the Arthurian legend the Black Knight, Sir Peread, was one of the four brothers who kept the passage of Castle Dangerous.

Black Law, in the United States the name given to certain laws in force before the Civil War in many of the northern and border States discriminating against free negroes who might become citizens. Such laws excluded negroes from the public schools and from the militia, forbade them to testify in court against a white man, or in any case in which a white man was interested.

Black Lead. See GRAPHITE.

Black Letter, that variety of type otherwise designated Gothic, and which in a modified form is the ordinary type made use of in Germany, although in recent years there has been a tendency to employ the Roman letter, the Gothic type being considered injurious to the eyes. The earliest printed books were in black letter. See PRINTING.

Black Lilly. See FRITILLARY.

Black List, a list of bankrupts or other persons whose names are officially known as failing to meet pecuniary engagements. The term is also applied to a list of employees who have been discharged by a firm or corporation and against whom some objection is made and reported to other firms or corporations to prevent them obtaining employment. Blacklisting is made a punishable offense by the laws of some States. See Eddy, 'Laws of Combinations' (1901).

Black Monday. (1) A name for Easter Monday, in remembrance of the dreadful experiences of the army of Edward III., before Paris, on Easter Monday 14 April 1360. Many soldiers and horses perished from the extreme cold. (2) The 27th of February, 1865, a memorable day in Melbourne, Australia, when a destructive sirocco prevailed in the surrounding country.

Black Mountains, the culminating group of the Appalachian system, named from the dark growth of balsam-firs and other evergreens which cover their summits. Their position is in Yancey and Buncombe counties, North Carolina, between the main central ridges on the west and a portion of the Blue Ridge on the east. Unlike the other ridges of the Alleghanies, they lie for the most part transverse to the general trend of the range, and give this direction to the great valleys and rivers included between them. They rise from a district of great elevation, the height of the valley at Asheville, on the French Broad River, being about 2,000 feet above the sea, and that of Toe River, at Burnsville, Yancey County, about 2,500 feet. From this plateau the drainage is toward the Ohio in a northerly direction by the branches of the Great Kanawha, by those of the Holston and the French Broad toward the southwest, and by those of the Yadkin and the Catawba into the Pedee and Santee toward the southeast. This position at the sources of streams flowing in such diverse directions, long since pointed out this district as probably the most elevated east of the Rocky Mountains. The chief peaks are Mitchell, 6,710, and Clingman's Peak, Guyot's Peak, or Balsam Cone, Sandoz Knob, Hairy Bear, Cat Tail Peak, Gibbe's Peak, Sugar Loaf, or Hallback Peak, Potato Top, Black Knob, Bowler's Pyramid, Roan Mountain, all of which are above 6,500 feet in height.

Black Prince (EDWARD, PRINCE OF WALES), the son of Edward III. of England. He is thus styled in history by reason of the color of his armor. He died in 1376 and his son became king in 1377 as Richard II.

Black-quarter, an apoplectic disease which attacks cattle, indicated by lameness of the forefoot, one of the limbs swelling, and after death being suffused with black blood, which also is found throughout the body. The disease, which chiefly attacks young cattle, is due to undrained fertile pasture, or to the too rapid transference of the cattle from poorer to richer soils. It is difficult to cure, but may be prevented by thorough draining or by giving regular doses of nitre to all the animals. The usual treatment consists in blood-letting, cutting into the swollen parts, and administering first nitre and afterward ammonium acetate and purgatives. In the United States the disease is especially prevalent in Texas, Kansas, Nebraska, South Dakota, and Colorado.

Black Republic, a name applied to the Republic of Haiti, which is under the dominion of the African race.

Black Republicans, a name applied to those members of the Republican party, who resisted the introduction of slavery into any State where it was not already recognized.

Black River, the name of several American rivers. (1) A river which rises in New York in Herkimer County, and after passing through Oneida and Lewis counties, changes its course at a place called Great Bend, passes by Watertown, and flows through Black River Bay into Lake Ontario. Near Turin, in Lewis County, it has a fall of about 63 feet. Below the fall, it is navigable to Carthage, a distance of 40 miles. The whole length of the river is 125 miles, and its breadth at Watertown (six miles from its mouth) is 60 yards. (2) A river of Missouri and Arkansas, also known as the Big Black River, the largest affluent of White River. It rises in the southeastern part of the former State, takes a southerly course, enters Arkansas, and joins the White River 40 miles below Batesville. During nine months of the year it is navigable for a distance of 100 miles from its mouth. Its entire length is about 400 miles. Trout and other excellent fish are caught in its waters in great abundance. (3) A river of Wisconsin. It rises in Marathon County and enters the Mississippi 15 miles above La Crosse, after a course of 225 miles. (4) A river of Vermont which rises in the town of Plymouth and

is a tributary of the Connecticut. Its abundant water power is utilized by various manufactories along its course. (5) A portion of the Washita River in Louisiana between the mouth of the Tensaw River and the Red River; also sometimes styled Black River.

Black River Falls, Wis., a city and the county-seat of Jackson County, 171 miles north of Milwaukee. A fine water power is afforded by the falls of the Black River, and there are flour and lumber mills, wagon and other factories, foundaries, machine shops, and nurseries. There are iron mines in the neighborhood, and kaolin deposits from which fire-brick are manufactured. Pop. (1900) 1,938.

Black Rock Desert, a tract of nearly 1,000 square miles, north of Pyramid Lake, in Nevada. In summer it is a barren level of alkali and in winter covered in places with shallow water. Called also "Mud Lakes."

Black Rod, Usher of the, an officer of the House of Lords, appointed by letters patent from the Crown, and employed to execute orders for the commitment of parties guilty of breach of privilege and contempt, to assist at the introduction of peers and other ceremonies; and to summon the Commons to attend in the House of Lords when the royal assent is given to bills. His proper title is gentleman-usher of the black rod; that of his deputy, yeoman-usher.

Black Rood of Scotland, a cross of gold in the form of a casket, alleged to contain a piece of the true Cross. It was brought to Scotland in the 11th century by Margaret, queen of Malcolm III.; was bequeathed as an heirloom, and regarded as a sacred relic. It was delivered to Edward I. in 1291, but restored to Scotland after the Peace of Northampton in 1328. It was finally taken in battle by the English in 1346, and hung in the Cathedral of Durham until the Reformation, when it disappeared.

Black Saturday, 4 Aug. 1621; so called in Scotland because a violent storm occurred at the very moment the parliament was sitting to enforce episcopacy on the people. The name has also been applied to 10 Sept. 1547 on which date the disastrous battle of Pinkie was fought.

Black Sea (Lat. *Pontus Euxinus*), a sea situated between Europe and Asia, and bounded on the west by Turkey, Bulgaria, and Rumania, northwest, north and east by the Russian dominions, and on the south by Anatolia (Asia Minor), being connected with the Mediterranean by the Bosporus, and with the Sea of Azov by the Strait of Yenikale. The area of the Black Sea and the Sea of Azov amounts to 168,500 square miles. The water is not so clear as that of the Mediterranean, and, on account of the many large rivers which fall into it,—the Danube, Dniester, Dnieper, Don, Kuban, etc.,—being less salt, freezes more readily. The tempests on this sea are sometimes tremendous in winter, as the land which confines its agitated waters gives to them a kind of whirling motion; but being practically clear of islands and rocks its navigation is not difficult on the whole. In 1854 one of its tremendous storms occasioned a very serious loss to the shipping of the allied British and French. The fisheries in the Sea of Azov and the Black Sea are not unimportant, various kinds of valuable fish both large and small being taken; among others, several species of sturgeon. Caviare is made on the coast, as well as fish-glue, fish-oil, and, from the spawn of the sea mullet, botargo. The chief ports are Odessa, Kherson, Nicolaiev, Sebastopol, Novorossisk, Batoum, Trebizond, Samsun, Sinope, and Varna. It contains no islands of any note. After the capture of Constantinople (1453) the Turks excluded all but their own ships from the Black Sea till 1774, when the Russians obtained the right to trade in it, the same right being accorded to Austria in 1784, and to Britain and France in 1802. The preponderance thereafter gained by Russia was one of the causes of the Crimean war, by which she was compelled to cease keeping armed vessels on it, the sea being declared neutral by the Treaty of Paris in 1856. In 1871, however, the sea was deneutralized by a conference of the European powers (France being unrepresented) at London in response to a protest from Russia.

Black Tin, tin ore when dressed, stamped, and washed ready for smelting, forming a black powder. See TIN.

Black-vomit, a form of vomiting occurring usually in severe cases of yellow fever, due to the presence of blood in the stomach. See YELLOW FEVER.

Black Wad, an ore of manganese, used in making chlorine gas and as a drying ingredient in paints. It is an earthy variety of the dioxide found in low-lying districts, and is often mixed with oxides of cobalt or copper.

Black Walnut. See WALNUT.

Black Warrior, an American merchant vessel, seized and confiscated by Cuban customs officers in May 1854. This seizure was used as an excuse for proposed filibustering expeditions against Cuba. Spain, however, made compensation for the seizure.

Black Warrior, a river of Alabama, formed by the confluence of the Locust and Mulberry forks. It flows into the Tombigbee near Demopolis, after a course of 300 miles, and is navigable in its lower course to Tuscaloosa.

Black Watch, The, a famous British regiment, originating as a body of Highlanders, raised about 1668, for the purpose of keeping the peace in the Highlands, and so named from their dark dress. They were embodied in the regular army under the title of the 42d regiment in 1739. It first distinguished itself in the battle of Fontenoy (1745). From 1750 till 1767 the regiment was in America, and on its return it received the title of Royal Highlanders. It again served in America during the War of Independence; and in 1801 it particularly distinguished itself in Egypt at the battle of Alexandria. The Black Watch was also present at Napoleon's final defeat in the battle of Waterloo. It has gained special mention for its conduct at the Alma, in the Ashantee war, and at Tel-el-Kebir. The regiment was practically annihilated in the Boer war in 1901. Few English regiments surpass them for number of engagements or battle honors.

Black Water State, a popular nickname for Nebraska.

Blackadder, John, Scottish preacher: b. 1615; d. December 1685. He entered the Presbyterian ministry and when, in 1662, the episcopal

WHITE BLACKBERRY, "ICEBERG."

form of church government was forced upon a people who were generally repugnant to it, Blackadder, so far from complying with the new system, employed himself for several successive Sundays in exposing what he considered its unlawfulness, and, in his own words, entered his «dissent in heaven» against it. He was obliged to demit his charge in favor of an Episcopal incumbent, and in 1670, having performed worship at a conventicle near Dunfermline, where the people had armed themselves for self-defense, he was summoned before the privy council, but contrived to elude their power. On one occasion he preached at Kinkell, near St. Andrews; the people flocked from the metropolitan city to hear him, notwithstanding all the injunctions and surveillance of Archbishop Sharpe. It is said, that on Sharpe desiring the provost to send out the militia to disperse the congregation, he was informed that it was impossible — the militia had gone already as worshippers. After spending several months in Holland, in 1680 he returned to Scotland, and in the succeeding year was apprehended, and confined in the state prison upon the Bass Rock, where he died. See Crichton, 'Life of Blackadder' (1823).

Blackberry, various species of Rubus (q.v.), in which the drupelets adhere to the receptacle after ripening. Two general types are common: the trailing or dewberry (q.v.), and the upright, which is more generally known as the blackberry. The leading or representative species of this group is the very variable *R. nigrobaccus* (*R. villosus* of some botanists), which since 1841, when the first variety was introduced, has developed numerous varieties and has become in America, but not elsewhere, an important commercial fruit. It is used chiefly as a dessert fruit, but is also preserved, canned and evaporated. The plant thrives best on a northern slope and on rather heavy, loamy soils retentive of moisture but well drained. The soil must not be rich in nitrogenous food, since this tends to increase wood at the expense of fruitfulness. On light soils the plants are likely to suffer from lack of moisture in dry seasons. Potash fertilizers are required in abundance. Plants are usually propagated from root cuttings or suckers, and when one season old the smaller varieties are set in the field usually three by eight feet apart, the larger four by ten or else in checks six by six feet or more. When set in checks cultivation may be given both ways. For cultivation, diseases, etc., see RASPBERRY. In Europe the bramble (*R. fruticosus*) is called the blackberry. It is not extensively cultivated. Consult: Bailey and Miller, 'Cyclopædia of American Horticulture' (1900–2); Card, 'Bush Fruits' (1901).

Blackberry Lily (LEOPARD FLOWER) (*Belamcanda punctata*), a perennial herb, out of the two species of its genus of the natural order *Iridaceæ,* native of Japan and China and long cultivated as a garden plant for its orange, red-spotted flowers. Its popular names were suggested by the blackberry-like clusters of roundish seeds and the spotted flowers. The seed stalks are occasionally used for decoration with dried grass. The seeds may be sown in a sunny place where the soil is light and rich, and in after years the root-stocks may be divided.

Blackbird, the name given to two distinct species of birds: (1) The American grakles (q.v.) of the family *Icteridæ,* which consists of about a dozen species differing in size and color. (2) The English song-thrush or «merle.» Four species are known in the eastern States, namely: the purple grakle, and rusty grakle, the red-winged blackbird, and the cow-bird.

The most familiar American one is the crow-blackbird, more properly termed purple-grakle, because of the iridescent or metallic gloss on its plumage. This bird is found throughout the entire East, and as far west as Dakota. It is the largest variety, being 12 inches in length. In the spring flocks of these grakles are found among the advance guard of the returning hosts of the homeward-bound migrants, although many remain in the southern States throughout the entire winter season. Their nests, located along the edges of the swamps, are rude, strong structures of sticks and reeds, placed among the branches of bushes, in the tops of tall pine trees, or in holes of old tree-stumps. The eggs are remarkably varied in size, shape and color, some being pointed, others long and slender, while others are nearly globular, the length averaging about 1.25 by .90 of an inch. The color is any shade of dirty white, light-blue or green, and the markings consist of confused blotches, scratches, and straggling lines of various dark tints. A bird similar in its habits and mode of life to the purple-grakle is the rusty blackbird, lacking only the metallic hues, its plumage being rusty black. The marshes where they breed are great centres of blackbird population, and there they collect in great flocks of young and old as the end of the season approaches. At this time they visit any neighboring fields of Indian corn, sometimes in hordes, to tear open the husks, feed upon the milky kernels, and make themselves obnoxious to the farmers, although, indisputably, they are, on the whole, beneficial by their destruction of insects. The red-winged blackbird (*Agelæus phœniceus*), a variety of which is also found on the Pacific coast, varies in color from the bird of the eastern States, in the fact that it has on the wing a dark, blood-red patch, bordered with pure white, the other possessing only the scarlet patches on each shoulder, from which it takes its name. The nests of the red-winged blackbird are placed near the ground, among reeds or in small bushes and swamps. The eggs are smaller and lighter in color than those of the grakle, but resemble them in the scrawled markings. The French-Canadians call them «officer-birds.» The impression upon the beholder, as he gazes at the prodigious flocks of tens of thousands of these red-epauleted blackbirds, when gathered upon the marshes preparing for the fall migrations, and wheeling in regular lines as they fly, their epaulets glistening in the sun, is that of an army of soldiers. Besides these, there is found in the middle west the handsomest of the family, the yellow-headed blackbird (*Xanthocephalus xanthocephalus*), in which the whole head and throat are rich orange-yellow. The females of many species are strikingly contrasted in plumage to their mates, having only a streaked brown dress instead of glossy black and red or yellow of the males. The young resemble the females in their protected dullness of plumage. For the English Blackbird, see SONG THRUSH. For the cow-bird, see COW-BIRD.

The name is given to various other birds, prevailingly black in plumage, as, for example, to the bobolink (q.v.), which is called "skunk blackbird," because of the resemblance in its black and white markings to those of a skunk; and to the ani of Florida and the West Indies, which is commonly termed "savanna blackbird."

See Baird, Brewer and Ridgway, 'North American Birds' (Boston 1874); Ingersoll, 'Wild Life of Orchard and Field' (1902).

Blackbreast, a local name among American sportsmen for (1) the black-bellied plover (*Charadrius squatarola*); (2) the dunlin (*Tringa alpina*), also called "blackheart."

Blackbuck, the common small antelope (*Antilope cervicapra*), of the plains of India and Assam. This is the typical antelope, with horns from 16 to 20 inches long, rising in an elegant spiral from the top of the head. The body is blackish brown above, sharply contrasted with white on the under parts, and with a conspicuous white ring around each eye. These handsome little antelopes go about ordinarily in family parties, but sometimes gather in large herds, and are a favorite object of sport in India, where they are usually chased on horseback with greyhounds — sometimes also with the cheeta (q.v.), or by the aid of falcons. They are so swift that the best of dogs are required to catch them. They continue numerous because they are never hunted by the native Hindus, on account of religious prejudices. Consult: Baker, 'Wild Beasts and Their Ways,' and other writers upon the sport and natural history of India.

Blackburn, Henry, English journalist and art critic: b. Portsea, 15 Feb. 1830. He was educated at King's College, London. Beside contributions to newspapers and magazines, he has written 'Life in Algeria' (1864); 'Art in the Mountains: the Story of the Passion Play in Bavaria' (1870); 'Breton Folk' (1879); etc.

Blackburn, Joseph Clay Styles, American lawyer: b. Woodford County, Ky., 1 Oct. 1838; was graduated at Centre College, Danville, Ky., in 1857; admitted to the bar in 1859, and practised in Chicago. During the Civil War he served in the Confederate army, and after the war resumed practice in Kentucky. In 1871 he was elected to the Kentucky legislature, and in 1874 to Congress; and was a United States Senator in 1885–97 and again elected for the term 1901–7. During the presidential campaign of 1896 he was a leader in the free coinage silver movement.

Blackburn, Luke Pryor, American physician: b. Fayette County, Ky., 16 June 1816; d. 14 Sept. 1887; was graduated at Transylvania University, Lexington, Ky., in 1834, and began practising in that city. When cholera broke out in the town of Versailles he went there and gave his services free during the epidemic. In 1846 he went to Natchez, Miss., and in 1848, when yellow fever appeared in New Orleans, as health officer of Natchez, he originated the first quarantine against New Orleans that had ever been known in the Mississippi valley. During the Civil War he was a surgeon on the staff of Gen. Price. In 1875, when yellow fever broke out in Memphis, he hastened to the city and organized a corps of physicians and nurses, and in 1878 gave his services to the yellow fever sufferers at Hickman, Ky. He was elected governor of Kentucky in 1879. He founded the Blackburn Sanitarium for Nervous and Mental Diseases in 1884.

Blackburn, William Maxwell, American Presbyterian clergyman and educator: b. Carlisle, Ind., 31 Dec. 1828; d. 1900. He became president of the University of North Dakota in 1884 and of Pierre University, South Dakota, in 1885, and president-emeritus of the last (now Huron College) in 1898. He wrote 'St. Patrick and the Early Irish Church'; 'Admiral Coligny and the Rise of the Huguenots'; 'History of the Christian Church,' etc.; and the 'Uncle Alick' series of juvenile stories.

Blackburn, England, a municipal, parliamentary, and county borough in Lancashire, 21 miles north-northwest from Manchester. There is a free grammar school, founded by Queen Elizabeth in 1557; a free school for girls, founded by William Leyland in 1765; a technical school, and a free library. The town-hall, infirmary, exchange, municipal offices, county court, county police station, opera house, library and museum, and union workhouse are all modern and handsome buildings. There are two public parks, one beautifully situated on the declivity of Revidge Hill. The railways all converge, and pass through one large railway station belonging to the Lancashire & Y. Ry. Company. The corporation owns all the public utilities. Blackburn is one of the chief seats of the cotton manufacture, there being upward of 140 mills, as well as works for making cotton machinery and steam-engines. The cottons made in the town and vicinity have an annual value of about $25,000,000. Pop. (1901) 127,527.

Blackcock, or **Heathcock,** a large European grouse (*Tetrao tetrix*), so called because of the glossy black color of the cock. The female is grayish, mottled in darker colors, and is called "grayhen," or "heathhen." See Capercallie.

Blackfeet Indians, a tribe of Indians inhabiting the United States and Canada from the Yellowstone to Hudson Bay. They received this name from the fact that the first ones seen by white men wore leggings blackened by traveling over the burnt prairie. They call themselves "plainsmen." At the end of the first quarter of the 19th century they numbered nearly 50,000. In 1903, less than 6,000 remained, of whom nearly half were on the reservation in Montana.

Blackfin. See Bluefin.

Blackfish, any one of a variety of dark-colored fishes, both of America and Europe. For the American "blackfish," see Tautog; Sea-bass, and Minnow. The English "blackfish" is a kind of mackerel (*Centrolophus niger*), about two feet long. It occurs rather abundantly off the south coast of Europe, and is much esteemed as a food fish.

The name is also given to a small "killer" whale of the genus *Globiocephalus,* which goes about in herds that often enter harbors. They are sought by fishermen for the sake of a small amount of oil, resembling sperm-oil, to be obtained from their fat, and also for the sake of their beef-like flesh. The common blackfish of the Atlantic is *G. brachypterus,* and that of the

North Pacific *G. scammoni*. Sailors give the name "blackfish" to the "caaing," or "pilot" whale (q.v.), and to various other small cetaceans. Consult: Bullen, 'Cruise of the Cachalot'; Scammon, 'Marine Mammals of North America.' See also KILLER.

Blackguard, a term used in the 16th century for the lowest menials of a noble house, the scullions who cleaned pots and pans. It was also used of the hangers-on of an army, camp followers, then a rabble, and to vagabonds in general.

Blackhead, the name for several animals, characterized by the blackness of the head; especially in the United States: (1) the scaup duck; (2) a common minnow, the fathead (q.v.). The name is also applied to the accumulations of dirt found in the sebaceous follicles. See ACARUS.

Blackheath, England, an elevated heath in the county of Kent. It borders on Greenwich Park, and is about five miles from St. Paul's, London. It contains 267 acres, and is a place of popular resort, much used for cricket-playing. In 1831 Wat Tyler and John Ball mustered their followers here. Jack Cade occupied the same position twice in 1450. In 1497 the Cornish insurgents, under Lord Audley, were routed there by the king's forces. Blackheath has been the scene of many historical pageants and processions, as it was formerly the custom for the mayor and corporation of the city of London, and even the king and court, to repair thither to meet illustrious foreigners from the Continent. Henry IV. met there (1400) the Byzantine emperor, Michael Palæologus; the corporation of London there met Henry V., on his return from Agincourt, and the year afterward, the Emperor Sigismund. The most splendid, and one of the last of all, was the reception of Anne of Cleves, by Henry VIII., January 1541; she was conducted through Greenwich Park to the palace at Greenwich, followed by prodigious numbers of nobility and gentry, and 1,200 privileged citizens, clad in velvet and chains of gold.

Blackhorse, a fish, one of the suckers of the Mississippi valley (*Cycleptus elongatus*); also known as the Missouri or gourdseed sucker. It is about two feet long, with a small head, suggesting, in profile, that of a horse, and becomes almost jet-black in spring. See SUCKER.

Blackie, John Stuart, Scottish poet, litterateur, and professor: b. Glasgow, 1809; d. 2 March 1895. He was educated at the universities of Aberdeen and Edinburgh; subsequently went to Göttingen, Berlin, and Rome, where he continued his studies, which were chiefly connected with philology. In 1834 he published a translation of Goethe's 'Faust,' and the same year became an advocate at the Scottish bar; in 1841 he accepted the chair of humanity in Marischal College, Aberdeen. This position he held until, in 1852, he was appointed to the professorship of Greek in the University of Edinburgh, a chair which he resigned in 1882. By his unwearied efforts to preserve the Gaelic language, he succeeded in raising $60,000, with which sum a Celtic chair was endowed in Edinburgh University. Among his more important writings are: 'Lyric Poems'; 'Homer and the Iliad'; 'Musa Burschicosa'; 'Horæ Hellenicæ'; 'Self-culture'; 'Songs of Religion and Life'; 'Lays of the Highlands and Islands'; 'Lay Sermons'; 'Altavona'; 'Wisdom of Goethe'; 'Life of Burns'; 'Scottish Song'; and 'Song of Heroes.' His biography has been published (2 vols.) by Anna M. Stoddart.

Blacking, the article employed in blacking boots and shoes, usually contains for its principal ingredients oil, vinegar, ivory, or bone black, sugar or molasses, and strong sulphuric acid, though every manufacturer has his own recipe, and endeavors to turn it to best account by concealing its composition and puffing its merits. Blacking is used either liquid or in the form of a paste, but both are obtained from the same ingredients, the only difference being that in making the paste a portion of the liquid is withheld. A celebrated old English blacking consists of 18 ounces of caoutchouc dissolved in 9 pounds of hot rape-oil, 60 pounds ivory-black, 45 pounds molasses, and 20 gallons vinegar, of strength No. 24, in which 1 pound finely ground gum-arabic has been dissolved. The whole mixture, after being carefully triturated in a grinding mill, receives 12 pounds sulphuric acid, in small successive quantities, stirring strongly for half an hour. The stirring is continued for half an hour daily during a fortnight, and then 3 pounds of gum-arabic are added, after which the stirring is resumed, and continued as before for another fortnight. This gives fine liquid blacking; the paste is obtained within a week by withholding 8 of the 20 gallons in which the gum-arabic is dissolved.

Blackleg, a cattle disease. See BLACK QUARTER.

Blackmail, originally a certain rate of money, corn, cattle, or the like, anciently paid, in the north of England and in Scotland, to certain men who were allied to robbers, to be protected by them from pillage. It was carried to such an extent as to become the subject of legislation. Blackmail was levied in the districts bordering the Highlands of Scotland till the middle of the 18th century. In the United States, in common language, and in general acceptation, it is equivalent to, and synonymous with, extortion — the exaction of money, either for the performance of a duty, the prevention of an injury, or the exercise of an influence. It supposes the service to be unlawful and the payment involuntary. Not unfrequently it is extorted by threats, or by operating upon the fears or the credulity or by promises to conceal, or offers to expose, the weaknesses, the follies, or the crimes of the victim. There is moral compulsion, which neither necessity nor fear, nor credulity can resist. The New York statutes upon the subject have been adopted in substance by many other States of the Union. These statutes provide, substantially, that a person who knowing the contents thereof, and with intent, by means thereof, to extort or gain any money or other property, or to do, abet, or procure any illegal or wrongful act, sends, delivers, or in any manner causes to be forwarded or received, or makes and parts with for the purpose that there may be sent or delivered, any letter or writing, threatening to accuse any person of a crime, or to do any injury to any person or to any property, or to publish or connive at publishing any libel, or to expose or impute to any person any deformity or dis-

grace is punishable by imprisonment for a term, usually, not exceeding five years. In New York and in various other States it is also a misdemeanor for any person who, under circumstances not amounting to robbery, or an attempt at robbery, with intent to extort or gain any money or other property, verbally makes such a threat as would be criminal under the statute mentioned above, and it is immaterial whether a threat made as specified in the statute, is of things to be done or omitted by the offender, or by any other person.

Blackmore, Richard Doddridge, English novelist: b. Longworth, Berkshire, 7 June 1825; d. 20 Jan. 1900. His father, curate of Longworth, and a graduate of Exeter College, Oxford, was a man of scholarly character; among his ancestors on his mother's side Blackmore numbered Philip Doddridge, the Non-Conformist divine. Blackmore was educated at Blundell's School at Tiverton and at his father's college, which he entered in 1843 with a good reputation for scholarship, and where he had a successful career. In one of his long vacations he began 'The Maid of Sker,' which was not published till 1872. He was graduated in 1847, with M.A. in 1852. In 1852 he married Miss Lucy Maguire, and while supporting himself in London read law in the Inner Temple. Admitted to the bar the same year, he had some success as a conveyancer, but finding London life detrimental to his health, gave up his work and in 1855 became classical master at Wellesley House School, Twickenham Common. In 1853 he published his first volume, 'Poems by Melanter,' and a little later 'Epullia,' also an anonymous volume of verses. In 1855 appeared 'The Bugle of the Black Sea,' and in 1860 'The Fate of Franklin.' About this time a legacy from his uncle, the Rev. H. H. Knight, enabled him to build himself a substantial country house, Gomer House, at Teddington, near Twickenham. Here he lived the rest of his life, devoting his mornings to the raising of fruits and flowers, famous for quality but costing him an average loss of £250 a year. The remainder of his time he gave over to literature. A translation of two of the Georgics of Virgil, entitled 'The Farm and Fruit of Old' (1862), was followed by 'Clara Vaughan' (1864) and 'Cradock Nowell' (1866), neither very successful novels. His third novel, 'Lorna Doone' (1869), after a somewhat slow start, became one of the great popular novels of the century; up to the time of Blackmore's death it had gone through nearly 50 editions, and has now assumed the place of a semi-classic. Uneven in structure, often prolix, exaggeratedly romantic, occasionally falling into a false metrical prose, it nevertheless continues to hold the interest of its readers through the fine sense of the Devon country where the scene is laid, the very real and human country types, and the essentially manly character of its hero, John Ridd. Up to the time of his death, Blackmore continued to produce novels at the rate of about two in five years. Of these the most important are 'The Maid of Sker,' regarded by the author as his best, 'Springhaven' (1887) which he thought superior to 'Lorna Doone,' 'Alice Lorraine' (1875), and 'Cripps the Carrier' (1876). The other titles are: 'Erema, or My Father's Sin' (1877), 'Mary Annerley' (1880), 'Christowell' (1882), 'The Remarkable History of Tommy Upmore' (1884), 'Kit and Kitty' (1889), 'Perlycross' (1894), 'Tales from the Telling House' (1896), and 'Dariel' (1897). A volume of verse, 'Fringilla' (1895), completes the list of his published work. No life has as yet been published, and most of the commentary on him is to be found in magazine articles and reviews.

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Blackpool, England, a town and county borough on the west coast, and in the Blackpool Division of North Lancashire, between the estuaries of the Ribble and Wyre, 27 miles southwest of Lancaster, which has of late years attracted many visitors by its advantages as a watering place. It affords excellent accommodation for visitors in the numerous hotels, hydropathic establishments, and lodging-houses, and consists of ranges of lofty houses about three miles long facing the sea, in front of which extends an excellent promenade and carriage drive. The town is abundantly supplied with the means of amusement and recreation, including theatres, concert rooms, fine winter gardens, aquarium, extensive pleasure-grounds, park of 60 acres, a great steel tower over 500 feet high, a gigantic wheel, and other attractions. There are a courthouse and three markets, several churches, six council schools, eight non-provided schools and one for higher education, libraries and newsrooms. Blackpool was incorporated as a municipal borough on 21 Jan. 1876, and as a county borough 1 Oct. 1904. Pop. (1903) 48,000.

Blacksnake, or **Blue Racer,** a common colubrine serpent (*Zamenis constrictor*) found throughout the United States, and the adjacent parts of Canada. The typical eastern blacksnake is uniform lustrous black above, and slate-color beneath, the lower jaw, chin, and sometimes upper edges of the lip-plates white, the tongue black. Western specimens are bright olive-green, with the entire under surface greenish-white, varying to bright yellow, which accounts for the name, «blue» or «green racer,» often heard in the Mississippi valley. The young, under 18 inches in length, are variegated with dark blotches upon olive, and light margins to the scales, especially on the sides. The female is larger than the male, but rarely if ever exceeds six feet in length. This is one of the most numerous and vigorous of American snakes, making its home in hollow stumps and underground dens. At the approach of winter, many are likely to gather together in similar retreats, and remain there in a torpid condition until spring, entangled into a ball, for the sake of mutual warmth. Its motions are of the swiftest, it being capable of running with great rapidity and of scaling trees, sometimes to a height of 100 feet above the ground, where it searches from branch to branch for birds' eggs, young squirrels, etc. It seeks much of its food in swamps and along streams, mainly frogs, toads, eggs and young of birds, insects, and other snakes. Cope says: «The constricting power of blacksnakes is not sufficient to cause inconvenience to a man, but might seriously oppress a child. . . . It is easy to unwind the snake with the free hand and arm.» The blacksnake is harmless, and its bite is no worse than

that of a mouse. It is readily tamed, and shows some intelligence. It is courageous and will sometimes attack an enemy, moving forward with the head raised a foot or two above the ground, and waving about with a most terrifying aspect. Its principal enemies are the badger and skunk, and it seems to hold a special animosity toward the copperhead and rattlesnakes, whose trail it follows, at night, by its power of scent; and having overtaken the object of its pursuit, it leaps upon it, avoiding its stroke by its swiftness, wraps itself about it, and slowly crushes its victim to death, after which it swallows it whole. The blacksnake breeds during the summer, the female laying 15 or 20 eggs at a time in the hollow of a sunny bank, or in the midst of a decayed stump, around which she stays, guarding her young until they reach a considerable age.

Several other species of the genus belong to the southwestern United States, Mexico, and the West Indies, and the Texan whipsnake (q.v.) is a near relative. The "chainsnake" is sometimes called "mountain blacksnake." Other blackish serpents known as blacksnakes include a colubrine of Jamaica (*Ocyophis ater*); the death adders (q.v.) of Australia and Tasmania, and some others notable for dark hues. One of the most widespread of the native names of the East Indian Cobra de Capello has the meaning "blacksnake." Consult: Cope, 'Snakes of North America.'

Blackstock Hill, South Carolina, a locality where, on 20 Nov. 1780, the patriots of the State, under Gen. Sumter defeated Tarleton's cavalry after a sharp encounter.

Blackstone, William, the first inhabitant of Boston, was an Episcopal minister, who settled there as early as 1625 or 1626, and died 26 May 1675, on Blackstone River, a few miles north of Providence. On the arrival of Gov. Winthrop at Charlestown, in the summer of 1630, it is stated in the records of that place that "Mr. Blackstone, dwelling on the other side of Charles River, alone, at a place by the Indians called Shawmut, where he only had a cottage, at or not far off from the place, called Blackstone's Point, he came and acquainted the governor of an excellent spring there, withal inviting him and soliciting him thither; whereupon, after the death of Mr. Johnson and divers others, the governor, with Mr. Wilson, and the greatest part of the Church, removed thither." At a court held in April 1633, 50 acres of land near his house in Boston were granted to him forever. In 1634 he sold his land and became the first white settler within the present limits of Rhode Island.

Blackstone, Sir William, English lawyer, and the most popular writer on the laws and constitution of his country: b. London, 10 July 1723; d. 14 Feb. 1780. He was educated on the foundation of the Charter House, whence in 1738 he was removed to Pembroke College, Oxford. He was much distinguished, both at school and at the university, and at an early age compiled a work for his own use, entitled the 'Elements of Architecture,' which has been much praised. Having chosen the profession of the law, he was in due time entered at the Middle Temple, and on this occasion published the admired verses called the 'Lawyer's Farewell to His Muse,' which appeared in 'Dodsley's Miscellany.' In 1743 he was elected Fellow of All-Souls College, Oxford, and in 1746 was called to the bar, and commenced the practice of law. Being deficient in elocution, and not possessed of the popular talents of an advocate, his progress was slow. Having attended the courts of law at Westminster for seven years, without success, he determined to quit the practice of his profession, and retire to his fellowship at Oxford. The system of education in the English universities supplying no provision for teaching the laws and constitution of the country, Blackstone undertook to remedy this defect by a course of lectures on that important subject; and the manner in which he executed the task has conferred a lasting distinction on Oxford. His first course was delivered in 1753, and was repeated for a series of years with increasing effect and reputation. These lectures doubtless suggested to Mr. Viner the idea of founding, by his will, a liberal establishment in the University of Oxford for the study of the common law; and Blackstone was, with great propriety, chosen the first Vinerian professor. His engagements at Oxford did not prevent his occasional practice as a provincial barrister; and in 1754, being engaged as counsel in a contested election for the county of Oxford, he was led into considerations on the elective franchise, which produced his work entitled 'Considerations on Copyholds.' In 1759 he published a new edition of the Great Charter and Charter of the Forest, with an historical preface; and during the same year, the reputation which he had obtained by his lectures induced him to resume his attendance at Westminster Hall, when business and the honors of his profession soon crowded in upon him. In 1761 he was elected member of Parliament for Hindon, made king's counsel and solicitor-general to the queen. About this time he also married, and thereby losing his fellowship, was appointed principal of New Inn Hall; which office, with the Vinerian professorship, he resigned the next year. In 1765 he also published the first volume of his 'Commentaries on the Laws of England'; a work of greater merit than any which had yet appeared on the subject. The real merit and talents of Blackstone, backed by political tendencies which are generally favorable to advancement, now made him an object of ministerial favor, and he was offered the post of solicitor-general in 1770, and, declining it, was made one of the justices of common pleas, which station he held until his death, in his 57th year.

Blackstone, Mass., town in Worcester Co., on the Blackstone River, and on the New York, New Haven and Hartford R.R. It is an important manufacturing town and the centre of an extensive agricultural region. It has numerous churches, schools, library, weekly newspapers, electric lights, and excellent water power. Pop. (1890) 6,138; (1900) 5,721.

Blackstone River, a river of eastern New England; rises in Paxton and Holden townships, Worcester County, Mass., flows southeast into the State of Rhode Island, and empties into the Providence River, near Providence, where it is known as the Seekonk. It is over 50 miles long, and falls over 700 feet, thus affording abundant water-power, and for a great part of its course flows through an almost continuous village of manufacturing establishments.

Blacktail, the name of two different species of western American deer, notable for the blackness of the tail as compared with the snowy white tail of the eastern or "white-tailed" deer. One of them is more suitably called "mule" deer, and is described elsewhere under that title. The other is the Columbian or Pacific Coast deer (*Cervus,* or *Odocoileus, columbianus*).

The Columbian blacktail is somewhat smaller than the mule deer, with relatively shorter ears and finer hair. The general color in summer is red or reddish-yellow; in winter the color is more varied. The coat is then brownish-gray, darkest along the spine; top of head, chestnut and black; face gray, with a black spot on the forehead, passing backward as a stripe over each eye; chin white, behind which is a black patch; upper throat, posterior portion of under part, and base of tail, white; chest, sooty; legs, dark cinnamon, white inside, and rest of under parts covered with black; upper surface of the tail, black. The antlers of the buck resemble those of the mule deer. This deer is limited to the Pacific coast, from central California northward to Alaska, and does not pass east of the coast ranges of mountains. It is a deer of the woods, frequenting the foot-hills and valleys especially those covered with small brush; and its habits and gait, more nearly resemble those of the white-tailed deer, than of the mountain-loving mule deer. Its hunting affords excellent sport, and its venison is highly prized. See also Deer. Consult: Farell, 'Big Game in North America', and VanDyke, 'The Deer Family.'

Blackthorn, a shrub or small tree. See Sloe.

Blackwater Fever, an obscure disease of uncertain causation that is prevalent in Africa, and is said to be present in other parts of the world. By many it is regarded as a very severe form of malaria, a malignant form, associated with great prostration and with bloody urine. By others it is considered a disease of itself and due to a special parasite of the blood. The question will undoubtedly be settled within a short time as soon as skilled physicians have the opportunity of studying the disease in Africa.

Blackwell, Mrs. Antoinet Louisa (Brown), American woman suffragist and Unitarian minister: b. Henrietta, N. Y., 20 May 1825. A graduate of Oberlin (1847), she "preached on her own orders," at first in Congregational churches, becoming at length a champion of women's rights. She married Samuel C., a brother of Dr. Elizabeth Blackwell (1856). She has written 'Shadows of Our Social System' (1855); 'The Island Neighbors' (1871), a novel of American life; 'Sexes Throughout Nature' (1875), etc.

Blackwell, Elizabeth, the first woman who ever received the degree of M.D. in the United States: b. Bristol, England, 3 Feb. 1821. Elizabeth, a girl of 17 years at the time of her father's death, and one of the elder of nine children, opened a school, which she conducted successfully for several years. But her energetic temperament and strong desire for the acquisition of knowledge demanded a wider field; and long reflection having persuaded her that some avenue should be opened to women whom either necessity or choice impelled to gain a subsistence by their own exertions, she felt that her path of duty lay in that direction. She resolved to become a physician, and to return again to teaching to acquire the requisite means of education. A situation as governess was found in the family of Dr. John Dixon, of Asheville, N. C., where she remained a year, having access, during that time, to a medical library, and receiving from Dr. Dixon some direction as to her reading, but no encouragement in her purpose. At the end of the year she removed to Charleston, S. C., still acting as a teacher of music, but pursuing her studies with the aid and sympathy of Dr. S. H. Dixon, subsequently professor of the institute and practice of medicine in the University of New York. Miss Blackwell next went to Philadelphia, and passed six months in study under Dr. Allen and Dr. Warrington, of that city. During that time she made formal application to the medical schools of Philadelphia, New York, and Boston, for admission as a student. In each instance the request was courteously but firmly denied, on the ground of a want of precedent for such an admission, and of the impropriety of such an innovation upon established custom. Several of the professors, however, avowed a sincere interest in her hopes and purposes, and some of them urged her to seek admission into one or another of the schools under the disguise of a feigned name and male attire. She declined to take into consideration any such suggestion, for, though anxious to obtain a medical education for herself, she was hardly less desirous of asserting her right to it as a woman. Undismayed by these difficulties, however, she next made application to 10 other medical schools in different parts of the country, which was rejected by all except those at Geneva, N. Y., and at Castleton, Vt. At Geneva, the faculty, after expressing their own acquiescence, laid the proposition before their students, leaving the decision with them. The young men unanimously assented to the reception of the new pupil, and pledged themselves that no conduct of theirs should ever cause her to regret the step she had taken. It is to their credit that they faithfully observed this pledge during the two subsequent collegiate years that she passed among them. Here Miss Blackwell took her degree of M.D., in regular course, in January 1849. During her connection with the college, but when not in attendance there upon lectures, she pursued a course of clinical study in Blockley Hospital, in Philadelphia. The spring after her graduation she went to Paris and remained six months as a student in the Maternité, devoting herself to the study and practice of midwifery. The next autumn she was admitted, as a physician, to walk the hospital of St. Bartholomew, in London, where she could not have been received as a student. After nearly a year spent in St. Bartholomew's she returned to New York, where she practised her profession with credit and success, and established the New York Infirmary for Women and Children, and the Woman's Medical College. In 1859 she registered as a physician in England, and since 1869 has practised in London and Hastings; she founded the National Health Society in London, and assisted in founding the London School of Medicine for Women. Her works include: 'Physical Education of Girls'; 'Religion of Health'; 'Counsel to Parents on Moral Education'; 'Pioneer in Opening

the Medical Profession to Women'; 'The Human Element in Sex'; 'Decay of Municipal Representative Institutions.'

Blackwell, Lucy Stone. See STONE, LUCY B.

Blackwell, Thomas, Scottish writer: b. Aberdeen, 4 Aug. 1701; d. Edinburgh, 1757. After receiving the rudiments of his education at the grammar-school of his native city, he entered Marischal College, where he took the degree of A.M. in 1718. A separate professorship of Greek had not existed in this seminary previous to 1700. Blackwell, having turned his attention to Greek, was honored in 1723, when only 22 years of age, with a Crown appointment to this chair. His 'Inquiry into the Life and Writings of Homer' was published at London in 1737. A second edition of the work appeared in 1746, and shortly after 'Proofs of the Inquiry into Homer's Life and Writings.' In 1748 he published anonymously 'Letters Concerning Mythology.' In the course of the same year he was advanced to be principal of his college. In 1750 he opened a class for the instruction of the students in ancient history, geography, and chronology. In 1752 he obtained the degree of LL.D., and in the subsequent year published, in quarto, the first volume of 'Memoirs of the Court of Augustus.' A second volume appeared in 1755, and a third, which was posthumous, and left unfinished by the author, was prepared for the press by John Mills, Esq., and published in 1764.

Blackwell's Island, N. Y., an island in the East River belonging to New York city. It has an area of about 120 acres, and contains the penitentiary, almshouse, lunatic asylum for females, workhouse, blind asylum, hospital for incurables, and a convalescent hospital. Nearly all of these buildings were erected from granite quarried on the island, by convict labor, the style of architecture being of a turreted and battlemented design of the feudal character. The island is bordered by a heavy granite sea wall, also built by the convicts, and a large amount of farming and gardening is carried on by inmates of the penitentiary.

Blackwood, Adam, Scottish writer: b. Dunfermline, 1539; d. 1613. Scotland, during his youth, was undergoing the agonies of the Reformation. He therefore found it no proper sphere for his education, and went to Paris, where, by the liberality of his youthful sovereign, Queen Mary, then residing at the Court of France, he was enabled to complete his studies, and to go through a course of civil law at the University of Toulouse. Having now acquired some reputation for learning and talent, he was patronized by James Beaton, the expatriated Archbishop of Glasgow, who recommended him very warmly to Queen Mary and her husband the dauphin, by whose influence he was chosen a member of the Parliament of Poitiers, and afterward appointed to be professor of civil law at that court. His first work was one entitled 'De Vinculo Religionis et Imperii, Libri Duo' (Paris 1575), to which a third book was added in 1612. His next work was entitled 'Apologia pro Regibus,' and professed to be an answer to George Buchanan's work, 'De Jure Regni apud Scotos.' He next published, in French, an account of the death of his benefactress, Queen Mary, under the title, 'Martyre de Maria Stuart Reyne d'Escosse' (Antwerp, 8vo. 1588). At the end of the volume is a collection of poems in Latin, French, and Italian, upon Mary and Elizabeth; in which the former princess is praised for every excellence, while her murderess is characterized by every epithet expressive of indignation and hate. In 1644, 30 years after his death, appeared his 'Opera Omnia,' in one volume, edited by the learned Naudeus, who prefixes an elaborate eulogium upon the author.

Blackwood, William, Scottish bookseller, known as the projector and publisher of 'Blackwood's Magazine': b. Edinburgh, 20 Nov. 1776; d. 16 Sept. 1834. He settled in his native city as a bookseller in 1804, and soon added the trade of a publisher to his original business. The first number of 'Blackwood's Magazine' appeared on 1 April 1817, and from the first was conducted in the Tory interest. It was started just at the time when the general peace which had been established in Europe was beginning to reanimate the hopes of the Whigs, and when it was all the more necessary for the Tories to defend by the press that preponderance which they still held in Parliament. Mr. Blackwood was fortunate enough to secure as his coadjutors in his new literary undertaking most of the leading authors of the day belonging to the Tory party, among them Sir Walter Scott, John Gibson Lockhart, Hogg (the Ettrick Shepherd), Prof. Wilson (Christopher North), De Quincey (the English Opium-eater), and others. All that was connected with the management of the magazine he took into his own hands, and he himself selected the articles for each number — a task for which he was admirably qualified, for although he wrote little himself, he was an admirable judge of literary works. The new magazine on its first appearance entered upon a campaign against the Edinburgh 'Review,' combating both its political views and its literary decisions. From the first it attracted a great deal of attention, and its success was decided by the appearance of the 'Noctes Ambrosianæ,' a series of articles in the form of dialogues, in which the current questions in politics and literature were discussed with the most pungent sarcasm and inexhaustible humor. The brilliant articles of Dr. Maginn added not a little to its reputation, and constantly, as the original contributors withdrew, new and valuable accessions were made to the staff of its supporters. After his death his business continued to be carried on by his sons, and the magazine, although it has perhaps lost some of its former reputation (or notoriety), still keeps its place as one of the leading periodicals.

Blackwood. See DALBERGIA.

Blackwood's Magazine. See BLACKWOOD, WILLIAM.

Bladder, the muscular organ that in man and the lower animals holds the urine. The kidneys secrete urine constantly, the bladder stores it and only empties itself at more or less definite intervals. In man the bladder is a flattened rounded to conical organ about the size of an orange, and holding under normal conditions about 16 ounces of urine (one pint). It is situated in the lower portion of the abdominal cavity just behind the pubic bone, which serves as a protection. Its general shape is rounded triangular, the flat side being above, the ureters leading from the kidneys entering at the corners; the pointed end corresponding to the

opening into the urethra, through which canal the urine is voided. The walls of the bladder are made up of several layers; the outer wall is of peritoneum in part, or serous and connective tissue combined. The greater part of the wall is made up of involuntary muscle fibre, arranged longitudinally and circularly; the innermost coat is thin and delicate,— the mucous membrane,— and is lined throughout by layers of regularly flattened squamous epithelial cells. The nervous supply of the bladder, by means of which it is emptied, is complex and probably threefold. It is under the influence of the sympathetic nervous system of the hypogastric plexus; there are subsidiary centres in the spinal cord and higher up in the human cortex certain voluntary efforts have their influence on the bladder control. The primary centres of control are in the sympathetic. These cause the bladder in the young infant and also in the patient whose spinal cord and centres are diseased to be emptied and in the so-called irritable bladder it is probable that this part of the mechanism is mostly affected.

There is a very marked relation between the skin activities and the kidney and bladder action, for while the skin is acting freely as in exercise in warm weather, a large amount of water is thus given off, which in cold weather is eliminated through the kidneys and thus by the bladder. This is noted daily when in cold weather one leaves the warm house and shortly after walking in the cold of the outside air, the desire to urinate becomes urgent. Irritability of the bladder, particularly in children, and bedwetting is often a very troublesome complaint. It may be due to a variety of causes, excessive irritation, however, would probably not result in bedwetting, particularly in older children, if the control (inhibition) normally maintained by the brain were not cut off by deep slumber. The treatment is always medical and is often very difficult. Infection of the bladder frequently occurs and leads to many serious complications. (See Cystitis.) Stones also develop in the bladder. (See Calculus.)

Paralysis of the bladder *per se* is a rare affection; paralysis of the sphincter that controls the outlet may result from a variety of causes. It usually results in incontinence of urine. Retention is an opposite condition and is frequently due to loss of sympathetic nerve action, such as follow labor, or an operation, or from the anæsthesia of opium, belladonna, or similar narcotics. It may also be due to mechanical obstruction, in old men, particularly being due to an hypertrophied prostate gland.

Bladder-nut (*Staphylea*), the type genus of the order *Sapindaceæ*, consisting of eight species of ornamental shrubs or small trees, natives of the northern hemisphere. The common bladder-nut (*S. pinnata*) a native of Europe and Asia, which attains a height of 15 feet, and is often planted for ornament, bears panicles of whitish flowers in late spring. The American bladder-nut (*S. trifolia*), which ranges from Quebec to Minnesota and southward to South Carolina and Missouri, bears nodding panicles or umbel-like recemes of white flowers and, like several of the other species, is used in shrubberies. The wood of the two species mentioned is white and hard and is used in turning. The flower buds are pickled like capers and the seeds sometimes eaten. The common name is suggested by the inflated capsule and the hard shell of the seed; the generic name by the resemblance of the raceme to a bunch of grapes, the staphyle of the Greek language.

Bladderworm, *Cysticercus* or immature stage of the tapeworm, the hydatid of physicians. By far the most injurious species is *Tænia echinococcus,* more frequently causing death than any other entozoon. In its adult or strobila state this worm only infests the dog and wolf, but its larva, the hydatid of physicians, frequently occurs in the human body. It is very small, seldom exceeding six millimetres in length, there being but four segments, including the head, which has a pointed rostellum, with a double crown of large-rooted hooks; there are four suckers present, and the last segment, when sexually mature, is as long as the anterior ones taken together. The hydatid (*Proscolex*) forms large proliferous vesicles, in which the scolices (echinococcus heads) are developed by budding internally. About 5,000 eggs are developed in a single segment (*Proglottis*). The six-hooked embryos develop, are expelled from the dog, and find their way in drinking water or in food into the human intestines, whence they bore into the liver, their favorite habitat, or are carried along the blood vessels into some other organ, where they develop into bladder-like bodies, called hydatids. In its earliest stages the hydatid is spherical and surrounded by a capsule of condensed connective tissue of its host. By the fourth week the young *F. echinococcus* is one-fiftieth of an inch long, and it is probably many months before the echinococci heads are entirely developed. When this stage is reached the tapeworms become sexually mature in from seven to nine weeks after, when the milk-white worms may usually be found imbedded in the mucus of the duodenum and upper part of the small intestines, with their heads attached to the villous surface of the intestine. The hydatids or cysts in which the echinococci develop are of three kinds,— exogenous, endogenous, and multilocular,— and lie imbedded in the parenchyma of the liver, etc., and are filled with a clear amber-colored fluid. The echinococcus heads, first on the inner surface of the cyst and in the interior of the echinococcus head (brood-capsule), develops a second brood of scolices, contained in a secondary cyst. Finally, a tertiary cyst, containing tertiary or granddaughter scolices, arises. In such cases the number of tapeworms which arise from one embryo is naturally enormous, and the parent vesicle may reach a very considerable size, being sometimes as large as a man's head. In consequence of this enormous growth the vesicles frequently obtain an irregular shape; while on the other hand the tapeworms which develop from them remain very small, and carry, as a rule, only one ripe proglottis. Sometimes the secondary hydatids will develop scolices and granddaughter vesicles before the original maternal hydatid has acquired echinococcus heads.

So long as the tapeworm head (*scolex*) remains attached to the body of the bladder-worm and in the host of the latter, it never develops into a sexually mature tapeworm; although in many cases it grows to a considerable length (*Cysticercus fasciolaris* of the house-mouse). The bladderworm must enter the alimentary canal of another animal before the head can, after separation from the body of the bladderworm, develop into the sexually mature tapeworm. This

transportation is effected passively, the new host eating the flesh or organs of the animal infected with *Cysticerci.* The tapeworms, therefore, are principally found in the *Carnivora,* the *Insectivora,* and the *Omnivora,* which receive the bladderworms in the flesh of the animals on which they feed. The vesicles are digested in the stomach, and the cestode head becomes free as a scolex. The latter is, perhaps, protected from the too intense action of the gastric juice by its calcareous concretions, and at once enters the small intestine, fastens itself to the intestinal wall, and grows by gradual segmentation into a tapeworm. From the scolex the chain of proglottides proceeds as the result of a growth in length accompanied by segmentation, a process which is to be looked upon as a form of asexual reproduction (budding in the direction of the long axis). The development of the scolex is then to be explained as a metamorphosis, characterized by the individualization of certain stages of the development. But the whole life-history is a case of metagenesis, inasmuch as the sexual proglottides alternate with the asexual scolex. See TAPEWORM.

Bladderwort, *Utricularia,* a genus of about 150 species of largely aquatic herbs of the natural order *Lentibulariaceæ,* widely distributed throughout the world, but especially abundant in the tropics. The aquatic species are remarkable for the little, sometimes valved, bladders which entrap and digest aquatic insects and other water animals. The bladders which are at first filled with water become inflated with air at flowering time so that the flower instead of being submerged like the rest of the plant, is raised above the surface until after blossoming, when water again fills the bladders, the plants sinking to the bottom, where the seeds are ripened. These aquatic species, of which about a dozen with yellow or blue flowers are natives of the United States, are common in ditches, ponds, and marshes throughout the world. They are sometimes cultivated in aquaria more as curiosities than for any intrinsic beauty. In the marsh species the bladders are less effective and numerous than in the pond species, and in the terrestrial kinds they are small, abortive, and useless. These last have leaves of ordinary forms and are often tuberous, whereas members of the first group have much dissected foliage like other pond plants and are rootless. Some of the tropical species are showy epiphytes and are cultivated in hot-houses like orchids, with some of which they compare in beauty. Consult: Bailey, 'Cyclopedia of American Horticulture' (1900–2).

Bla'densburg, Maryland, a small town in Prince George County, on the east branch of the Potomac, about six miles east from Washington, with a population in 1900 of 463. At the bridge over the Potomac west of Bladensburg, the battle with the English which preceded the capture of Washington, took place toward the latter part of the War of 1812, Gen. Ross and Admiral Cockburn with about 5,000 men, appeared in Chesapeake Bay to attack Washington. The American forces fell back to Bladensburg and awaited the British. The Americans numbered about 7,000, but were scattered and untrained. On 24 Aug. 1814, the British advanced to the attack. The American artillery held them in check for a time, but the troops pushed forward. The Americans fled in wild disorder; the confusion spread and soon Gen. Winder, the American commander, gave orders for a general retreat. The American loss was 76 men; the British more than 500 killed and wounded. Bladensburg is famous in American history as the site of the duelling ground, where many famous duels growing out of quarrels in Washington were fought, as that in which Barron killed Decatur in 1820.

Blagoveshtchensk, blä-gō-vyĕsh'chĕnsk, Russia, a town of eastern Siberia, capital of the province of the Amoor, and of the general government of the Amoor, on the river Amoor, where it receives the Zeya, near the Chinese town of Aigoon. Founded as a military post in 1856 it is now an important place, with secondary schools, theological seminary, etc. Pop. (1903) 37,841.

Blaikie, William, American athlete and writer on physical training: b. York, N. Y., 1843; d. there 6 Dec. 1904. He became a lawyer in New York. He has written 'How to Get Strong' (2d ed. 1880); 'Sound Bodies for our Boys and Girls' (1883).

Blaikie, William Garden, Scotch clergyman: b. Aberdeen, 1837; d. 11 June 1899. He was graduated at the University of Aberdeen; ordained a minister of the Established Church in 1842; joined the Free Church in 1843; and was appointed professor of apologetics and pastoral theology in New College, Edinburgh, 1868. He was a delegate to the Presbyterian General Assembly of the United States in 1870; took a leading part in the formation of the Alliance of the Reformed Churches; and was editor of the 'Free Church Magazine' in 1849–53; the 'North British Review' in 1860–3; the 'Sunday Magazine' in 1871–4; and the 'Catholic Presbyterian' in 1879–83. His writings include 'Bible History in Connection with General History' (1859); 'Bible Geography' (1860); 'Glimpses of the Inner Life of David Livingstone' (1880); 'Public Ministry and Pastoral Methods of Our Lord' (1883); 'Leaders in Modern Philanthropy' (1884), etc.

Blaine, Ephraim, American soldier: d. Carlisle, Pa., 1808. He entered the army as a colonel, at the commencement of the Revolutionary War, and was subsequently made commissary-general. His services were gallant and patriotic. He was with Washington in many of the most trying scenes of the Revolution, and enjoyed the confidence of his chief to the fullest extent. During the «dark winter» at Valley Forge, the preservation of the American army from starvation was in a great degree owing to the exertions and sacrifices of Col. Blaine.

Blaine, James Gillespie, American statesman: b. West Brownsville, Pa., south of Pittsburg, 31 Jan. 1830; d. 27 Jan. 1893. His father, a cultivated landowner, was a Presbyterian of Scotch-Irish blood; his mother was a Catholic. He was a precocious boy with a strong taste for history and literature, and the star of his debating club as orator and parliamentarian. At 13 he entered Washington College in his native county, graduated at 17, and after teaching and studying law, removed to Augusta, Me., in 1854. He entered journalism and politics, joined the new Republican party the next year, was a delegate to its first (Fremont) convention in 1856, and in 1858 became chairman of the State

Republican committee — an extraordinary position at 28 after but four years' residence. He remained such for 20 years, the almost omnipotent dictator of the party's State action. In 1858, also, he was elected to the legislature, and re-elected three more terms, being speaker the last two; and in 1862 was sent to Congress, and re-elected six additional terms to the House. In the House he was the most effective and dexterous of debators, an adept at parliamentary law, of instant readiness and endless resource; and outside he became early the most captivating, magnetic, and brilliant of party leaders. With a prodigious and instant memory both for facts and faces, saturated with political history and the records of all prominent public men, with great charm of utterance and exuberant geniality of manner, he excited in the mass of his party the most enthusiastic devotion; but unfortunately in the "independent" wing an equally invincible distrust, which ultimately defeated his most cherished ambition. As congressman, his most noted positions were opposing Thaddeus Stevens' reconstruction plans for putting the South under military government, and of cutting down the representation of the States when readmitted to a basis of legal voters; opposing the payment of the public debt in greenbacks; and supporting the agitation which led to Great Britain's admitting her citizens' right to change their allegiance (1870). From 1869 to 1874 he was speaker, and gained the highest reputation for parliamentary ability, firmness, impartiality, and dispatch of business. The tremendous reaction of 1874 against Grant's second term swept the Democrats into control of the House by an immense majority, and Mr. Blaine became the leader of the Republican minority. An envenomed struggle at once began. As a matter of party tactics, and to pave the way for the election of 1876, Mr. Blaine sought to inflame Republican feeling by dwelling on the harshest memories of the war; the Democrats retorted by a series of attacks on his personal integrity in the speakership, as evidence of which they cited letters to a Boston broker which had been kept by a clerk named Mulligan. (See MULLIGAN LETTERS.) He exhibited and read the letters on the floor of the House to prove that they contained nothing discreditable; but the charges, in the hands of his enemies, remained one of the influences which twice lost him the nomination and at last the election to the presidency. In 1876 he received 285 votes, much the largest single vote, on the first ballot at the Republican convention, and 351 on the seventh; his imminent success then produced a coalition on Gen. Hayes. Senator Morrill of Maine becoming secretary of the treasury, Mr. Blaine was chosen senator for the unexpired term, and the following winter for the full term. He opposed the electoral commission on the ground that Congress was conferring powers beyond its own; opposed Hayes' withdrawal of the troops that upheld the carpet-bag governments; opposed the Bland Silver Bill and the adoption of the gold standard alike, believing bimetallism feasible and preferable; advocated ship subsidies, and rigid prohibition of Chinese immigration. In 1880 the attempt at a third term for Grant was defeated by the Blaine forces, who gave him 284 on first ballot; but after six days and 35 ballots, seeing that Blaine could not be nominated, united with the Sherman party to nominate Garfield, by 399 to Grant's 306. Garfield made him secretary of state, and in his short tenure he planned a Pan-American Congress, attempted mediation between victorious Chile and crushed Peru, and attempted to cancel the Clayton-Bulwer Treaty (q.v.). But the speedy assassination of Garfield, and the accession of Arthur, the lieutenant of Blaine's mortal enemy, Roscoe Conkling, made his place untenable, and on 19 December he resigned. He at once began his two-volume 'Twenty Years in Congress,' a work of great charm and value; issuing the first volume in 1884, in time to do good work conciliating support for the next election. But meantime a memorable political letter to a New York State friend, widely published, was taken as a cue to his adherents in that State to vote against the administration candidate; and caused such a heavy fall in the Republican vote for governor that S. J. Folger, secretary of the treasury, was overwhelmed, and Grover Cleveland, the mayor of Buffalo, in high repute for having crushed a ring of plunderers there, was elected by 192,000 plurality. This unprecedented victory in the largest State of the Union gave Mr. Cleveland the Democratic nomination for President in 1884; and when Mr. Blaine was at last nominated by the Republicans (541 out of 813 on fourth ballot), the Independents carried out the threat of many years by bolting the nomination and mostly voting for Cleveland, who carried New York by 1,047 and with it the electoral majority. After his defeat he issued the second volume of his work (1886), and the next year a volume entitled 'Political Discussions.' Again a candidate in 1888, he withdrew in favor of Harrison, and was made secretary of state once more; he resumed his Pan-American policy, made a futile attempt to induce Great Britain to join in preserving the seals from extermination (see BERING SEA QUESTION), and favored a reciprocity commercial policy which made many of his old opponents draw toward him. He resigned in June 1892, in hope of securing the next Republican nomination, but found it out of the question. He died early the following year, of Bright's disease. His life was written by his kinswoman, Gail Hamilton (1895).

Blainville, Henri Marie Ducrotay de, ŏñ-rē mä-rē dü-krō-tā dė, French naturalist: b. Arques, near Dieppe, 1778; d. 1 May 1850. He studied medicine and the allied sciences at Paris, and obtained his degree of M.D. in 1808. He was for a time assistant to Cuvier, whose influence helped to place him in the chair of anatomy and zoology in the Faculty of Sciences at Paris in 1812. Unfortunately misunderstandings soon arose between the master and his comparatively youthful rival, and ultimately terminated in an open rupture. In 1825 Blainville was admitted to the Academy of Sciences as the successor of Lacépède, and on the death of Lamarck in 1829, the chair which he held in the Museum of Natural History having been divided, the department of mollusca, zoophytes, and worms was committed to Blainville, whose important works on these groups made it impossible to confer it on any other. In 1832 he quitted this department to become the not unworthy successor of Cuvier in the chair of comparative anatomy in the same establishment. His works, contained both in the more important collections of the period, and in separate treatises, are too numerous to be enumerated,

but mention is especially due to 'L'Organisation des Animaux, ou Principes d'Anatomie Comparée' (1822); 'Manuel de Malacologie et de Conchyliologie avec Atlas de 100 Planches' (1825); 'Cours de Physiologie Générale' (1829–32); 'Manuel d'Actinologie' 1834); 'Sur les Principes de la Zooclassie' (1847); and above all, the gigantic but unhappily unfinished work entitled 'Ostéographie ou Description Iconographique Comparée du Squelette et du Système Dentaire des Cinq Classes d'Animaux Vertébrés, Récents et Fossiles' (1839–50).

Blair, Andrew Alexander, American chemist: b. Kentucky, 20 Sept. 1848. He graduated at the United States Naval Academy, 1866; was chief chemist to the United States Commission to test iron, steel, and other metals, 1875–8, and to the United States Geological Survey and 10th census, 1879–81. Since then he has been engaged in general practice. Besides reports to the government and contributions to scientific journals he has published 'The Chemical Analysis of Iron: Complete Account of all the Best-Known Methods for the Analysis of Iron, Steel, etc.' (Phila. 1888).

Blair, Austin, American lawyer: b. Caroline, N. Y., 8 Feb. 1818; d. Jackson, Mich., 6 Aug. 1894. He graduated at Union College in 1839; studied law in Oswego, N. Y., and removed to Jackson, Mich., where he was admitted to the bar in 1842. He was elected to the legislature in 1846; became conspicuous in the convention which established the Republican party in Michigan; and was elected governor of Michigan in 1860. He was a member of Congress (1866–70).

Blair, Francis Preston, American journalist and politician: b. Abingdon, Va., 12 April 1791; d. Silver Spring, Md., 18 Oct. 1876. In early life he was a Jacksonian Democrat. He edited the Washington *Globe* from 1830 to 1845. Through his anti-slavery sentiments he became one of the founders of the Republican party, but in later years returned to the Democratic faith.

Blair, Francis Preston, Jr., American soldier and statesman (son of the preceding): b. Lexington, Ky., 19 Feb. 1821; d. St. Louis, Mo., 5 July 1875. He was a representative in Congress from Missouri (1857–9 and 1861–3); became a major-general in the Union army in the Civil War, taking an active part in the Vicksburg campaign and Sherman's march to the sea; was an unsuccessful Democratic candidate for Vice-President in 1868, and United States senator (1870–3).

Blair, Henry William, American legislator: b. Campton, N. H., 6 Dec. 1834. He received an academic education; was admitted to the bar in 1859; served through the Civil War, becoming lieutenant-colonel of the 15th New Hampshire Volunteers, and was twice wounded. After serving in both branches of the State legislature he was a member of Congress (1875–9 and 1893–5), and United States Senator (1879–89). He is the author of what was known as the «Blair Common School Bill,» designed to distribute a certain amount of Federal money for educational purposes among the various States in proportion to the number of illiterates. He was a strong opponent of Chinese immigration, and, when he was appointed and confirmed United States minister to China, that government objected to receiving him. He has been an active worker in the cause of temperance and other reforms.

Blair, Hugh, Scottish divine: b. Edinburgh, 7 April 1718; d. 27 Dec. 1800. He commenced his academic career at Edinburgh University in 1730. In 1741 he was licensed as a preacher, and the following year was ordained to the parish of Collessie, Fife, but a few months after he was elected to the second charge of the Canongate, Edinburgh. In 1754 he received one of the city charges, that of Lady Yester's church, and in 1758 one of the charges of the High Church. In 1759 he commenced a course of lectures to students upon the principles of literary composition; and in 1762 he was made professor of rhetoric and belles-lettres in the University of Edinburgh, being the first that ever occupied this chair. He continued the course till 1783, when he published his lectures, which received very high praise. In 1763 he published a dissertation on the 'Poems of Ossian,' in the authenticity of which he firmly believed.

It was not till 1777 that he could be prevailed upon to offer to the world any of those sermons with which he had so long delighted a private congregation. One of the sermons having been sent by Strahan, the king's printer, to Dr. Johnson for his opinion, Strahan received from him the following characteristic note: «I have read over Dr. Blair's first sermon with more than approbation; to say it is good is to say too little.» Strahan thereupon agreed to purchase the volume, with Mr. Cadell, for $500. The sale was so rapid and extensive, and the approbation of the public so high, that the proprietors voluntarily doubled the stipulated price. The volume speedily fell under the attention of George III., and by royal mandate a pension of $1,000 a year was bestowed on Dr. Blair. During the subsequent part of his life Dr. Blair published three other volumes of sermons; and it might safely be said that each successive publication only tended to deepen the impression produced by the first.

Blair, James, American clergyman and educator: b. Scotland, 1656; d. Williamsburg, Va., 1 Aug. 1743. In 1685 he was sent as a missionary to Virginia by Dr. Compton, Bishop of London. There he secured the confidence of the planters, and proved himself far in advance of his contemporaries on the question of slavery. In 1689 Sir Francis Nicholson appointed him «commissary,» the highest ecclesiastical office in the colony. This office gave him a seat in the Council of the colonial government; he presided over the trials of clergymen, and pronounced sentence upon conviction of crimes or misdemeanors. His great desire was to see a college established in the colony. The Assembly and governor warmly sympathized with his project; he went to England and laid his plan before William and Mary, and on 14 Feb. 1692, a charter for the college was granted, the bishop of London being appointed chancellor and Blair president, and the institution named «William and Mary.» Its opening was repeatedly delayed, and Blair did not enter on his duties as president until 1729, but his enthusiasm never wavered, and his efforts were finally crowned with success. He left his library to the college. He wrote 'Our Saviour's Divine Sermon on the Mount' (London 1722, 4 vols.; 3d ed. 1740), a

work highly considered throughout the 18th century.

Blair, John, Scotch chronologist and geographer: d. 24 June 1782. He went to London about the middle of the 18th century. In 1754 the publication of a work in folio, entitled 'The Chronology and History of the World from the Creation to 1753 A.D.,' gained him great reputation. He dedicated his work to Lord Chancellor Hardwicke, and in 1757 was appointed chaplain to the Princess Dowager of Wales, and mathematical tutor to the Duke of York, whom he accompanied, in 1763, on a tour to the Continent, having already received several ecclesiastical preferments. On his return to England he published, in 1768, a new edition of his 'Chronological Tables,' with 14 maps of ancient and modern geography annexed.

Blair, John Insley, American philanthropist: b. Belvidere, N. J., 22 Aug. 1802; d. 2 Dec. 1899. In early life he was a merchant and banker; subsequently becoming the individual owner of more miles of railroad property than any other man in the world. He acquired a very large fortune; loaned the Federal government more than $1,000,000 in the early part of the Civil War; built and endowed at a cost of more than $600,000 the Presbyterian Academy in Blairstown, N. J.; rebuilt Grinnell College, Iowa; erected Blair Hall and made other gifts to Princeton University; was equally liberal to Lafayette College; and had erected more than 100 churches in different parts of the West, besides laying out many towns and villages on the lines of his numerous railroads.

Blair, Montgomery, American lawyer: b. Franklin County, Ky., 10 May 1813; d. Silver Springs, Md., 27 July 1883. He was graduated at the United States Military Academy in 1835; resigned from the army, 1836; was admitted to the bar, 1839, and began practice in St. Louis. He was judge of the court of common pleas, 1843–9; removed to Maryland in 1852; was United States solicitor in the court of claims, 1855–8. He acted as counsel for the plaintiff in the widely known Dred Scott case. In 1861–4 he was postmaster-general. In 1876–7 he acted with the Democratic party in opposing Hayes' title to the office of President.

Blair, Robert, Scotch clergyman and poet: (eldest son of the Rev. David Blair, one of the ministers of Edinburgh, and chaplain to the king): b. Edinburgh, 1699; d. Athelstaneford, 1746. He was ordained, in 1731, minister of Athelstaneford, in East Lothian, where he spent the remainder of his life. He was a man of learning and of elegant taste and manners. A botanist and florist; he was also skilled in optical and microscopical knowledge, on which subjects he carried on a correspondence with some learned men in England. He was a man of sincere piety and very assiduous in discharging the duties of his clerical functions. His best-known poem, 'The Grave,' was chiefly composed before his ordination. It was first printed in 1743, and is now esteemed as one of the standard classics of English poetical literature, in which rank it will probably remain longer than many works of greater contemporary or even present fame.

Blake, Edward, English statesman: b. Cairngorm, Ont., Canada, 13 Oct. 1833. He was educated at Upper Canada College and Toronto University; was called to the bar in 1856 and engaged in practice in Toronto. He entered public life in 1867; was premier of Ontario, 1871–2; minister of justice, 1875–7, and the recognized leader of the Canadian Liberal party, 1880–91. He declined the appointments of chancellor of upper Canada in 1869, chief justice of Canada in 1875, and chief justice of Ontario in 1897, and also the honor of knighthood. In 1892 he was invited by the leaders of the Anti-Parnellites in Ireland to enter the British House of Commons as the representative of an Irish constituency. Consenting, he removed to South Longford, was elected for that district, and in 1895 was re-elected. In 1896 he was appointed a member of the judiciary committee of the privy council.

Blake, Eli Whitney, American inventor: b. Westboro, Mass., 27 Jan. 1795; d. New Haven, 17 Aug. 1886. He graduated at Yale University in 1816, and began business with his uncle, Eli Whitney, in the manufacture of fire-arms. In 1834 he founded, near New Haven, Conn., the pioneer factory for the manufacture of domestic hardware. In 1857 he invented the widely-known stone- and ore-crusher called the Blake crusher, which introduced a new era in road-making and mining industries, and is used throughout the world.

Blake, Francis, American inventor: b. Needham, Mass., 25 Dec. 1850. He served for 13 years on the United States Coast Survey, part of the time engaged in field work and its reduction to determine differences of longitude between the observatories at Greenwich, Paris, Cambridge, and Washington. Having devoted himself to the study of experimental physics, in 1878 he invented the famous Blake transmitter, which is the telephonic transmitter now most widely used throughout the world. He has also patented other electrical devices.

Blake, John Laurie, American clergyman and author: b. Northwood, N. H., 21 Dec. 1788; d. Orange, N. J., 6 July 1867. He was educated at Phillips Exeter Academy and at Brown University. He first entered the Congregational ministry, but in a short time became an Episcopalian and was ordained in that Church. He settled in Pawtucket, and later in Hopkinton, N. H., and in 1822 removed to Boston. He continued to teach in this school till 1830, then devoted himself to literary work. While a teacher he published several text-books, prepared for his own classes, and was editor of the 'Gospel Advocate.' His greatest work, a 'Biographical Dictionary,' was first published in 1835.

Blake, Mrs. **Lillie** (Devereux) **Umstead,** American advocate of woman's rights and novelist: b. Raleigh, N. C., 1835. Her first husband, Frank G. Quay Umstead, died in 1859; she married Grenfill Blake in 1866, who died in 1896. She has written and spoken much on woman suffrage, and her novels bear on this theme. She has written 'Southwold' (1859); 'Rockford' (1863); 'Fettered for Life' (new ed. 1885); 'Woman's Place To-Day' (1883), a reply to Dr. Morgan Dix's 'Lenten Lectures on Women,' which attracted attention; etc. In 1900 she was president of the Civic and Equality Union.

Blake, Mary Elizabeth McGrath, American poet and writer: b. Dungarven, Ireland, 1 Sept. 1840. In verse she has written 'Poems' (1882); 'Youth in Twelve Centuries' (1886); etc. Of her travels may be named 'On the Wing' (1883); 'A Summer Holiday.'

Blake, Robert, British admiral: b. Bridgewater, Somerset, August 1599; d. 17 Aug. 1657. After attending the grammar school of his native place he was sent to Wadham college, Oxford, where he took the degree of B.A. in 1617. On his return to Bridgewater he lived quietly on the fortune left him by his father, and was led to embrace the principles of the Puritans, by whose interest he was elected member for Bridgewater in the Parliament of 1640. This being soon dissolved, he lost his election for the next, and immediately sought to advance the cause in a military capacity in the war which then broke out between the king and the Parliament. He soon distinguished himself by his activity. In 1649 he was sent to command the fleet in conjunction with Cols. Deane and Popham, and thus commenced the naval career which has given him so distinguished a place in British history. He immediately sailed to Kinsale in quest of Prince Rupert, whom he attempted to block up in that port. The prince escaped to Lisbon, where Blake followed him; and, being refused permission to attack him in the Tagus by the king of Portugal, he took several rich prizes from the Portuguese (against whom the Parliament declared war), and followed Rupert to Malaga, where, without asking permission of Spain, he attacked him and nearly destroyed the whole of his fleet. On his return to England he was made warden of the Cinque Ports, and soon after reduced the islands of Scilly and Guernsey. In 1652 he was made sole admiral, and on the 19th of May was attacked in the Downs by Van Tromp with a fleet of 45 sail, the force of Blake amounting only to 23. He fought so bravely, however, that Van Tromp was obliged to retreat. He then continued his cruise, took a number of Dutch merchantmen, and after several partial actions drove the enemy into their harbor and returned to the Downs. On 29 May he was again attacked by Van Tromp, whose fleet was now increased to 80 sail. Blake engaged this vast force with a very inferior number and an unfavorable wind; but, after every possible exertion, was obliged to retreat into the Thames, on which Van Tromp was so much elated that he sailed through the Channel with a broom at his masthead, to signify that he had swept the sea of British ships. In the February following, Blake, having with great diligence repaired his fleet, put to sea with 60 sail, and soon after met the Dutch admiral, who had 70 sail and 300 merchantmen under convoy. During three days a furious running fight up the Channel was maintained with obstinate valor on both sides, the result of which was the loss of 11 men-of-war and 30 merchant ships by the Dutch, while that of the English was only one man-of-war. It was in April of this year that Cromwell assumed the sovereignty, on which occasion Blake and his brother admirals issued a declaration that, notwithstanding this change, they resolved to persist in faithfully performing their duty to the nation. «It is not for us,» said Blake to his officers, «to mind state affairs, but to keep the foreigners from fooling us.» On 3 June he again engaged Van Tromp with dubious success; but, renewing the action the next day, he forced the Dutch to retire with a considerable loss in ships and men. On his return he was received by Cromwell with great respect, and returned member in the new Parliament for Bridgewater. Aware of his affection for a republican government, the protector was not displeased at having occasion to send him, with a strong fleet, to enforce a due respect to the British flag in the Mediterranean. He sailed first to Algiers, which submitted, and then demolished the castles of Goletta and Porto Ferino, at Tunis, because the dey refused to deliver up the British captives. A squadron of his ships also blocked up Cadiz and intercepted a Spanish plate fleet. Being now very sick, he resolved to do one more service to his country before his death, and sailed with 24 ships to Santa Cruz, in Teneriffe, and, notwithstanding the strength of the place, burned the ships of another Spanish plate fleet which had taken shelter there, and by a fortunate change of wind came out without loss. His brother having failed in some part of duty during this service, he immediately removed him from his command. Finding his disorder making rapid progress he then sailed for England, and expired while the fleet was entering Plymouth Sound. His body was honored with a magnificent public funeral, and interred in Westminster Abbey, whence it was, with pitiful spite, removed at the Restoration and buried in St. Margaret's churchyard. So disinterested was he that, after all his rich captures and high posts, he scarcely left behind him $2,500 of acquired property, freely sharing all with his friends and seamen, into whom he infused that intrepidity and spirit of enterprise by which the British navy has been ever since so highly distinguished.

Blake, William, English poet, painter, and engraver: b. London, 28 Nov. 1757; d. 12 Aug. 1857. At the age of 10 he was sent to a drawing-school, and four years later he was apprenticed for seven years to the engraver James Basire, for whom he drew from the monuments in the older London churches and Westminster Abbey. In 1778 he studied in the Royal Academy, and about this time he began to engrave for the booksellers, among his chief productions being plates after Stothard for the 'Novelists' Magazine.' To the first exhibition of the Royal Academy he sent a drawing entitled 'The Death of Earl Godwin.' He married in 1782, and for the three years 1784–7 carried on a printseller's shop in partnership with another engraver. From his earliest years Blake was a mystic. He believed that all things exist in the human imagination alone, and had a wonderful power of imaginative vision which enabled him to see angels in trees and in fields, great men of past times, etc. His 'Songs of Innocence,' verse and designs (1789), and the companion 'Songs of Experience' (1794), were reproduced by himself and his wife by a process which he believed to have been revealed to him in a dream by a dead brother. Between 1793 and 1800 he produced a large number of designs, among them 537 illustrations for Young's 'Night Thoughts.' In 1800 he became acquainted, through Flaxman, with the poet William Hayley, who gave him artistic commissions, and for three years he lived in his neighborhood at Felpham. He next produced the designs to Blair's

'Grave' (engraved by Schiavonetti), which stand in the forefront of his artistic work. In 1808 he sent to the Royal Academy the pictures 'Christ in the Sepulchre Guarded by Angels,' and 'Jacob's Dream,' the last pictures he exhibited there. From 1813 till his death he had a staunch friend and patron in the painter John Linnell. It was about this time that he executed the series of pencil drawings known as 'Spiritual Portraits.' The highly prized woodcuts to Thornton's 'Virgil' were executed in 1820, and in 1825 he produced for Linnell his wonderful 'Inventions to the Book of Job,' which, containing 22 engravings, 21 original designs in colors, with the original colored drawings by the artist (the property of the Earl of Crewe), sold in London, in 1903, for $28,000. He also executed a series of engravings and designs from the 'Divina Commedia.' At the sale just mentioned 12 drawings in colors for 'L'Allegro' and 'Il Penseroso' brought $9,800, and the original colored issue of 'America, a Prophecy,' sold for $1,475. Among Blake's other writings are: 'Poetical Sketches' (1783); 'Gates of Paradise' (1793); 'Prophetic Books,' sadly incoherent, but with splendid designs (1793–1804). The only complete edition of his works is that of E. J. Ellis and W. B. Yates (3 vols. 1893). Consult Gilchrist's 'Life' (1863), and 'Works' by Swinburne (1868), and Story (1893).

Blake, William Phipps, American mineralogist: b. New York, 1 June 1826. Graduating at the Sheffield Scientific School in 1852, he joined the United States Pacific Railroad exploring expedition (1853) as mineralogist and geologist. In 1861 he became mining engineer for the Japanese government, and with R. Pumpelly organized the first school of science in Japan. As an expert in his specialty he was connected in important capacities with the Paris Exposition of 1867, the Vienna Exposition (1873), United States Centennial Exhibition (1876), Paris Universal Exposition (1878), and drafted the system of classification of United States ores and minerals at the Columbian Exposition (1893). He has conducted important explorations in Alaska, California, and Nevada, and the chief mining districts of the United States, frequently publishing his results in valuable reports and scientific papers. Publications: 'Silver Ores and Silver Mines' (1861); 'California Minerals' (1863); 'Production of the Precious Metals' (1867); 'Iron and Steel' (1873); 'Ceramic Art and Glass' (1878); 'History of the Town of Hamden, Conn.'; 'Life of Captain Jonathan Mix.'

Blake, William Rufus, American actor: b. Halifax, N. S., 1805; d. Boston, 22 April 1863. His first appearance on the American stage was at the old Chatham Theatre, New York, under the management of Mr. Barrere, in 1824, as Frederic in 'The Poor Gentleman,' and in Elliston's favorite character in 'The Three Singles.' His success was great. Jesse Rural, in 'Old Heads and Young Hearts,' was one of his best parts. Mr. Blake was a fluent and effective speaker. He was stage manager of the Tremont Theatre, Boston, joint manager of the Walnut Street Theatre, Philadelphia, and stage manager of the Broadway Theatre, New York.

Blakeley, Johnston, American naval officer: b. near Seaford, County Down, Ireland, October 1781; lost at sea, 1814. His father emigrated to the United States in 1783, and eventually made his home in Wilmington, N. C. Johnston graduated at the University of North Carolina in 1800, and on 5 February of that year entered the navy as midshipman, and rose to the rank of captain. On 1 May 1814 he left Portsmouth, N. H., in command of the new sloop-of-war Wasp, and very shortly appeared in the English Channel, spreading terror among the merchant ships and seaport towns. On 28 June he fought and defeated the British sloop Reindeer, for which exploit Congress voted him a gold medal. On 1 September he destroyed the Avon and on the 21st, near the Azores, took the Atlanta, which he sent home to Savannah. On 9 October the Wasp was spoken by the Swedish bark Adonis; and that was the last ever heard of the vessel and of those on board of her. It seems probable that, being heavily armed and sparred, the vessel foundered in a gale.

Blakelock, Ralph Albert, artist: b. New York, 15 Oct. 1847. He graduated at the College of the City of New York in 1867, and it was intended that he should follow his father's profession of medicine, but he developed a strong taste for music and the arts, and without a master taught himself painting. He has painted landscapes, moonlight scenes, and Indian figures; one of the last-named represents the Ta-vo-kok-i, or circle-dance of the Kavavite Indians. His work is very striking on account of its harmonious color-schemes. His studio is in New York.

Blakesley, Joseph Williams, English clergyman: b. London, 6 March 1808; d. Lincoln, 18 April 1885. He graduated at Trinity College, Cambridge, in 1831; was Fellow there 1831–45, and select preacher 1840–3; became a member of the New Testament Committee on Bible Revision in 1870; became dean of Lincoln in 1872. His publications include 'Life of Aristotle' (1839); 'Conciones Academicæ' (1843); and an edition of 'Herodotus' (2 vols., 1852–4).

Blakey, Robert, English writer: b. Morpeth, Northumberland, 18 May 1795; d. Belfast, 26 Oct. 1878. He bought the Newcastle *Liberator* in 1838, and got himself into trouble with the government on account of certain alleged seditious articles which he published. In 1848 he became professor of logic and metaphysics at Queen's College, Belfast. Among his works are 'Treatise on the Divine and Human Wills'; 'History of Moral Science'; 'Historical Sketch of Logic'; 'Temporal Benefits of Christianity'; and 'The Angler's Song Book.'

Blanc, blŏn, **Anthony,** American clergyman: b. Sury, France, 11 Oct. 1792; d. New Orleans, 20 June 1860. He was ordained to the Roman Catholic priesthood in 1816; went to Annapolis, Md., in 1817; was appointed bishop of New Orleans in 1835; and became archbishop there in 1850.

Blanc, Jean-Joseph-Louis, zhŏn-zhō-sĕf-loo-ē, French historian, publicist, and socialist: b. Madrid, 29 Oct. 1811; d. 6 Dec. 1882. He studied with great success in the college at Rodez, and completed his education at Paris. He was for a short time an attorney's clerk, afterward a teacher of mathematics and a private tutor. Subsequently at Paris he devoted him-

self to the career of journalism, fighting stoutly in the ranks of the militant democracy. In 1839 he founded the *Revue du Progrès*, in which first appeared his great work on socialism, 'De l'Organisation du Travail' (separately published in 1840). In this work he condemns individual and competitive rivalry in labor; society should not be subjected to a perpetual combat, but should form a harmonious whole, in which each member should contribute according to his abilities and be recompensed according to his needs. In 1841–4 appeared his 'Histoire de Dix Ans' (1830–40), in which he vigorously exposed the trickery and jobbery of the government of Louis Philippe, and which greatly contributed to bring about its downfall. On the outbreak of the revolution of 1848 Blanc was elected a member of the provisional government, and appointed president of the commission for the discussion of the question of labor. He has been unjustly charged with creating and organizing the disastrous scheme of national workshops, a scheme which he strenuously opposed. After the closing of these workshops, and the June insurrection of 1848, he was prosecuted for conspiracy, but escaped to England, where he took up a lengthened residence. During this period he wrote the bulk of his famous 'Histoire de la Révolution Française' (12 vols. 1847–62). His other works are: 'Lettres sur l'Angleterre' (1865–7); 'Histoire de la Révolution de 1848' (1870); 'Questions d'Aujourd'hui et de Demain' (1873–4); etc. On the downfall of the second empire (1870) Blanc returned to Paris and became a member of the National Assembly in 1880.

Blanc, Ludwig Gottfried, lood'vĭg got'frēd, German philologist: b. Berlin, 19 Sept. 1781; d. Halle, 18 April 1866. He was educated at the French Theological Seminary in Berlin and ordained as pastor at Halle. In 1811 he was accused of taking part in a conspiracy against the king of Westphalia, and was imprisoned at Magdeburg, and later at Kassel, until released in 1813 by a Russian skirmishing corps. He was chaplain in the Prussian army in the war of 1814–15; from 1822 was professor of the Romance languages at the University of Halle; and in 1860 was appointed preacher at the cathedral in that city. He was an authority on the Romance languages and especially on the works of Dante. In connection with his study of Dante he wrote a 'Dante Vocabulary' (in French); 'Attempt at a Philological Explanation of Several Disputed Points in the "Divine Comedy"'; and translated the 'Divine Comedy' into German. He has written also 'Grammar of the Italian Language'; and a 'Handbook of the Most Remarkable Facts of Nature and the History of the Earth and Its Inhabitants.'

Blanc, Marie Thérèse, mä-rē tā-rāz (Thérèse Bentzon), French novelist and littérateur: b. Seine-Port, 21 Sept. 1840. She has been for many years on the editorial staff of the 'Revue des Deux Mondes,' to which she has contributed notable translations and reviews of many American, English, and German authors. Her literary essays on these contemporaneous writers were collected in 'Foreign Literature and Customs' (1882), and 'Recent American Novelists' (1885). Her first work to attract attention was 'A Divorce' (1871), published in the 'Journal des Débats.' Two other novels, 'A Remorse' (1879), and 'Tony' (1889), were crowned by the French Academy. Other stories are 'Georgette' and 'Jacqueline' (1893); 'Condition of Woman in the United States' (1895).

Blanc, Paul Joseph, pōl zhō-zef, French genre painter: b. Paris 1846; d. Paris 5 July 1904. He studied under Bin and Cabanel. He won the Grand Prix de Rome in 1867; the first-class medal of the Paris Salon in 1872; the decoration of the Legion of Honor in 1878; and the first-class medal in the Paris Exposition of 1889. One of his best-known works is a decorative composition depicting the consecration, baptism, and triumph of Clovis.

Blanc, Mont. See Mont Blanc.

Blanchard, blăn-shard, **Edward Laman,** English dramatist and novelist: b. London, 1820; d. 1889. His novels, 'Temple Bar' and 'A Man Without a Destiny,' evinced no special talent for story-telling; on the other hand he composed for Drury Lane Theatre about 100 Christmas pantomimes in the vein of grotesque burlesque, among them 'Sinbad the Sailor,' which were received with unbounded popular favor.

Blanchard, Emile, ā-mēl blŏñ-shär, French naturalist: b. Paris, 6 March 1819. He is especially renowned as an entomologist, and is the author of many scientific works, including 'Researches into the Organization of Worms' (1837); 'Natural History of Orthopterous and Neuropterous Insects' (1837–40); 'History of Insects, etc.' (1843–5).

Blanchard, François, frăñ-swā, French aëronaut: b. 1753; d. 1809. He displayed great ingenuity by the invention of a hydraulic machine in the 19th year of his age, and afterward in the construction of a flying ship, which, by means of a counterpoise of six pounds, was raised to more than 20 feet from the ground. He eagerly availed himself of the discoveries of the brothers Montgolfier, and the improvements of the same by Prof. Charles and M. Robert in Paris. After having made his first aërostatic voyage, 4 March 1784, he crossed the Channel from Dover to Calais, 1785, with Dr. Jeffries, a gentleman of Boston. For this exploit he was rewarded by the king of France with a present of $2,400 and a pension of $240. In the same year, at London, he first made use of a parachute invented by him, or, according to others, by Etienne Montgolfier. After having performed many aërostatic voyages in foreign countries also, he was accused of propagating revolutionary principles, and imprisoned (1793) in the fortress of Kufstein, in the Tyrol. Having obtained his liberty, he made his 46th ascent in the city of New York in 1796. In 1798 he ascended with 16 persons in a large balloon at Rouen, and descended at a place 15 miles distant. In 1807 his aërostatic voyages amounted to more than 66. His wife continued to make aërial voyages. In 1811 she ascended in Rome, and after going a distance of 60 miles she rose again to proceed to Naples. In June 1819 having ascended from Tivoli, in Paris, her balloon took fire at a considerable height, from some fire-works which she carried with her. The car fell in the Rue de Provence, and the aëronaut was dashed to pieces.

Blanchard, Jacques, zhäk, French painter: b. Paris, 1600; d. 1638. He received the first lessons of his art from Bellori, his maternal uncle, studied some time at Lyon, and in 1624 repaired to Rome. After two years he visited Venice, studied the works of Titian and the other great colorists of his school, and executed several paintings which gave him a name. After his return to Paris he executed a great number of works, which procured him the surname of «the French Titian.» His best piece, a 'Descent of the Holy Spirit,' is in the cathedral at Nôtre Dame.

Blanchard, Jonathan, American educator: b. Rockingham, Vt., 19 Jan. 1811; d. Wheaton, Ill., 14 May 1892. He graduated at Lane Theological Seminary in 1832 and was ordained a Presbyterian minister in 1838. He was American vice-president of the World's Anti-Slavery Convention in London in 1843; and in 1846 became president of Knox College at Galesburg, Ill. He was president of Wheaton College, Ill., 1880–2; and, on resigning, was chosen president-emeritus, and subsequently gave most of his time to editing 'The Christian Cynosure.'

Blanchard, Thomas, American inventor: b. Sutton, Worcester County, Mass., 24 June 1788; d. 16 April 1864. He joined his brother in the manufacture of tacks by hand, and at the age of 18 commenced his invention of a tack-machine, which in six years he brought to such perfection that by placing in the hopper the iron to be worked, and applying the motive power, 500 tacks were made per minute with better finished heads and points than had ever been made by hand. He sold the patent for $5,000. About this time various attempts were made in the United States armories at Springfield and Harper's Ferry, to turn musket-barrels with a uniform external finish. Blanchard undertook the construction of a lathe to turn the whole of the barrel from end to end, by the combination of one single self-directing operation. About three inches of the barrel at the breech was partly cylindrical and partly with flat sides; these were all cut by the same machine, ingeniously changing to a vibrating motion as it approached the breech. The superintendent of the Springfield armory contracted with Mr. Blanchard for one of his machines. While it was in operation one of the workmen remarked that his own work of grinding the barrels was done away with. Another, employed on the wooden stocks, which were then all made by hand, said that Blanchard could not spoil his job, as he could not make a machine to turn a gunstock. Blanchard answered that he was not sure, but he would think about it, and as he was driving home the idea of his lathe for turning irregular forms suddenly struck him. The principle of this machine is, that forms are turned by a pattern the exact shape of the object to be produced, which in every part of it is successively brought in contact with a small friction-wheel; this wheel precisely regulates the motion of chisels arranged upon a cutting wheel acting upon the rough block, so that as the friction-wheel successively traverses every portion of the rotating pattern, the cutting wheel pares off the superabundant wood from end to end of the block, leaving a precise resemblance of the model. This remarkable machine, with modifications and improvements, is in use in the national armories as well as in England, and in various forms is applied to many operations in making musket-stocks, such as cutting in the cavity for the lock, barrel, ramrod, butt-plates, and mountings, comprising, together with the turning of the stock and barrel, no less than 13 different machines. Beside gunstocks, it is also applied to a great variety of objects, such as busts, shoe lasts, handles, spokes, etc. Mr. Blanchard was also interested at an early day in the construction of railroads and locomotives, and in boats contrived to ascend rapid rivers. He also invented a machine for cutting and folding envelopes, a steam wagon, and a process for bending heavy timbers.

Blanche of Bourbon, Castilian queen: b. 1338. She was the daughter of Peter, Duke of Bourbon, and in 1353 married Peter, king of Castile, surnamed the Cruel. Don Frederick, Peter's natural brother, had been deputed to meet her at Narbonne and bring her into Spain, and she is said to have so far forgotten herself as to conceive a violent passion for him. Rumors to this effect had reached the king's ears, and though he celebrated the marriage he soon showed that he had placed his affections elsewhere. He shortly after declared the marriage null, imprisoned the queen in the castle of Medina Sidonia, and is said to have gotten rid of her by poison.

Blanche of Castile, French queen: b. 1187; d. Milan, November 1252. She was the daughter of Alphonso IX., married Louis VIII. of France and became the mother of Louis IX. («St. Louis»). On the death of her husband she anticipated the formal appointment of a regency by procuring the immediate coronation of her son, and during his minority held the reins of government in his name with distinguished ability and success. In 1244, when St. Louis took his departure for the Holy Land she again became regent and gave new proofs of her talents and virtues. Her days are said to have been shortened by the long absence of her son, and a prevailing rumor that he had resolved to remain permanently in Palestine.

Blanche, August Théodor, ow'goost tā'ō-dôr blänsh, Swedish dramatist and novelist: b. Stockholm, 17 Sept. 1811; d. Stockholm, 30 Nov. 1868. His comedies and farces,—more particularly 'Jenny, or the Steamboat Trip'; 'The Doctor'; 'The Rich Uncle'; and 'The Foundling'—have made all Sweden laugh; while his realistic fictions,—among them 'The Spectre'; 'Tales of a Cabman,' and 'Sons of North and South,'—are eagerly read.

Blan'chet, Joseph Goderick, Canadian statesman: b. Saint Pierre, 1829. He studied medicine, graduating from the College of Saint Anne; but has been especially active in public life; he has been mayor of Lévis, speaker of the Provincial legislature of Quebec for seven years, and member of the Canadian Assembly, from which he resigned on account of the law on dual representation.

Blanching, the process which prevents or checks the formation of chlorophyll and other substances in plants by excluding light. It alters the flavor as well as lightens the color of celery, sea-kale, asparagus, etc., and is generally accomplished by covering the plants with earth, boards, straw, paper, etc., or, in a small way, by inverted flower-pots, kegs, barrels, etc.

Blanco, Antonio Guzman, än-tō'nyō gooz'-män blän'kō, Venezuelan soldier: b. Caracas, 29 Feb. 1828; d. 29 July 1899. He became prominent in the Federalist revolts, 1859–63, and, when his party triumphed, was made first vice-president in 1863 under Falcon, who was deposed in the revolution of 1868. Blanco led a successful counter-revolution in 1870, became president, and retained the office till 1882. In 1893 he was appointed minister to France, where he resided till his death.

Blanco, Jose Felix, hō'sa fā-lēks, Venezuelan historian: b. Mariana de Caracas, 24 Sept. 1782; d. Caracas, 8 Jan. 1872. At different times he acted in the capacity of priest, soldier, and statesman. He was one of the leaders in the revolution at Caracas, 19 April 1810, and was the first editor of the great historical work, 'Documentos para la historia de la vida publica del Libertador,' etc.

Blanco, Pedro, pā'drō, Bolivian statesman: b. Cochabamba, 19 Oct. 1795; d. Sucre, January 1829. He joined the Spanish army in 1812, but soon deserted to the patriots, and served with them till the end of the revolution. In 1828 he became a general, and in the same year, when Sucre fell, was made president of Bolivia, but was superseded in the revolution of 31 Dec. 1828. He was shot in Sucre.

Blanco, Ramon y Arenas, rä'mōn ē a-rā'nas, Marquis de Pena Plata, Spanish soldier: b. San Sebastian, Spain, 1833; d. Madrid, 4 April 1906. He began his military career in 1855 as lieutenant; was promoted captain in 1858, and won the rank of lieutenant-colonel in the war with San Domingo. In 1894 Blanco went to the Philippines as governor of Mindanao. When he returned to Spain he was assigned to the Army of the North, and in the war with the Carlists made a brilliant record. He successfully stormed Pena Plata, for which achievement he was created a marquis with that title. He succeeded Gen. Weyler as captain-general in Cuba, and his career was marked by deeds of blood and violence. When in command at the Philippines he ordered 169 prisoners to be thrown into a dungeon, where they were left for two days. When the guard opened the door they were all dead from asphyxiation. In the second Cuban insurrection 1,500 defenseless prisoners were slaughtered by his orders. At Cavité the Spanish captured several native leaders, and, by Blanco's instructions, after being tortured, the unhappy wretches were disemboweled and their bleeding bodies hung on the gates of the city. The Spanish government permitted him to resign his post in Cuba before the day set for the American occupation.

Blanco, Encalada, Manuel, mä-noo-el blän-ko-ĕn-kä-lä'dą, Spanish-American soldier: b. Buenos Ayres, 5 Sept. 1790; d. 5 Sept. 1875. He distinguished himself in the Chilean war of independence. He was chosen president of Chile in July 1826, but soon resigned and was made general of the army. He unsuccessfully invaded Peru in 1837, and was not allowed to retire till he had signed a treaty of peace. Chile annulled this treaty, and he was court-martialed, but freed. In 1847 he was intendant of Valparaiso, and in 1853–8 minister to France.

Blanco, blän'kō, **Cape** (literally, «white cape»), a name given to a great number of capes by the Spaniards, Portuguese, and Italians. It corresponds to the French *cap blanc.* The name is as common and as unphilosophical as that of White Hill, Black River, etc. The cape best known by this name is a headland on the west coast of Africa, in lat. 20° 47′ N., and lon. 16° 58′ W., the extremity of a rocky ridge which projects from the Sahara in a westerly direction, and then bending southward forms a commodious harbor called the Great Bay. Cape Blanco was first discovered by the Portuguese in 1441.

Bland, Edith Nesbit (E. Nesbit), English writer: b. London, 15 Aug. 1858. She was married to Hubert Bland, 1879. She has written several volumes of verse, as well as a series of popular children's books and several novels. Her published works include: 'Lays and Legends' (1886–92); 'Leaves of Life' (1888); 'A Pomander of Verse' (1895); 'Grim Tales' (1893); 'Something Wrong' (1893); 'The Marden Mystery' (1896); 'Songs of Love and Empire' (1897); 'The Secret of Kyriels' (1898); 'The Story of the Treasure Seekers' (1899); 'Pussy and Doggy Tales' (1899); 'The Book of Dragons' (1900); 'The Would-be Goods'; 'Nine Unlikely Tales'; 'Thirteen Ways Home' (1901); 'Five Children and It' (1902); 'The Red House' (1902); with Hubert Bland, 'The Prophet's Mantle' (1889); with Barron, 'The Butler in Bohemia' (1894).

Bland, Richard Parks, American legislator: b. near Hartford, Ky., 19 Aug. 1835; d. Lebanon, Mo., 15 June 1899. He received an academical education, and, between 1855 and 1865, practised law in Missouri, California, and Nevada, and was engaged for some time in mining. In 1865 he settled in Rolla, Mo., and practised there till he removed to Lebanon in the same State. He was a member of Congress in 1873–95 and from 1897 till his death. In 1896 he was a conspicuous candidate for the presidential nomination in the Democratic National Convention, but on the fourth ballot his name was withdrawn, and the vote of his State was cast for William J. Bryan. Mr. Bland was best known as the leader in the Lower House of Congress of the Free-Silver movement, and the author of the Bland Silver Bill. At the time of his death he was a member of the committees on coinage, weights and measures, and expenditures on public buildings.

Bland, Theodoric, American military officer: b. Prince George County, Va., 1742; d. 1 June 1790; he studied medicine in the University of Edinburgh, and for a time practised in England. He returned home in 1764, wrote against Gov. Dunmore under the name of Cassius; and was active in his profession until the outbreak of the Revolutionary War, when he sided with the Colonists, and became captain of the first troop of Virginia cavalry. In 1777 he joined the main army as a lieutenant-colonel, and later became a colonel. He distinguished himself at the battle of Brandywine, and was placed in command of the prisoners taken at Saratoga, who were marched to Charlotteville, Va. In 1780–3 he was a member of the Continental Congress, and was a representative from Virginia to the First Federal Congress in 1789.

Blank Verse, verse without rhyme. This was the invariable form of the poetry of the ancients, but it is now peculiar to the Italian, English, and German languages. The poetry of the Anglo-Saxons and the earliest English poetry was not rhymed, yet it is not generally called blank verse, as their versification had a peculiarity of its own called alliteration. When rhyme, however, was once introduced into English verse, it was for a long time regarded as the exclusive form of versification, and the Earl of Surrey, who was beheaded by order of Henry VIII. in 1547, is said to have been the first to use blank verse in England, namely, in his translation of the second and fourth books of Virgil's 'Æneid.' The most common form of blank verse in English poetry is the decasyllabic, such as that of Milton's 'Paradise Lost' and the dramas of Shakespeare. From Shakespeare's time it has been the kind of verse almost universally used by dramatic writers. Dryden, indeed, after the Restoration, introduced ryhme into his tragedies, in imitation of the French rhymed plays; but after keeping the stage for a number of years, they became intolerable to the English ear, and the introduction of rhyme into the drama has never since been attempted in England. Shakespeare not uncommonly ends a scene with a few lines of rhyme, although the rest of the scene is in blank verse, and in the subordinate play interwoven with the action of Hamlet blank verse is used throughout. The first use of the term blank verse is said to be in Hamlet, ii. 2: "The lady shall say her mind freely, or the blank verse shall halt for't."

Blanket (that is "fine white" goods), a heavy bed or horse cover, of a fabric with a thick soft nap on both sides. Originally made entirely of wool, and still so in the finest grades, the bulk of medium and cheap blankets are now made with a cotton chain or warp and a wool filling, as cheaper, stiffer, and little less durable in good condition. In the finest grades of American blankets, the filling is Australian wool, the longest and softest fibre known; the warp of American wool. The cheapest ones have for filling the shorter combings of wool, shoddy, etc.; ordinary horse blankets the same or still coarser half-cleaned wool, and largely animal hair. Of late also an immense quantity of all-cotton blankets are made, the nap being cotton wool; these have competed less with wool blankets than with comfortables, whose sale for a time they cut in half. They are used for economy, where heavy blankets are not needed, and to replace cotton sheeting in cold rooms, for children, etc. The most famous blankets in the world are those of the Mysore in India, so delicate that one 18 feet long can be rolled inside a hollow bamboo. In the United States they are a specialty in southwestern Indian domestic manufacture, especially among the quite civilized Navajos (q.v.), whose rough hand looms and stick shuttles turn out blankets weighing 20 pounds or more, and selling for $1 and $2 a pound, much prized by Alaskan and Klondike gold-seekers. But of civilized manufacture, the finest are from California, Nevada, and Oregon, and from Minneapolis; some of these retail for $25 per pair with a weight of less than 10 pounds. Maine, Ohio, and West Virginia also produce very fine goods. Below the above fancy price, of which much is loading for short runs, prices range for all-wool blankets from $20, the highest usually kept in stock, down to $7.50, and for cotton-warp down to $2, all-cotton, $1. Few blankets have been imported into this country since 1860. The early manufacture here was "a series of costly and futile experiments," except a few coarse ones for army or navy use, and for slaves on plantations, for which in 1831 a mill was started in Pendleton, S. C.; another to make "Indian" blankets was opened in Buffalo the same year. But the first effective attempt was under the sharp tariff of 1842, soon swept away by the moderate one of 1847. The tariff bill of 1857, however, which formed one of the southern counts for secession, taxed imported blankets so heavily that by 1861 importations had practically ceased. In 1860 the United States' total manufacture was 616,400 pairs, mainly in New England, Pennsylvania, and California. In 1880 this had increased to 4,400,000, gross value $6,840,000, and the prices had dropped so much that the cheaper grades had gone out of use; the foreign commissioners at the Centennial of 1876 reported that for weight, thickness, softness, and perfection of surface, nothing in Europe compared with the American, and that the European cheaper grades could not be sold even to the Indians. But competition had so glutted the market that in 1878 a great auction was held in New York to clear them off, at heavy sacrifice. In 1890 the manner of report was changed to square yards,— 20,793,644 of "house blankets," valued at $7,153,900, and 5,507,074 of horse blankets, $1,721,516. For some reason, probably the larger use of comfortables, the use of the all or part-wool article fell off heavily in the last decade — to 18,155,505 square yards, valued at $5,200,959; though horse blankets increased to 7,315,304, valued at $1,740,988 or about the same as before. The chief seats of manufacture were Pennsylvania for all-wool, and Massachusetts for cotton-warp, though Indiana, Minnesota, California, and several other States furnished large quantities.

The nap is formed in the finest grades, and till recently was so altogether, by pulling up the fibre with teazles; these have now been replaced in the cheaper makes with steel teeth or brushes on revolving cylinders, which, however, are too inflexible and liable to tear the goods to be trusted with expensive ones. The use of Jacquard patterns with two or three colors, in place of printed ones, is another change which has popularized blankets by increasing their beauty.

Blanqui, blăn-kę, **Jérôme Adolphe,** French economist: b. Nice, 1798; d. 1854. While studying medicine at Paris he made acquaintance with Jean Baptiste Say, and was induced to devote himself to the study of economics. He succeeded Say in the Conservatoire des Arts et Métiers as professor of industrial economy. Blanqui, who favored a free-trade policy, published, among other works, 'Précis Elémentaire d'Économie Politique' and 'Histoire de l'Économie Politique en Europe.'

Blanqui, Louis Auguste, French revolutionist: b. Nice, 7 Feb. 1805; d. 1 Jan. 1881. He made himself conspicuous chiefly by his passionate advocacy of the most extreme political opin-

ions, for which he suffered with the pride of a martyr. He was one of the foremost fighters in all the French revolutions of the 19th century. In 1830 he was decorated for his valor at the barricades. In 1848 he figured as the chief organizer of the popular movement under the provisional government. He took the lead also in the revolutionary *attentat* of 15 May, the aim of which was to overthrow the Constituent Assembly. At the head of an excited mob he demanded of the French representatives the resuscitation of the Polish nationality, while one of his friends pronounced the dissolution of the Assembly. For his share in these disturbances he was rewarded with a 10 years' imprisonment in Belleisle. In 1861 Blanqui was sentenced to another imprisonment of four years. After the downfall of the second empire in 1870, Blanqui resumed his revolutionary activity, and, in 1871, took a prominent part in forming the Commune. Being too unwell to endure transportation to New Caledonia, he was condemned to imprisonment for life, from which he was released in 1879. He spent nearly half of his life in prison.

Blanquillo, blan-kēl'yō, a fish of the Gulf of Mexico (*Caulolatilus chrysops*), related to the tile-fish. The name is also given in southern California to the yellow-tail (q.v.).

Blarney, Ireland, a village four miles northwest of the city of Cork, near the stream of same name, here crossed by a handsome bridge of three arches. It is a small but well-built place; and besides the parish church, contains a national school. Flax and cotton were formerly manufactured to some extent, but both of these branches have now decayed. Spinning and dyeing woolen yarn is, however, still carried on; and there is an extensive tweed manufactory employing a number of people. Blarney Castle stands on an isolated limestone rock at the junction of the Blarney and Comane. Erected in the 15th century, it was the scene of several interesting historical events; but derives its chief notoriety from a stone in its northeast angle, several feet from the top, bearing a Latin inscription, recording the date of the erection, and called the "Blarney Stone." To this stone tradition ascribes the faculty of communicating to all who kiss it that species of most persuasive fluency of speech commonly called "blarney." The "groves of Blarney" are extensive and interesting, and beneath the castle there are also some curious natural caves.

Bläser blĕ'zĕr, **Gustav,** German sculptor: b. Düsseldorf, 9 May 1813; d. Cannstatt, 20 April 1874. He was associated 11 years with Rauch and for that time shared in all his work. In 1845 he went to Rome, but returned to Berlin when appointed to design one of the groups for the "Schlossbrücke.' His group, 'Minerva Leading a Young Warrior to Battle,' is thought to be the best of the series. Among his other works are a statue of St. Matthew in the church at Helsingfors; the 'Prophet Daniel'; Barussia in the new museum at Berlin; the statues of Jeremiah, Daniel, and Charlemagne for the church at Potsdam; the equestrian statue of Frederick William III. at Cologne; 'Hospitality'; and many busts, including one of Lincoln and one of Washington.

Blashfield, Edwin Howland, American artist: b. New York, 15 Dec. 1848; studied in Paris under Léon Bonnat; and began exhibiting in the Paris Salon in 1874. He returned to the United States in 1881, and has since distinguished himself by the execution of large decorative works. Among his noteworthy productions in this line are one of the domes of the Manufacturers' building in the World's Columbian Exposition, the great central dome of the Library of Congress, and the new apartment of the appellate court in New York; besides ceiling and panel work in the residences of C. P. Huntington, W. K. Vanderbilt, and George W. C. Drexel, and in the Astoria ballroom and several clubhouses in New York.

Bla'sius, St., or **St. Blaise,** Bishop of Sebaste, in Armenia, is said to have suffered martyrdom about 316, by order of Agricola, governor of Cappadocia and little Armenia. His feast day is celebrated in the Greek church on 11 February and he is commemorated in the oldest martyrologies of the Roman church. In the Roman Martyrology, 3 February is assigned to him. He is the patron saint of wool-combers, his flesh having been torn by iron combs. He is especially invoked in diseases of children and animals, and ailments connected with the throat are more particularly in his province.

Blasphemy, is somewhat variously defined. According to the most general definition, it means the speaking irreverently of the mysteries of religion; and formerly, in Roman Catholic countries, it also included the speaking contemptuously or disrespectfully of the Holy Virgin or the saints. Public blasphemy has been considered by the Catholic Church as an unpardonable sin, and it was formerly punished with death by the municipal laws. The 77th novel of Justinian assigned this punishment to it; and the capitularies inflicted the same punishment upon such as, knowing of an act of blasphemy, did not denounce the offender. The former laws of France punished this crime with fine, corporal punishment, the gallows, and death, according to the degree and aggravation of the offense. The records of the parliaments supply numerous instances of condemnation for this crime, and many of punishment by death; others of branding and mutilation. A man was for this offense condemned to be hanged, and to have his tongue afterward cut out, and the sentence was executed at Orleans as late as 1748. But it is remarked by a writer in the French 'Encyclopédie Moderne,' that we should form an erroneous opinion from the present state of society of the effect of this offense, and the disorders it might introduce in former times; for religion was once so intimately blended with the government and laws, that to treat the received articles of faith or religious ceremonies with disrespect was in effect to attack civil institutions.

By the common law of England, as stated by Blackstone, blasphemy consists in denying the being and providence of God, contumelious reproaches of Jesus Christ, profane scoffing at Holy Scripture, etc., and is punishable by fine and imprisonment, or corporal punishment; the offense is also statutory, the statute 9 and 10 William III. cap. xxxii., declaring that if any one shall deny any of the persons of the Trinity to be God, or assert that there are more gods than one, or deny the truth of Christianity or of the Scriptures, he shall be incapable of holding any office; and for a second offense be

disabled from suing any action, or being an executer, and suffer three years' imprisonment.

By the law of Scotland, as it stood under acts of 1661 and 1695, the punishment of blasphemy was death. Blasphemy consisted of railing at or cursing God, or of obstinately persisting in denying the existence of the Supreme Being, or any of the persons of the Trinity.

The early legislation of the American colonies followed that of the mother country, and in some of them the crime of blasphemy was punished with death; but the penalty was mitigated before the establishment of independence, and imprisonment, whipping, setting on the pillory, having the tongue bored with a red-hot iron, etc., were substituted. Several penalties against blasphemy are to be found in the laws of some of the New England States, according to which it is provided that, if any person shall blaspheme, by denying, cursing, or contumeliously reproaching God, his creation, government, or final judging of the world, or by cursing or reproaching Jesus Christ or the Holy Ghost, or contumeliously reproaching the Word of God, consisting of the commonly received books of the Old and New Testament, he is liable to imprisonment for a term not exceeding five years. But the most direct and public violations of these laws are passed over without punishment or prosecution, due probably to the provisions of the National and State Constitutions, guaranteeing religious liberty, and the freedom of speech. In many States, the offense of blasphemy, not being a subject of special statutory provision, is only punishable either as an offense at common law, or a violation of the statute laws against profane swearing.

Blast Furnace, a modern mechanical appliance, or structure built of refractory material in which metallic ores are smelted in contact with fuel and flux, the combustion of the fuel being accelerated by air under pressure. The materials are fed in at the top of the furnace, and after the ores are reduced, the metal, or in some cases the matte, and the resulting slag are tapped in a molten state at or near the bottom; as a rule, the slags, being of less specific gravity than the metal, float upon it. The sizes of blast furnaces vary from a few feet to over 100 feet in height, a horizontal section through the structure showing either circular or rectangular interiors, the circular form being adopted for the larger sizes, while those of smaller height are often made rectangular to permit of introducing a number of tuyeres with air nozzles into a narrow hearth.

A vertical section of a modern American blast furnace shows at the lower part, the hearth or crucible of the shape desired, into which the air is admitted under pressure through tuyeres. On this hearth is superposed an inverted frustum of a cone forming the boshes, and above these the shaft of the furnace ascends in the form of a right cone. The shafts are inclosed by shells of sheet steel or by crinolines formed of bands and beams, and carried on columns. The boshes are usually secured by bands and the crucibles by sheet and metal jackets. The materials are charged into the shaft so that layers of fuel alternate with layers of ore and flux, the taper of the shaft being sufficient to permit of expansion as the materials are heated, and facilitate their delivery to the hopper formed by the boshes, where reduction of the ores takes place. The reduced ore, meeting the burning fuel near the tuyeres, is melted, and the liquid slag and metal drop into the hearth or crucible (the cinder or slag floating on the liquid metal), from which they are tapped out from time to time. By heating the blast before it enters the tuyeres combustion is accelerated, and the furnaces produce increased quantities of metal with reduced fuel consumption per unit of product.

The large blast furnaces smelt ores of iron or manganese, or of iron and manganese, and are from 40 to 106 feet in height, a cross section at the top of the boshes showing a circle from 10 feet to 23 feet in diameter. The blast is heated to 1,000°, and sometimes to 1,200°, or 1,400° F., and is forced into the crucibles or hearth through from 6 to 20 tuyeres, at pressures from 5 to 15, and, at times, exceeding 20 pounds per square inch. The blast furnaces smelting silver or copper ores seldom exceed 30 feet in height, the horizontal section being rectangular, and the blast pressure but a fraction of a pound. A modern blast furnace will produce from 300 to 600 tons of pig iron daily, requiring from 1,000 to 2,000 tons of ore, fuel and flux to be fed into it. The cost for construction and equipment of one of these modern furnaces, with its necessary railroad tracks, storage room and bins for receiving the raw material, the mechanism for elevating it to the top of the stack, with sufficient blowing engines, boilers, hot blast stoves, etc., ranges from $400,000 to $800,000.

As a rule, blast furnaces smelting other ores than those of iron have the top of the furnace stack open, while, in those producing iron, the top is usually sealed by a bell closing against a hopper, to distribute the stock in the wide throat of the furnace and to control the gases which are the result of the smelting operation, so as to employ the calorific value of these gases for heating the blast or for generating steam in boilers to operate machinery. The practicability of using these gases in engines, where the gas, in exploding, gives impetus to a piston, has also been demonstrated. The blast is heated in hot blast stoves, generally cylinders from 14 to 25 feet in diameter and from 50 to 115 feet high, filled with checker work of fire brick. These stoves are placed in series; the gas being admitted to and burned in a stove raises the temperature of the masonry, after which the gas is shut off and the blast forced through the highly heated checkers. By alternating a series of stoves on gas or blast, at intervals of one or two hours, a nearly uniform temperature is maintained.

The blast, after passing through the hot blast stoves, is conveyed in iron or steel conduits, lined with fire brick, to tuyeres, set in the walls of the crucible. These tuyeres are formed of an inner and outer shell with closed ends, water circulating between the two shells. The tuyeres are mostly made of bronze or copper and are set in larger tuyere blocks (also water cooled) of iron or bronze. Nozzles connect the lined air conduits to the tuyeres. The cooling water required by a modern blast furnace amounts to millions of gallons daily. A large furnace requires a boiler equipment of from 3,000 to 3,500 horse power for its blowing, pumping and elevating machinery, electric plant, etc.

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MODERN BLAST FURNACE, SHOWING AUTOMATIC HOISTING AND CHARGING EQUIPMENT.

Blast furnaces are numerous in Great Britain, Germany, France, Belgium, Spain, Russia, Austria-Hungary, Sweden, and they also exist in Canada, Mexico, Italy, China, India, and Japan. Data as to the number of these is not at hand, but the pig iron production of various countries gives an approximate idea. In 1905 these figures (in metric tons) were approximately as follows: United States 23,340,258 tons; United Kingdom 9,746,221 tons; Germany 10,987,623 tons; France 3,077,000 tons (for the first six months of 1906, 1,573,504 tons); Russia 2,125,000 tons; Austria-Hungary 1,372,300 tons; Belgium 1,310,200 tons; Sweden 531,200 tons; Spain 383,100 tons; Canada 475,491 tons; Italy 31,300 tons; all other countries (estimated) 655,000 tons; making a total production of about 54,054,783 tons.

It is impossible to give the total number of blast furnaces in the United States, for the reason that the number of those used for producing copper, silver, etc., are not collated, but lists of the furnaces employed in reducing iron ores are carefully reported by the American Iron and Steel Association. There were in 1906, in the United States, a total of 424 blast furnaces, whose aggregate reported capacity amounted to over 25,000,000 long tons of pig iron, but as all of these furnaces are not active at one time (on 31 Dec. 1905 only 313), it is more equitable to consider the practical production as between that reported and the greatest annual output, which, in 1905, amounted to 22,992,380 long tons, valued at $382,450,000 See STEEL; IRON AND STEEL; FOUNDRY PRACTICE; etc.

Blast Furnace Practice, Modern. The first requisite for the conduct of Blast Furnace Practice is equipment, and therefore although the space allotted for this article is very limited, a brief description of the apparatus required to obtain modern furnace practice is necessary.

The construction of the Duquesne Blast Furnaces in 1902 and 1903 marked a great advance in the evolution of the modern blast furnace, for the labor of filling the furnaces formerly done by hand was performed mechanically, and their size far exceeded any previously built. The capacity predicted of 600 tons per day and actually accomplished, was the most marked achievement, as it was fully 50 per cent greater than any furnace production at that time. These furnaces were 100 feet high and were equipped with powerful blowing engines of large capacity.

The ore was handled in and out of stock pile mechanically, by means of a large gantry crane euipped with a scraper bucket spanning the ore yard. The stock house was equipped with steel bins for ore, stone, and coke, and the furnaces were filled by an inclined hoist, operating a cylindrical bucket, which was deposited in the stock house on a low car and transferred to the bin chutes for filling.

This bucket was closed by a bell, to the rod of which the hoist rope was hooked when the tub was hoisted, and this bell when lowered on top discharged the contents automatically into the receiving hopper, thus forming a complete ring in layers of material in this hopper each time a tub was hoisted.

The success of these stacks was followed rapidly by the construction in different parts of the country of stacks of similar dimensions, but differing somewhat in equipment, particularly in the charging mechanism. These furnaces for a while gave good results, but later were a grave disappointment, owing to the almost universal failure of their linings after a few months' operation, while the Duquesne furnaces made over one million tons on their first lining, a result which the writer believes to have been clearly shown since to be due entir 'y to the good distribution obtained by the mechanical charging apparatus installed at the Duquesne Works.

The hoist and distributing mechanism installed at Duquesne seemed to engineers, when built, more complicated and expensive than was necessary, and at the same time they aimed to make a still greater reduction in the labor employed, but they failed to appreciate the importance of good stock distribution on top of the furnace and how it was accomplished by the Duquesne design.

The usual construction now adopted for charging the furnace is mechanical stock handling, storage bins, and skip hoists equipped with single or double skips. These dumping skips are responsible for the short life of the furnace linings, for, in discharging their load on top of the furnace, they cause a sorting of the stock, the finer parts dropping down near the dumping point of the skip, and the lumps going farthest away. It was quite possible to obtain a uniform layer in the furnace of coke, limestone, and ore, but the fact that more of the lumps went to the side of the furnace farthest from the skip made the gases channel on that side and thus cut the inwall by concentrating the smelting action to that side of the furnace. Good stock distribution may be obtained by mechanically filled furnaces provided with any kind of skip hoists by the use of the rotary distributor, of which there are three distinct types.

From the bins, an electrically driven larry should weigh and deliver the stock to the skip at the foot of the inclined furnace hoist. Plants operating on lake ore must receive most of their yearly requirements during warm weather, and hence a stocking equipment is required, and even at all furnaces some form of stocking plant is desirable.

When the plant is located on navigable water and receives its ore that way, the unloading machines operating grab buckets are arranged to deliver the material into the stock piles, from whence it is recovered by another grab bucket, operated by a gantry crane spanning the ore yard, and delivering its load into an electrically driven transfer car serving the stock bins. When two or more large furnaces are located away from navigable water, and hence receiving all the stock by rail, a mechanical car dumper is an economy.

Considering next the power equipment, we find that the water tube boiler gives the best results with waste gas as a fuel, but for more than two furnaces, much greater economy is obtained by burning the gas direct in the cylinder of the gas engine, and thus furnishing the electric power required to drive auxiliary machinery about the plant, and in the gas driven blowing engine the blast required for the furnace. In plants where the water tube boiler is still in use, the steam engines are compounded and the exhaust steam condensed in a central condenser of large capacity.

Furnace gas is made much more efficient under boilers, if cleaned before use, and if going to internal combustion engines, a thorough cleaning is absolutely necessary.

For use under boilers, the cleaning may be effected by the wet dust catcher of the contact type, where the gas is repeatedly directed against a surface of water kept clean by circulation.

Such dust catchers remove 95 per cent of the solid matter in the gas, absorbing less than 1 per cent of moisture, and reducing the temperature about 5 per cent. For use in the gas engines, the gas must be thoroughly cooled and scrubbed to remove the solid matter very completely, for which a great variety of devices are used. It is good practice to pass all the gas through a good contact wet dust catcher and thus retain most of the initial heat for the gas to be burned in the stoves, subjecting the balance to a more thorough treatment for use in the gas engines.

No furnace plant to-day is complete without some means of regulating the amount of moisture admitted into the furnace in the blast, and the most satisfactory way to do this is to reduce the amount to the lowest possible minimum. This is accomplished by refrigeration of the air admitted to the air cylinders of the blowing engines, a process patented by James Gayley, and accomplishing greater economical results than was estimated possible in that direction.

Iron Ores.—Such ores are smelted when containing from 40 per cent and upwards, and, in case of calcareous ores, even lower grade material has been treated profitably, but the costs of manufacture increase very rapidly as the yield in metallic iron drops in the mixture. It is, therefore, important to give attention to the preparation of the ore before smelting, with the view of removing objectionable elements. This concentration frequently removes considerable phosphorus which is practically unaffected by the smelting process, and occasionally reduces the sulphur, which is always a difficult and expensive element to remove.

In concentration, it is usually necessary to crush fine, which leaves the product in a finely divided state, and, as the ore grains decrease in size below what would stay on a 60 mesh sieve, the difficulty of smelting increases; hence two methods are used to agglomerate this fine product and thus render it more easily and economically smelted.

One is, briquetting either with or without binder, in the latter case, it is necessary to burn the product in a continuous furnace. The other is nodulizing, that is, agglomerating by use of the rotary kiln. This latter process practically removes all the sulphur, that occasions any trouble in the smelting; breaking up sulphates, as well as sulphides. Ores carrying 6 per cent of sulphur, contain after such treatment, less than 3-10 of 1 per cent. Some ores, principally the soft brown hematites, found quite abundantly in the Southern states, are best concentrated by washing.

The point necessary to emphasize in discussing this subject is the importance of bringing the material for smelting into the blast furnace as pure as possible, consistent upon securing the proper slag volume for good working.

Fuels.—For the blast furnace, coke (q.v.) is to-day the most commonly used, on account of the wide distribution of coking coals, but anthracite is still used largely by the plants within easy radius of the anthracite field of Pennsylvania and charcoal is still used, where timber is abundant.

The development of the retort oven, particularly with the saving of by-products, has made possible the coking of coal that is practically non-coking, in the ordinary beehive oven. At the same time, it has reduced the cost of coking from 40 cents to $1.50 per ton of coke, depending upon the nature of the coal and the market value of the by-products at the ovens.

With fuel, as with ores, it is important to eliminate earthy impurities before the smelting operation. It is therefore found advantageous to wash coal, high in sulphur and ash, that is, such as will, in the raw state, give a coke over 1.25 per cent in sulphur and 15 per cent in ash.

By-product coke, however, lacks the silvery color of beehive coke, and is not quite as efficient in the blast furnace pound per pound of the carbon contents. It is also frequently high in moisture, due to faulty methods of quenching.

In order of efficiency in the blast furnace, charcoal comes first, next anthracite, beehive coke, retort coke.

Small furnaces operate with lower fuel consumption on anthracite than on coke and it is always necessary to lighten the burden when changing such furnaces from anthracite to coke fuel. Other things beings equal, the fuel with high combined carbon is more efficient in the blast furnace than one of lower carbon content. For example, the best coke from the Pocahontas region is more efficient than the best Connellsville; the former, while a soft coke, has from 5 to 7 per cent of ash, while the latter, although hard and silvery, has from 10 to 12 per cent of ash.

Fluxes.—Purity is here a desideratum as well as in ores and fuels, but the only way it can be obtained is by choosing as pure a deposit as possible, then strip off the overlying earth carefully, and, in quarrying, throw out stratas or dykes of silicious material.

It is important that the flux for the furnace be crushed to conform with the average of the stock, which ordinarily means, broken to pass a three-inch ring.

Both Dolomite and Calcite are used as flux, the latter is a more active desulphurizing agent, but does not make as fluid a slag, and this lack of fluidity offsets to a large extent its greater affinity for sulphur. While the greater fusibility of dolomite slag increases the opportunities of calcium present to combine with the sulphur, and hence as a rule, one flux is as efficient as the other, as a purifying agent in the blast furnace process.

Throughout the South, dolomite is used when basic pig is desired and calcite when foundry iron is sought. In other words, dolomite is found to give low silicon and low sulphur, while calcite gives higher silicon in the pig.

Blast.—Each furnace should be equipped with blowing engines, capable of delivering the full quota of air at 30 lbs. pressure, if necessary, and provided with governors, to give a constant speed without regard to the pressure

of the blast. This practice has been one important cause of the very large production obtained for American blast furnaces, and has been adopted by some of the English iron masters, after remodelling their plants.

The volume of the blast required for a modern stack is 85 cu.ft. per min. for each ton of pig made per 24 hours and weighs nearly 1½ times all the solid materials charges into the furnace, hence any variations in the quantity or temperature of this blast, acts quickly upon the smelting process going on in the furnace.

In the desire to return as much heat as possible to the furnace, the use of the iron pipe stove, where the maximum temperature of the blast is limited to 950°F., has been superseded by the firebrick stove, where the temperature is only limited by the refractory quality of the firebrick lining.

The iron pipe stoves have the advantage of maintaining a nearly constant temperature of the blast, so long as there is gas enough to fully supply the burners in the stove setting, but has the disadvantage of cooling off very rapidly, when blast is taken off the furnace for any purpose.

Firebrick stoves drop in temperature from 50° to 250°F. from the beginning to the end of an hour's blow, the usual period, but hold their heat when closed up tightly during a shut down of the furnace for a short period.

The best results with use of firebrick stoves is obtained by means of a good recording pyrometer to give the temperature of the blast going into the furnace and by introducing cold air through a tempering pipe, so as to hold the mixture of cold and hot blast at the temperature desired.

It is a good practice to maintain the temperature of the stoves two hundred degrees (200°) hotter than the blast going into the furnace, as a reserve to be called upon, should the furnace turn cold. With blast at constant volume and temperature, there is still another variable, which needs controlling, and that is the humidity of this blast.

The humidity of the atmosphere may vary from 9 grains in the summer to as low as 1 grain in the winter, and between these extremes, the humidity varies widely and rapidly during even a few hours of any day. Just the importance of this variable to furnace operation was never demonstrated until Mr. James Gayley constructed at the Isabella furnaces in the year 1904 his desiccating apparatus to furnish dry air for that plant. This trial showed that with blast at less than 2 grains of moisture per cubic foot, a saving of 20 per cent of the fuel required per ton of coke was effected, while theoretically only 3 7-10 per cent was expected. Since these astounding results, many efforts have been made by prominent metallurgists to explain the discrepancy between the actual and theoretical saving, current metallurgical literature contains much of interest on this subject.

Gas.—The waste gases issuing from the furnace consist principally of nitrogen, carbonic oxide (C O), carbonic acid (C O_2) and water in the form of steam.

The ratio C O and C O_2 indicates the character of the combustion taking place in the furnace hearth, the larger the percentage of C O_2, the better the combustion and the lower the fuel consumption. A good average ratio for the United States is C O-2 and C O_2-1, that is (2 to 1). In rare instances it has been as low as 1½ to1, but with a hot furnace making foundry or high silicon pig, it may reach 4 to 1, or in speigle manufacture, from 10 to 15 to 1, depending on the mixture being smelted.

To obtain the maximum economy in iron smelting, every effort is made to utilize the heat units escaping in the waste gases. This is accomplished in two ways. One portion is used in heating the blast, as already described, and the remainder is burned for power, either under water tube boilers, for the generation of steam, or in the cylinder of gas engines, about 65 per cent of the total waste gas produced being usually available for this purpose, and the balance 35 per cent going into the stoves for heating the blast.

The modern furnace is a large producer of power in excess of its own requirements, especially when the gas is utilized in gas driven engines. Such engines may furnish the blast required, and electrical energy for distribution about the furnaces, providing also an excess for sale or distribution elsewhere, amounting to 800 H.P. per ton of pig per hour.

Cinder or Slag.—This by-product in the manufacture of pig iron is a silicate of the oxides of the metals not reduced in the process. Various attempts have been made to utilize this material, and it is quite extensively used for road making and for railroad ballast. For this purpose it is frequently run when hot onto an endless chain of cast iron pans, and discharged broken and chilled, in cars for distribution. This method has the advantage of making the surface of the slag vitreous, and thus impervious to water.

The most remunerative use for furnace slag of certain composition is in the manufacture of slag cement. For this purpose the slag must not be over 4 per cent in magnesia and from 12 to 14 per cent in alumina. Two kinds of slag cement are manufactured, the ordinary Puzzolani, made direct from the slag without reburning, and slag Portland cement, made by clinkering the slag in a rotary kiln and then grinding. When slag is intended for cement purposes it is granulated, that is, run while hot into water, which breaks it up in the form of sand. Such material is also useful to replace sand in making concrete.

Granulated cinder is light or heavy, depending upon the amount of water used in quenching. In the first case, it seems to consist of small globules of chilled cinder, in the latter, it resembles sand.

The quantity of slag made per ton of pig produced varies from 600 lbs. per gross ton of pig to 3,000 lbs. and over. The slag has an important bearing on the quality of the pig made, and is one of the great purifying agents of the blast furnace. The greater part of the furnace slag produced, however, is unutilized, and is usually tapped into iron cars called ladles and hauled in the fluid state to the bank, where it is poured out.

Iron Product.—This metal is a crude carbide of iron, containing about 94 per cent of metallic iron, from 3.25 per cent to 3.75 per cent of carbon and graphite, silicon varying usually from ½ per cent to 4 per cent, and sulphur usually

from .01 per cent to .10 per cent, while the phosphorus in Bessemer pig is less than .10 per cent and in low phosphorus pig down to .03 per cent, and in basic from .10 per cent to 3 or 4 per cent, depending on the ores used. In the manufacture of pig iron, it is possible to vary the percentage of carbon somewhat and the proportions of carbon to graphite.

It is also possible to control the sulphur, and the silicon, but the phosphorus must be controlled solely by the choice of the materials charged. This choice also influences the formation of other elements under discussion, but in case of phosphorus, it is the *only* means for effecting such control or regulation.

Practically all of the phosphorus contained in the fuel flux and ore passes into the product, except a loss when making high silicon foundry iron of about 7 per cent by volatilization, and this loss may be increased to 10 per cent in the manufacture of speigle.

The usual way of handling the pig product is to run the metal while hot into moulds made in sand, forming a runner called a sow and short branches about three feet long, called pigs.

In case of gray iron, this metal is broken hot, when it has first solidified, and then cooled with water and loaded into cars. This iron has considerable sand adhering to the surface of the pigs, and for that reason is unsuited to melt in the open hearth furnace, where the lining is made of basic material. In order to obtain iron free from sand, and to reduce the arduous work of breaking this product hot, and carrying same by hand into cars for shipment, various devices have been constructed.

The Uehling pig machine is the most common device employed to make sandless pig. It consists of an endless chain of moulds, which are filled at one point and after spraying with water, discharge the pig into a transverse pan conveyer, which carries the pig under water, where it is thoroughly cooled and afterwards is delivered into cars for shipment.

Another form is provided with moulds and pans made of soft flange steel, and these when filled, pass into a tan where they are submerged, the metal cooled, and then delivered into cars. Still another form consists of a substantial turntable on which the moulds are mounted.

When it is not necessary to obtain sandless pig, the mechanical pig breaker is used. In the operation of this device the metal is cast in sand and the whole bed is removed mechanically by a travelling crane or trolley to the breaker, where the pigs are broken and fall into cars.

With the pig machines the metal must be first run into cars or ladles, from which it is poured into the machine, but with the pig breaker no ladles are required, the metal going direct into sand beds, as when it is to be handled by hand. Sandless pig may also be obtained by equipping the cast house with cast iron moulds or "chills," which are washed with loam while hot, thus making it easy to lift the pig when it is cooled.

Pig iron before the advent of the pig machine, and even since for some purposes, is graded according to fracture as follows:

No. 1, No. 2, No. 3 forge, mottled and white, the first No. 1 and No. 2 being made in a hot furnace and white in a cold furnace. No. 1 is called the highest grade and contains, as a rule, the lowest sulphur, and the highest percentage of graphitic carbon; white is called the lowest grade and is usually high in sulphur, low in graphite and high in combined carbon. These grades are practically obliterated in machine cast pig, and the iron is usually sold by analysis. This method of classifying also obtains at large steel plants, where most of the pig is taken direct, that is, in the fluid state, to the Bessemer or Open Hearth for treatment.

Blast Furnace Lines.—In the blast furnace the hearth represents the grate surface, and its area determines the amount of fuel burned per unit of time, hence, the production of the furnace. The top of the furnace controls the distribution of the charged materials, and has an important bearing on the working of the furnace, the character of the combustion taking place in the hearth, and hence the burden or amount of charge the coke unit is capable of carrying in smelting.

The bosh determines to a large extent, depending upon its height and angle of slope, the regularity of the working of the furnace, by assisting or retarding the descent of the charge in the smelting zone.

The largest furnaces in the United States at this writing are built with the hearth and top diameters practically equal, 15′-6″ to 16′-0″, while the diameter of the bosh is usually 25 per cent greater and the angle of the slope approximately 74°.

The tendency of the last five years has been to increase the hearth and top diameters, while the bosh has remained about the same in diameter, but lower in height. These changes seem to cause the stacks to work with greater regularity, and larger outputs on burdens composed, largely, of fine ore, and, at the same time, the loss of ore in flue dust has been materially reduced.

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Blasting, the technical term for splitting and breaking up any object by means of gunpowder or some of the other powerful explosives now in use. The operation, which is of extensive use in quarrying, mining, and other branches of engineering, is often performed by boring a hole in the substance to be exploded, by means of an iron rod, called a jumper, filling it with gunpowder, and igniting this by means of a match, burning so slowly as to allow the parties employed to remove to a sufficient distance before the explosion takes place. At one time it was supposed that the force of the explosion depended on the firm packing of the gunpowder in the hole by means of small chips of stone, sand, etc. It has since been ascertained that loose sand is as effectual as firm packing, which in consequence has been generally laid aside. One of the most important modern improvements in blasting is the firing of the charge by electricity. This mode is more especially applicable to submarine blasting, and was first practised for that purpose by Gen. Pasley, in 1839. The only thing necessary is to make an interruption in the conducting wire at the point where the explosion is to take place. In passing the electric current,

a spark produced at the interruption fires the charge. The effect being instantaneous the operator can fire any number of charges simultaneously. Gun-cotton is often employed in blasting, and nitro-glycerine has also been found to be a very powerful agent in such operations, but its use requires the utmost caution, as it is very liable to explode unexpectedly with most disastrous results. The same objection does not apply to dynamite, which is quite as effective and perfectly harmless when properly handled. For removing small volumes of rock in mines, quarries, and other engineering enterprises at a single blast, small-shot blasting is the most common method employed. This consists of drilling a small number of holes in the rock from 1¼ to 3 inches in diameter and from 18 inches to several feet in depth which are then filled with dynamite or blasting-powder or some other safe and easily handled explosive, and properly connected by fuse or with a magneto-machine or electric battery by electric wires. The space above the explosive is then plugged up with sand, dirt, clay, or other matter, and the charge exploded. For breaking the rock into small pieces so as to be more easily removed (as in excavating for a foundation) the holes are drilled close together and heavily charged, but where it is unnecessary to break into small pieces (as in quarrying) and large shapely masses are more desirable the holes are drilled in rows with greater distance between and filled with a smaller amount of explosive. This will split the rock practically along one line and will not shatter it as in the first case. In excavating tunnels, it is in many cases desirable to remove a mass of rock the size of the tunnel cross-section, an object which is generally accomplished by drilling and firing a small number of converging holes, thus forming and removing a cone-shaped or wedge-shaped centre-core. This central opening thus formed is enlarged by drilling and blasting successive rings of holes around it.

For removing vast quantities of rock or blowing up ledges, the best method is mine blasting. For this purpose shafts are sunk either vertically, or horizontally, or both, into the ledge to be removed; enormous quantities of powder, dynamite, or other explosives are placed at the bottom or end of the shafts, which are then closed up by rocks, earth, etc., and the charge is fired either by fuse or by electricity, most generally the latter.

One of the greatest mine blasting operations ever attempted was the removal of the reefs in the East River, near New York, known as Hell Gate. An entrance shaft was sunk on the Long Island shore, from which the reef projected. From this shaft nearly 20 tunnels were bored in all directions, extending from 200 to 240 feet, and connected by lateral galleries. Upward of 52,000 pounds of dynamite, rend rock, and powder were used, and millions of tons of rock were dislodged. In May 1894 a vertical cliff, Greben Point, was blown up in order to remove a rock obstruction in the Danube River, known as the "Iron Gates"; in 1889 the face of a quarry at South Bethlehem, N. Y., was broken down by a mine blast and in 1886 the same operation was carried out at Crarae Quarry in Argyllshire, Scotland; and on 18 Dec. 1899 a granite mound, known as Vesuvius Butte, was blown up in order to secure a sufficient quantity of rock to build a dam near Teller, Colorado. Surface blasting is generally used to remove reefs and obstructions to navigation, high explosives such as dynamite, gun-cotton, or nitro-glycerine being the only effective agencies in an unconfined space, as the detonation is so sudden that the shock is instantly transmitted to the rock with which it is in contact. Numerous important improvements have been made in blasting by the substitution of rock boring machines for hand labor. Of such machines, in which the jumper or drill is repeatedly driven against the rock by compressed air or steam, being also made to rotate slightly at each blow, there are many varieties. See also Explosives.

Blastomeryx. See Merycodus.

Blatchford, Samuel, jurist: b. New York, 9 March 1820; d. Newport, R. I., 7 July 1893. He graduated at Columbia, 1837; became secretary to Gov. W. H. Seward of New York, and practised law at Auburn, N. Y., as a member of the governor's firm, 1845-54. In 1854 he settled in New York as head of the firm of Blatchford, Seward & Griswold. Though he attained success in general practice, it was his application to admiralty law that gave him his widest repute. On 3 May 1867 he was appointed judge of the United States district court for the Southern district of New York; in March 1878, judge of the United States circuit for the second circuit; and in March 1882 he became an associate justice of the United States supreme court. Here he continued to give close attention to admiralty cases, and also rendered important decisions on bankruptcy, copyright, patent, and libel cases. Publications: 'Reports of Cases in Prize in the Circuit and District Courts for the Southern District of New York 1861-5' (1866); 'Reports of Cases in the Circuit Court of the United States, Volumes 4-6' (1867-9); 'Circuit Court Reports for the Second Circuit, 1847-75' (12 vols. octavo); 'Reports of the Circuit Courts of the United States, Second Circuit, Volumes 13-20' (N. Y. 1877-83, 8 vols.); with E. Howland and E. R. Olcott, 'United States District Court Reports (Admiralty Cases Decided by Judge Betts) for the Southern District of New York, 1827-47' (N. Y., 2 vols. octavo).

Blatchley, Willis Stanley, naturalist: b. Madison, Conn., 6 Oct. 1859. He graduated at Indiana State University 1887, and was successively an assistant on the Arkansas Geological Survey 1889-90, a member of Scoville's scientific expedition to Mexico 1891, and assistant on the United States Fish Commission in 1893. In 1894 he was elected State geologist of Indiana, and re-elected 1898 and 1902. Besides his annual reports his scientific writings include: 'Gleanings from Nature' (1899); 'Locustidæ and Blattidæ of Indiana' (1892); 'Some Indiana Acrididæ' (1891-8); 'Descriptions of New Species of Orthoptera'; 'A Nature Wooing' (1902); etc.

Blat'tidæ. See Cockroach.

Blaubok, blow'bŏk, a large antelope of South Africa. (*Hippotragus niger*). It is of a

bluish hue, and has long, stout horns which sweep back from its forehead like those of its relatives, the isabel and equine antelopes. It formerly occurred in large herds, but had a limited habitat, and is now probably extinct.

Blauvelt, blow'vĕlt, **Mme. Lillian Evans** (Mrs. Wm. F. Pendleton), prima donna: b. Brooklyn, N. Y., about 1870, of Welsh and Dutch ancestry. When eight years old she made her début as a violinist. She studied (voice) with M. Jacque Bouhy, of Paris, for three years. Her début in opera was made at the Theatre de la Mormari, Brussels, and she has taken the principal roles in 'Faust,' 'Romeo and Juliet,' 'Myna,' etc. Of late her work has been chiefly in concert and oratorio. Besides Great Britain, Canada, and the United States, she has sung in Russia, Germany, France, Italy, Holland, Belgium, Austria-Hungary, and Switzerland.

Blavatsky, blą-väts'kę, **Helene Petrovna,** Russian theosophist: b. Yekaterinoslay, Russia, 1831; d. London, 8 May 1891. She traveled in all parts of the world and succeeded in entering Tibet. In 1873 she came to the United States, founded the Theosophical Society in New York, and aided in establishing 'The Theosophist.' She studied the East Indian esoteric doctrines and Buddhist philosophy, and by her writings contributed to make this philosophy popular. She wrote 'Isis Unveiled'; 'The Secret Doctrine'; 'Key to Theosophy.' See Theosophy.

Blazing Star. Various hardy perennial plants. See Liatris.

Blazonry, the art of describing a coat of arms in such a way that an accurate drawing may be made from the verbal statements given. To do this a knowledge of the points of the shield is particularly necessary. Mention should be made of the tincture or tinctures of the field; of the charges which are laid immediately upon it, with their forms and tinctures; which is the principal ordinary, or, if there is none, then which covers the fess point; the charges on each side of the principal one; the charges on the central one, the bordure — with its charges; the canton and chief, with all charges on them; and, finally, the differences or marks of the cadency and the baronet's badge.

Bleaching (Fr. *blanchiment,* "whitening"), the process of removing the coloring matters from fabrics of cotton, linen, wool, silk, etc., or from the raw materials, and also from straw, wax, and other substances, and leaving them perfectly white. Steeping cloths in lyes extracted from the ashes of plants, appears to have been practised by the ancient Egyptians for this purpose. In modern times the Dutch have almost monopolized the business, at least till within about 100 years. Previous to this time the brown linens manufactured in Scotland were regularly sent to Holland to be bleached. A whole summer was required for the operation; but if the cloths were sent in the fall of the year, they were not returned for 12 months. It was this practice which caused the name of Hollands to be given to these linens. The Scotch introduced the business of bleaching for themselves about the year 1749; but it was long believed that the peculiar properties of the water about the bleaching grounds of Haarlem gave to this neighborhood advantages which no other region could possess. The use of chlorine as a bleaching agent was first proposed by Berthollet in 1785, and shortly afterward introduced into Great Britain, where it was first used simply dissolved in water, afterward dissolved in alkali, and then in the form of bleaching powder, commonly called chloride of lime, the manufacture of which was suggested by Mr. Tennant, of St. Rollox, Glasgow, in 1798. At first he passed the chlorine into milk of lime, and thus obtained the solution known as bleach liquor. In 1799 he took out a patent for absorbing chlorine by dry lime, and thus obtained bleaching powder. Bleaching powder has little bleaching action till the chlorine is liberated by the action of an acid. The best bleaching powder contains about 36 per cent of available chlorine; that is, chlorine which is liberated by acid.

In Silesia and Bohemia, where the chlorine process is not adopted, the linens are exposed to a fermenting process, then washed, and steeped in alkaline liquors, with alternate exposures upon grass, which processes are repeated a great number of times for 60 to 70 days; but to render them properly white, they are afterward passed through a bath acidulated with sulphuric acid, then treated again with the potash lye several times and alternately exposed on the grass, and finally thoroughly cleansed by washing in a revolving cylinder called a dash-wheel. This machine is also employed in the English and Scotch processes for washing the goods without subjecting them to unnecessary wear. The frequent repetition of the different processes is rendered necessary by the complete diffusion of the coloring matters through the flax fibres, and their close union with them; each operation decomposing and removing in succession small portions only.

In the bleaching of cotton cloth, the pieces, after being singed, by passing them over a red-hot plate or a semi-cylinder of iron or copper, are steeped in lukewarm water or old lyes, till they are completely soaked, which loosens any paste or filth got during weaving; they are then well washed through the dash-wheel, and put through the hydro-extractor or drying machine. If the cotton is in the hank, this process of steeping and washing is not required.

The mechanical operations of the bleaching house vary considerably, according to the quality of the goods and the facility for mechanical appliances. In the chemical operations of whitening the cloth there is little variation, further than that heavy fabrics require longer time and more frequent repetition of the processes. The first operation, after steeping and washing, is boiling. The boiling liquor is made by adding a quantity of water to slaked lime, and when the grosser particles of lime have settled to the bottom of the vessel, the milky liquor is put into the boiler, or, it may be, filtered through a cloth. Some bleachers use with the lime a little carbonate of soda; the quantity of lime varies from four pounds to eight pounds for every 100 pounds of cotton, and from one pound to two pounds of soda ash, where this is used. The boilers used for boiling the goods are called *kiers,* and many kinds are used, the boiling liquid being made to shower over the goods and percolate down through them. This is effected by having a false bottom or frame fitted inside the boiler at about one third of its depth from the bottom, upon which the goods are laid. The space between the false bottom

and real bottom of the boiler is filled with the liquor or lye, connected with which is a pipe leading to the top of the boiler. When the heat is applied, either by steam or fire, and the liquor begins to boil, it is forced up through this pipe, which is made to shower its contents over the surface of the goods. This boiling is continued, according to the quality of the goods, from 6 to 12 hours. The goods are now removed from the boiler and washed in water; they are then passed through dilute hydrochloric acid, again washed, and boiled for 12 hours with dilute caustic soda, after which they are passed into a solution of bleaching powder contained in a large stone or wooden trough or cistern, where they are left for from two to four hours. The bleaching solution is prepared by first dissolving a quantity of bleaching powder in water in a large cask and allowing the whole to settle; a quantity of the clear liquor is then drawn from the cask and put into the large bleaching cisterns, which have been previously nearly filled with water. To ascertain the necessary quantity of this strong bleaching liquor to be added to the troughs or cisterns, a certain measure of sulphate of indigo is taken in a graduated vessel, termed a test glass, and then, according to the number of graduated measures of the bleaching solution required to decolor the sulphate of indigo, the strength of the bleaching liquor is regulated. These test glasses and sulphate of indigo are carefully prepared for the purpose.

Instead of dash wheels, a more improved method of cleaning and washing is adopted by some bleachers previous to boiling the goods. They are all sewed together, end to end, making one line of the whole. This line of pieces is drawn along by machinery between rollers and squeezers, with a plentiful supply of water, and having been thus thoroughly washed and cleaned, is at last laid out by a mechanical contrivance into the bleaching trough. The goods are allowed to steep in the bleaching liquor from two to four hours; they are then lifted and washed, either by the dash wheel or rollers, as before, and are then laid in a sour, made by adding about one pint of hydrochloric or sulphuric acid to every four gallons of water. After steeping in the sour for four hours, the goods are again washed, as before, and are subjected to another boiling for eight hours; but this time the lye is caustic soda or potash, generally the former, made caustic by boiling together a quantity of soda ash and slaked lime, and allowing the sediment to settle, and using only the clear solution. About eight pounds of soda ash suffice for 100 pounds of goods. After the boiling the goods are again washed and steeped in the bleaching liquor for eight hours, and again washed and soured — the sour in this case being always made with sulphuric acid. Light fabrics require no further treatment; but heavy fabrics need a clearing process, which is a repetition of the last course, the liquors being generally, however, a little weaker, and the processes shorter. Cotton, in the hank, undergoes the same operation, except in the washings, which are performed by hand, not with the wheel. The goods being bleached and dried by the extractor, are now prepared for the operations of finishing. For this purpose they are stretched by women to their breadth, and the folds, as much as possible, taken out by beating them; then they are stitched together by the ends with a sailor's needle, and being thus prepared for the mangle the cloth is now starched, common wheat flour and a portion of porcelain clay being employed. It is then subjected to to the action of the stiffening machine, and having been thus impregnated with starch, the superfluous portion of which is pressed out as it passes through the rollers above, the goods are then hung upon rails in an apartment, called the stove, heated by two furnaces from which flues are led through the room. The heat thus generated is sometimes so great that the workmen, in hanging up the cloth, are obliged to throw off most of their clothes. When the goods are dried thoroughly, they are taken from the stove and carried to the damping machine, where they are subjected to the action of a shower of water. When the cloth comes from the damping machine, it may be seen covered with wet spots, the greater portion, however, being dry; but after remaining some time it becomes uniformly damp. The goods are now passed through the calender; they are then regularly folded and put into a Bramah press, with a sheet of pasteboard between each, and, being sufficiently pressed, they are then finished for the market. The process has been greatly shortened by the introduction of the Mather-Thompson process (1884). In this process an important feature is the use of the steamer kier, in which the goods are submitted to the action of low-pressure steam. The material is passed through soda lye, squeezed, and washed; then through boiling caustic soda, squeezed, and run into a steamer kier, where it is boiled for four hours under a pressure of four pounds, washed with hot water, and then passed continuously through a series of vats containing water, bleaching powder solution, carbonic acid gas, water, alkaline solution, water, bleaching powder, carbonic acid gas, water, hydrochloric acid.

The bleaching of linen is conducted after a similar manner to that of cotton; but there is much more coloring matter in the former than in the latter, and it is therefore found necessary in the bleaching of linen to repeat the boiling in lye and the steeping in chloride of lime three or four times. An electrolytic method of bleaching (the Hermite process) has recently been introduced. The chlorine for bleaching is liberated by the action of an electric current on solutions of calcium or magnesium chloride. Wool and silk cannot be bleached with chlorine, so sulphur dioxid, usually prepared by burning sulphur, is used instead. In the case of wool, the material is well washed with water and scoured with alkaline solutions to remove fatty matters. It is then exposed, while still wet, to the action of sulphur dioxid in a brick chamber for six or eight hours,— or it may be soaked for several hours in a solution of sulphurous acid,— after which it is well washed. Silk is treated with dilute acid, then worked in a soap bath for about 20 minutes to remove the gummy matter present, after which it is rinsed, tied up in bags of cotton, and boiled for from one to three hours in water, and rinsed in dilute alkali and finally in water. The bleaching is effected by stoving in sulphur dioxid, exactly as in the case of wool. In place of sulphur dioxid, hydrogen peroxid is coming into use for both wool and silk bleaching.

Bleaching Powder, a compound of lime, chlorine, and oxygen, greatly used for bleaching purposes, and as a disinfectant. It is commonly known also as "chloride of lime," a name somewhat unfortunately chosen, since it appears to imply that the substance is simple chloride of the element calcium, which is far from being the case. Its precise chemical nature has never been satisfactorily demonstrated, but it is believed to consist essentially of a mixture of calcium chloride and calcium hypochlorite. In preparing bleaching powder on a commercial scale, slaked lime is spread out, in a thin layer, on the floor of a chamber constructed of stone, or lined with lead. Chlorine gas is then admitted to the chamber, and allowed to act upon the lime until the latter has absorbed considerable of it, and has been superficially transformed into the substance desired. The lime on the floor is then thoroughly raked over, so as to expose a fresh surface to the chlorine, and the process is continued until samples of the powder, withdrawn for the purpose of analysis, are found to contain about 37 per cent of available chlorine. The lime used in the process should be as free from magnesia as possible, as otherwise more or less of the chlorine is wasted by the formation of undesirable compounds of chlorine and magnesium. The chlorine used in the manufacture of bleaching powder has been largely produced, in the past by heating manganese dioxid with the hydrochloric acid obtained as a by-product in the manufacture of soda from common salt. The tendency in recent times, however, has been toward the more direct manufacture of soda by the electrolysis of a solution of salt in water. Free chlorine gas is given off at the anode during this electrolytic process, and this is now largely utilized for the manufacture of bleaching powder; bleaching powder and soda being both produced in the same factory. Large works embodying this idea are in operation at Niagara Falls, and most of the soda and bleaching powders manufactured in the United States now come from that place. Bleaching powder is white, or nearly so, and has a strong smell of chlorine. Its disinfecting properties are supposed to be due to the slow liberation of that gas, which is a powerful germicide.

Bleak, or **Blick** (*Leuciscus alburnus*), a small river fish, six or seven inches long, of the carp family. It somewhat resembles the dace. Its back is greenish, otherwise it is of a silvery color, and its silvery scales are used in the manufacture of artificial pearls. It is a good food fish.

Bleak House, a novel by Charles Dickens (1853). Its secondary theme is the monstrous injustice and even ruin often wrought by delays in the old Court of Chancery, which defeated all the purposes of a court of justice.

Blechen, Karl Eduard, kärl ĕd'oo-ard bhĕH'ĕn, German landscape artist: b. Kottbus, 1798; d. 1840. After studying art in Italy for some years he settled in Berlin in 1830 and became professor at the Academy of Fine Arts there in 1835. The first representative of the Berlin landscape school, he painted 'Villa Este'; 'Villa Borghese'; 'View Near Nami'; 'View of Naples'; 'View at Tivoli'; etc.

Bled'soe, Albert Taylor, American clergyman and writer: b. Frankfort, Ky., 9 Nov. 1809; d. Alexandria, Va., 1 Dec. 1877. He was assistant secretary of war of the Southern Confederacy, and successively an Episcopal and a Methodist minister. He was also professor of mathematics at Kenyon College and at Miami University, 1833–6. Besides editing the 'Southern Review' and contributing frequently to leading literary, scientific, and theological periodicals, he wrote 'Examination of Edwards on the Will' (1845); 'Theodicy' (new ed. 1853); 'Philosophy of Mathematics' (1868); etc.

Bleecker, Ann Eliza, American poet, daughter of Brandt Schuyler: b. New York, Oct. 1752; d. Tomhanick, near Albany, N. Y., 23 Nov. 1783. She married, in 1769, John J. Bleecker, and moved to Tomhanick, whence she was driven by the news of the approach of Burgoyne's army. Her husband had already left to provide means of escape, when she was obliged to fly on foot, in the midst of her family, and of a crowd of other helpless persons, for refuge from the advancing savages. After enduring great horrors and distresses, they made their escape to Albany, and thence by water to Red Hook, where they remained until the surrender of Burgoyne enabled them to return to their home. Her poems were written as suggested by occasions, without a view to publication. She possessed a sportive fancy, with much tenderness of feeling, but the sad experiences of her life produced upon her such an effect, that she destroyed "all the pieces that were not as melancholy as herself." Her poems are to be found in the earlier numbers of the 'New York Magazine,' and a collection of her stories and "poetics" in a volume published in 1793, by her daughter Margaretta.

Bleeding, the escape of blood from the arteries or veins. Bleeding may be external, and thus readily seen and prevented by proper surgical measures, or it may take place internally, into one of the large body cavities, and is then a serious matter. The amount of blood that is in the human body varies from one tenth to one twelfth of the weight of the individual, and of this from 40 to 60 per cent may be lost without resulting in death from the direct effects of bleeding. Death may result in some individuals from the loss of much smaller quantities, but most persons can lose two fifths of their blood and not die. Bleeding varies widely in its rapidity. Some wounds ooze, others well-up, and again bleeding may be very rapid when a large vessel has been cut.

Bleeding from a vein or an artery may be recognized by the dark color and regular flow from the former, and the brighter red and spurting or throbbing flow from the latter. If bleeding is taking place while pressure is being applied to a cut these differences may not be so pronounced. In emergencies bleeding from an artery may be stopped by direct and hard pressure of the carefully cleaned finger immediately over the source of the issuing jet of blood. This pressure must be hard and continued. This will permit time to find the chief artery that is supplying the bleeding vessel, and as soon as this is found pressure upon it will further aid in suppressing the flow. Thus the brachial artery can be found on the inside of the arm by feeling on the patient's well side, and firm pres-

sure on it will stop all bleeding in the parts below, as in a cut wrist or cut hand. Pressure on the femoral artery in the groin will control all bleeding below the point of pressure. As pressure by means of the finger is difficult to maintain, an improvised apparatus may be made of a knotted napkin or large handkerchief. This may be placed about the arm or leg, the knot brought to press on the artery and then by means of a short stick the whole may be made to tightly compress the entire limb. (See TOURNIQUET). Pressure of this kind should not be too prolonged, or serious damage to the parts may result. Venous bleeding is usually controlled by direct pressure of the limb on the side away from the heart and by direct pressure of antiseptic gauze. In oozing, direct pressure of antiseptic gauze or direct application of hot water, 118-120° F., is most effective. Powders, cobwebs, iron, alum, etc., are not advisedly used.

Internal hemorrhage is extremely important, since the blood cannot be seen, and one has to rely on the symptoms solely. These are usually a beginning sense of faintness or weakness, and perhaps some nausea. The extremities commence to get cold and white, the face becomes pale and anxious, and the patient may commence to have air-hunger. He desires the windows to be opened wide, thinking thereby to get more air. Thus the beginning symptoms are very similar to those of a severe fainting spell. But as the bleeding continues there is increasing restlessness with increased air-hunger; there may be cold, clammy sweat over the patient's body; there is sighing to gasping respiration, and the heart-beat is hard to hear and it may be impossible to feel the pulse beat. The patient may die in convulsions, the face becoming deeply cyanosed, and the respirations spasmodic or convulsive in type. If the patient does not die he will have a long, tedious convalescence. Prompt medical or surgical aid is imperative in all such cases. The best temporary stimulant is an enema of hot (118-120° F.) salt solution, one teaspoonful to the pint, which is allowed to run in and out of the rectum, a quart or two at a time.

Bloodletting.— This procedure was one much in vogue in former years, and while still a most desirable operation to perform for certain types of disease, the conditions brought about by its use are now largely induced by other means. In conditions of poisoning, some cases of pneumonia, and in some apoplexies, bleeding is still performed by competent medical practitioners, and is advocated in most manuals of practice. It is its indiscriminate use for all ills that has fallen out of favor.

Bleeders.— Certain individuals have a tendency to bleed inordinately from even the slightest wound. They are called "bleeders," and are frequently found in families, most of the members of which have like traits. The pulling of a tooth is often followed by continuous hemorrhage. The causes for this idiosyncrasy are not all known. In some an insufficient quantity of calcium salts in the blood has been thought to be the most important cause.

Bleeding Heart. See DICENTRA.

Bleeding Heart Yard, a squalid locality in London, mentioned by Dickens in 'Little Dorrit.' The origin of the name is unknown.

Bleek, Friedrich, frēd'rĭH blāk, German biblical scholar and critic: b. Arensbök, Holstein, 4 July 1793; d. 27 Feb. 1859. He was appointed professor of theology at Bonn, 1829, and spent the remainder of his life there. He was the author of much esteemed commentaries and expository books, valuable Introductions to the Old and New Testaments (1860–2), his most important work being one on the 'Epistle to the Hebrews' (1828–40).

Bleek, Wilhelm Heinrich Immanuel, vĭl'hĕlm hīn'rĭH ĭm-män'oo-ĕl, German philologist, son of Friedrich Bleek (q.v.): b. Berlin, 8 March 1827; d. Cape Town, 17 Aug. 1875. In 1855 he went to South Africa and devoted himself to the study of the language, manners, and customs of the natives. In 1860 he was appointed public librarian at Cape Town, and his researches were rewarded with a pension from the civil list. He was principal author of the 'Handbook of African, Australian, and Polynesian Philology' (1858–63), his other chief productions being 'Vocabulary of the Mozambique Languages' (1856); 'Comparative Grammar of South African Languages' (1862); 'Hottentot Fables and Tales' (1864); and 'The Origin of Language' (1868).

Bleibtreu, Georg, gā-ōrH blīp'troi, German artist: b. Xanten, Rhenish Russia, 27 March 1828; d. Berlin, 16 Oct. 1892. His first important picture was the 'Destruction of the Kiel Turner-Corps at Flensburg' (1852) and his subsequent works are also battle pieces. Among them are 'Episode from the Battle of Waterloo' (1858); 'Battle of Königgratz'; 'Surrender of Napoleon after Sedan'; 'Attack of Saxon Corps at Saint Privat' (1880).

Bleibtreu, Karl August, kärl ow'goost blīp'troi, German poet and novelist: b. Berlin, 13 Jan. 1859. He is one of the foremost representatives of the youngest German school in literature, and a pronounced realist. All his views are radical, as shown by the very titles of his works; for example, 'Revolution in Literature' (1885); 'Literature's Struggle for Life.' He also wrote 'Dies Iræ'; 'Napoleon at Leipsic'; 'Cromwell at Marston Moor.' His dramas are: 'Lord Byron' (1888); 'The Day of Judgment'; 'The Queen's Necklace'; etc.

Bleichröder's, blīh'rē-dĕrz, a celebrated banking house in Berlin, established by Samuel Bleichröder, who died in 1855, continued by his son, Gerson Bleichröder, who died in 1893, and subsequently by the two sons of the latter. Under the patronage of Bismarck it entered into commercial relations with the Prussian government, rendering material assistance in 1866 and again in 1871. Gerson Bleichröder was raised to the hereditary peerage in 1872.

Blemmyes, blĕm'ī-ez, or **Blemyes,** a people of ancient Ethiopia, who for several centuries after Christ gave much trouble to the Romans during their occupation of northern Africa. Their influence extended to a period as late as the 7th century.

Blende (German, "to blind," in allusion to the fact that the mineral is easily mistaken for galena, and yet yields no lead). A native sulphide of zinc, having the formula ZnS, and known also as sphalerite. It crystallizes in tetrahedral forms belonging to the isometric

system, and has a very perfect cleavage. It is commonly brown, black, or yellow, but may have other colors also, and may be nearly colorless when pure. Its hardness is from 3.5 to 4, and its specific gravity is about 4.00. It usually occurs massive, with dodecahedral cleavage, and is found commonly in connection with galena, and also in deposits of considerable extent in cavities in limestone. It is a valuable ore of zinc, and is mined near Joplin, Mo., in Cornwall (England), and in various parts of the United States, notably in Kansas, Illinois, and Colorado. The miners of Cornwall call it «mock lead» and «black-jack.»

Blenheim, blĕn'ĭm, or **Blindheim,** a Bavarian village about 23 miles from Augsburg, the theatre of a great battle, fought 13 Aug. 1704 (also called the battle of Höchstädt, from another village of this name in the vicinity), in which Marlborough and Prince Eugene, commanding the allied forces of England and the German empire, gained a brilliant victory over the French and Bavarians. The latter armies were drawn into the engagement under the most unfavorable circumstances. Both these armies amounted to 56,000 men, while the forces of Marlborough and Eugene were about 52,000. The first had thrown their troops chiefly into the two villages of Blenheim and Kinzingen, which they considered as points of support for their wings, though at too great a distance in front of their main position. A large proportion of cavalry was in the centre, since each army, the Bavarian as well as the French, had their horse on their wings, and in this way those of two wings must necessarily join each other. Both the commanders would undoubtedly have perceived and corrected this mistake, as Tallard, the French general, had in Blenheim alone 27 battalions of infantry; but they expected so little to be attacked, that when the line of the allies began to move, 13 August, at two o'clock in the morning, they supposed them to be marching off. The greatest part of their cavalry was sent to forage. Even at seven o'clock, when the heads of the eight columns with which Eugene and Marlborough advanced toward the Nebelbach were to be seen, Tallard thought the whole a stratagem intended to cover the retreat; but he soon saw his error. The dispersed troops were recalled in the greatest hurry, and the cannon were drawn up in line. The French and Bavarians made every exertion to prevent the passage of the enemy over the small stream of Nebelbach, and the capture of the two villages, the conquest of which was considered by Marlborough and Eugene as decisive. Their line of attack was uncommonly long, about four and a half miles. Marlborough, in order to secure his right wing, attacked Blenheim, but without success; he then changed his plan, and threw himself with his principal forces into the wide interval between the right wing and the centre of the enemy, leaving only as many troops before Blenheim as were necessary to check the body which occupied this position. At five o'clock in the afternoon he succeeded, after great efforts, in passing the Nebelbach, by which his victory was decided. Tallard himself was among the prisoners; his son was killed. The consequences of the battle were decisive. Bavaria, as Marlborough had anticipated, fell into the power of Austria.

Blenheim Dog. See TERRIERS.

Blenheim House, the name of the seat of the Duke of Marlborough, in the parish of Woodstock, and county of Oxford. The estate having been given by Queen Anne to Marlborough for his eminent services, Parliament granted the sum of half a million sterling to erect a suitable family seat. The building was intrusted to Sir John Vanbrugh, and called Blenheim, from the village where the Duke gained his great victory. In this park once stood the royal palace of Woodstock, where Alfred is said to have resided, and which was the favorite residence of Henry II., who erected a house in the park for his favorite mistress, Rosamond Clifford, whence the well-known legend of Woodstock-bower, Queen Eleanor, and the Fair Rosamond. Edward III. was also much attached to this palace, in which his eldest son, the illustrious Black Prince, was born, as well as his youngest son, Thomas, Duke of Gloucester, usually called Thomas of Woodstock, from that event. Richard II. likewise kept his court here, at which time the poet Chaucer resided at Woodstock, in a house which stood near the present entrance to the park. During the civil wars of the 17th century it was for some time defended for the king; but it ultimately surrendered, and was much injured and dilapidated by the parliamentarians. The usual approach to Blenheim from Woodstock is through a triumphal arch or portal. In front of the building stands a sculptured column 130 feet high, surmounted by a statue of the duke, whose victories and achievements are recorded on tablets round the base. The front of the house measures 348 feet from wing to wing, and although architectural critics find many faults in detail, the general effect is in the highest degree noble and commanding. The interior is extremely magnificent; the hall, supported by Corinthian pillars, is 67 feet high; and the ceiling was painted by Sir James Thornhill, the design representing Victory crowning the Duke. The gallery and bow-window room abound in portraits by the most eminent masters, both foreign and English. On the tapestry of the latter are figured the various battles gained by the same great general, and more especially that of Blenheim. The saloon, a noble and spacious apartment, communicates with the hall, and occupies the entire breadth of the centre. The lower part is lined with marble, and six of its compartments are decorated with pictures by La Guerre, representing the inhabitants of the different nations of the world in appropriate costume. On the ceiling is a representation by the same artist, of the victorious Duke arrested in his career by Peace and Time. The remaining principal subjects of admiration are the library, theatre, state drawing-room, blue and green drawing-room, grand cabinet, the dining-room, etc. In the chapel, which forms one of the wings, is a fine marble monument by Rysbrack, to the great Duke and his almost equally celebrated duchess, Sarah. The gardens and grounds,

which are exceedingly spacious, were laid out by Brown, who contrived to make a most admirable use of the small river Glyme in the formation of a lake, or piece of water, which is justly deemed one of the greatest beauties of the place. It is crossed by several arches, and at the middle or grand approach is a magnificent bridge, the span of the centre arch of which is 101 feet.

Blenker, blĕnk'ĕr, **Louis,** German-American soldier: b. Worms, Germany, 1812; d. 16 Oct. 1863. He took an active part in the revolutionary movement of 1848 in Germany and was forced to leave his native land, emigrating to the United States. He organized the 8th regiment of New York Volunteers at the outbreak of the Civil War, and was its colonel. He was promoted to the rank of brigadier-general at the first battle of Bull Run, and engaged in the battle of Cedar Keys in 1862. He died of wounds received while at Warrenton, Va.

Blennerhas'sett, Harman, English emigrant in America: b. Hampshire, England, 8 Oct. 1764; d. on the island of Guernsey, 2 Feb. 1831. He sprang from a wealthy and highly connected house which traced its ancestry back to Edward III.; was educated at Westminster School, London, and Trinity College, Dublin, graduating 1790. The youngest of three sons, he studied for the law, but the death of his brothers soon after made him head of the family. Early in 1796 he privately married his sister's daughter, Margaret Agnew, a beautiful and highly accomplished girl of 18, also of excellent family, her father having been lieutenant-governor of the Isle of Man, and her grandfather an English officer killed at Germantown. This incestuous union brought its ultimate punishment from nature in a family of physical and moral wrecks; but a more immediate one was entire social ostracism, which soon drove him to break his entail and sell his estates, except some reserved incomes, and come to America with his wife and a library and philosophical apparatus. Arriving 1 Aug. 1796, he finally, in 1798, settled on a small island in the Ohio River a few miles below Parkersburg, W. Va., and spent $60,000 on a house and grounds, pictures, and statuary. This was for years the show place of America west of the Alleghanies, and drew a stream of notable guests, whom he entertained with elaborate hospitality. Here he read, made music, which was his chief passion, and dabbled in feeble absent-minded scientific experiments. In 1805 Aaron Burr (q.v.) was one of his guests, and then or next year induced him to join in the scheme for a southwestern empire, to include Mexico; Blennerhassett was to be prime minister and a duke, and perhaps ambassador to England. He was a timid, dreaming, futile, unadventurous man, but, like many such, may have fancied himself a great statesman and hero *in posse.* He may, perhaps, have consented because Mexico was farther from Great Britain than the Ohio, and the canker of his life was fear lest chance should disclose his secret to his friends and children. His wife, much the stronger nature of the two, was certainly ambitious for him, and he would not have embarked in such a venture without her approval. Anyway, he advocated Burr's «colonization» plan in the papers, and invested a great sum in arms, ammunition, provisions, boats, etc., on the faith of obligations from Burr's son-in-law Allston, which were largely defaulted. The scheme fell through; Blennerhassett was twice arrested, imprisoned and tried for treason, but discharged in 1807 on the acquittal of Burr. His place, however, had been wantonly injured by the militia, and was seized by his creditors and turned into a hemp field. The mansion was converted into a granary and was finally burned by accident. Blennerhassett now settled in Natchez, and soon after bought a 1,000-acre cotton plantation on the Mississippi, a few miles above Port Gibson, which he called La Cache. It was unsuccessful, and the War of 1812 injured his commercial speculations; and in 1819 he sold it for $28,000 and removed to Montreal, practising law in hope of obtaining a judgeship through his old schoolmate, the Duke of Richmond. This failing, he returned to England in 1822 in hope of winning back his property by a reversionary action, and then of obtaining employment through an influence which no longer existed. In 1824 he came back after his family. Everything failed him, though he and his wife were decently treated; at last his health gave way, and he died at Port St. Pierre on the island of Guernsey. He was generous with his money while he had it, and helped out of financial difficulties several of the musicians he consorted with. His wife, though disinherited, had always had an income paid her by her sisters; and in 1838 received a property by the will of her husband's maiden aunt. In 1840 she came to the United States to push a claim before Congress for the island property, and indemnity for the ravages of the militia. Henry Clay favored it, and its passage was probable; but before it came up she died in New York, 16 June 1842. The story of her being left penniless with a dependent family (the youngest was 19 at his father's death), and of her dying in poverty and being buried by sisters of charity, are fictions. She had some literary ambitions, and while in Montreal wrote two volumes of verse, 'The Deserted Isle' (1822), and 'The Widow of the Rock, and Other Poems' (1824).

Bibliography.— Therése Blennerhassett-Adams, 'The True Story of Harman Blennerhassett,' in the 'Century' (Vol. 62 1901); 'The Blennerhassett Papers' (1864); Safford, 'Life of Blennerhassett' (1835); Pidgin, 'Blennerhassett,' a romance (1902).

Blenny. These small fishes of the spiny-rayed marine family *Blennidæ,* frequent rocky coasts and shallows, in seas of all parts of the world. Their elongated bodies, some of which are scaleless, are remarkable for the abundance of slimy matter with which they are covered. These fishes are extraordinary in possessing but one dorsal fin, which in some species is deeply divided; and in having the faculty of using their ventral fins to aid them in moving about among the rocks and sea-weed. They are frequently deprived of water, by the ebb of the tide, when they are capable of subsisting for some hours. Small

crustaceans form their main food. In some species the eggs are retained in the oviduct until they hatch, so that the young are produced alive.

Blenorrhœa, an old term signifying a muco-purulent discharge from any mucous membrane. This discharge is usually creamy white and consists usually of water, mucus, epithelial cells, white blood cells, or pus cells, and bacteria. At the present time a blenorrhagic discharge is definitely named according to the structure involved. Thus a blenorrhœa of the eyes is termed a purulent conjunctivitis; of the vagina, leucorrhœa; of the urethra, gleet or urethritis; if a urethritis of infectious origin, gonorrhœa, etc. Treatment is usually local and general. Tonic stimulating applications may be locally applied, and the general health built up as thoroughly as possible.

Blepharitis, an inflammation of the margin of the eye-lids and hair follicles. It may consist of a very slight hyperæmia or redness that causes itching and discomfort. This form may be due almost entirely to eye-strain and proper glasses will usually cure it. The disease may be more extensive, involving the margin and the follicles, with redness and swelling and whitish scales. The eyelashes may drop out, but usually are regrown, and there is much itching and discomfort. This form may also result from refractive errors, or may be the index of a bad constitutional state from poor food, bad surroundings, or it may follow the infectious diseases, notably measles. A more persistent form is associated with ulceration and loss of the eyelashes. This is usually a very chronic type and resistant to treatment. In the management of all forms, all errors of refraction should be corrected by properly adjusted glasses,—not on opticians' prescriptions,—and the local treatment by stimulating ointments.

Blére, blā-rā, a French town, in the department of Indre-et-Loire, on the Cher, 15 miles east-southeast of Tours. It contains a notably fine 16th century chapel. Pop. (1896) 3,269. In the vicinity is the Château Chénonceaux, built in the time of Francis I., and still in excellent preservation. It was given by Henry II. to his mistress, Diana de Poitiers, who was dispossessed on the death of Henry by Catherine de Medici. In the latter part of the 18th century it was frequented by Fontenelle, Voltaire, Rousseau, and all the wits of the time, who were drawn together by the then owner of the château, Madame Dupin, widow of a *fermier-général* who died in 1799. See Cook, 'Old Touraine.'

Bles, Henri, ŏn-rē' blĕs, Flemish painter: b. probably at Dinant, about 1480; d. 1550. Very little is known of his career, and the 'Adoration of the Magi' in the Dresden Gallery is his only signed picture. He is known to have been a very prolific artist, and almost all the European galleries contain paintings ascribed to him.

Blesbok, blĕs'bŏk, one of the African hartbeests, now rare, which was distinguished by the violet color of its coat. See HARTBEEST.

Blessing, or **Benediction.** The expression of wishing one well soon gave rise, in early ages, to a solemn act, accompanied, like other solemnities of those periods, by symbolic signs; this was the blessing or benediction. In patriarchal times, when the authority of the head of a family included that of the priest and the civil ruler, the blessing of course appertained chiefly to him, on account of his venerable character, and when the priests began to form a separate class, became, in certain cases, a prerogative of theirs. As the authority of the father, in the infancy of every nation, is extremely great, the idea soon sprung up that his prayers, invoking the favor of the Deity, were more effectual than those of others, and that whatever he blessed would be likely to receive the favor of God. The same importance was soon attributed to blessings conferred by a priest. The heathens, the Jews, and many Christian sects, have cherished this idea. By the Jewish institutions, certain benedictions were reserved to the priest; the same is the case in the Roman Catholic Church, in which different benedictions are appropriated to different degrees of the clergy. We shall mention only a few of them. The Roman Catholic bishops alone can confer those benedictions which are connected with unction, and are called consecrations, as, for instance, the consecration of kings and queens, of the cup and *patera*, the church and altar. To them also is confined the benediction of abbots and abbesses, of knights, and the holy oil. For the benediction of the holy vestments, etc., they may employ a substitute. Every Roman Catholic clergyman may confer the benediction on the occasion of betrothment; also the marriage benediction; may bless the fruits of the earth, and the holy water. The benediction of a bishop is eagerly sought for by a faithful Roman Catholic, as contributing peculiarly to his spiritual welfare; and the Catholic clergy, in general, use the benediction as a salutation or reward for a service, etc. When the Pope rides or walks out the Roman Catholics kneel to receive his blessing, which he gives by a motion of his hand. In his ante-chamber are often seen things of different kinds, rosaries, etc., in large quantities, which he blesses in passing by. The Roman Catholic Church blesses things animate and inanimate, and this is believed by many to preserve them from sickness, injury, etc. Among most Protestant bodies there is a blessing pronounced upon the people at the close of a religious service, that of the Church of England being contained in the Prayer Book. Roman Catholics in many cases use the consecrated water in giving the benediction.

Blessington, Margaret (COUNTESS OF): b. Knockbrit, near Clonmel, Ireland, 1 Sept. 1789; d. Paris, 4 June 1849. She was the daughter of Edmund Power, and at the age of 15 was married to a Capt. Farmer, who died in 1817. A few months after his death she married Charles John Gardiner, Earl of Blessington. In 1822 they went abroad together, and continued to reside on the Continent till the Earl's death in Paris, in 1829, when Lady Blessington returned to London and took up her abode in Gore House, Kensington, which had been bequeathed to her by her husband. Here for many years she held those celebrated reunions and soirees, at which the most distinguished literary characters in London were wont to assemble. The

fascination of her manners and conversation, with her genial warm-heartedness of character, rendered these gatherings most attractive; but certain equivocal circumstances in relation to her connection with a Count d'Orsay prevented their being frequented much by respectable female society. The count had married a daughter of Lord Blessington by his first wife, and been separated from her shortly afterward, but after the death of his father-in-law, resided with the countess during the remainder of her life. Lady Blessington had made her début as an authoress in 1822 by the publication of two volumes of 'Sketches.' In 1832 she contributed to the 'New Monthly Magazine,' "Conversations with Lord Byron," considered by many as the best of her productions. She also wrote numerous novels, including, among others, 'The Belle of a Season'; 'The Two Friends'; 'Strathern'; and 'The Victims of Society.' None of these have much literary merit, but describe scenes in fashionable life with considerable power, and enjoyed at the time a large share of popularity. She acted as editress for several years of 'Heath's Book of Beauty' and the 'Keepsake,' and also of another annual, the 'Gems of Beauty.' In 1849 she proceeded to Paris, whither Count d'Orsay had previously gone, in the hope of obtaining an appointment under Louis Napoleon, with whom they had been intimate during his exile in England. Consult Madden, 'Life of the Countess of Blessington' (1855).

Blicher, Steen Steensen, stān stān'sĕn blīH'ĕr, Danish poet and novelist: b. Vium, Jutland, 11 Oct. 1782; d. Spentrup, 26 March 1848. His first work was a translation of 'Ossian' (2 vols. 1807–9), and his first original poems appeared in 1814, but attracted little notice. He quickly won a national reputation with his novels, and in 1842 appeared his masterpiece of novel writing, 'The Knitting Room,' a collection of short stories in the Jutland dialect.

Blida, blē-dä', a fortified town of Algeria, 30 miles inland from Algiers, well-built, with modern houses and public edifices, the centre of a flourishing district, and having a good trade. There are cedar and cork trees in the neighborhood and mines of copper and lead. The principal exports are oranges, grain, tobacco, raisins, etc. It is one of the chief stations on the railway connecting Oran, Algiers, and Constantine. Pop. (1896) 13,026.

Bligh, William, English navigator: b. Plymouth, England, 9 Sept. 1754; d. 7 Dec. 1817. He acquired considerable celebrity from having been the commander of the ship Bounty when the crew mutinied in the South Seas and carried her off. She had been fitted out for the purpose of procuring plants of the bread-fruit tree, and introducing these into the West Indies. Bligh, who had sailed with Capt. Cook, obtained the command, and in December 1787, left Spithead for Otaheite, where he arrived, and remained till April 1789. Having loaded his vessel with plants he set sail and was proceeding on his voyage for Jamaica when he was seized in bed, bound, and brought on deck. The launch was lowered, and Bligh, with 18 men supposed to be well disposed to him, were forced into it, with no other provision than 150 pounds of bread, 32 pounds of pork, a little rum and wine, and 28 gallons of water. Thus scantily provided they found themselves in the open sea, not far from the island of Tofoa, in lat. 19° S. and lon. 184° E., and managed by admirable skill and perseverance, though not without enduring fearful hardships, to reach the island of Timor in 41 days, after running nearly 4,000 miles without the loss of a single man. Ultimately 12 of the number reached England. Of these, Bligh was one, and in a second voyage accomplished the object of the first by giving the bread-fruit tree to the West India Islands. When several of the mutineers were afterward tried at Portsmouth, sufficient evidence was obtained to show that Bligh himself was not free from blame, and had on many occasions been too much inclined to play the tyrant. This feature in his character was afterward manifested on a larger scale. In 1805 he was appointed governor of New South Wales, and acted so harshly that the other authorities interfered and put him in confinement. On his return he was made an admiral. See PITCAIRN ISLAND.

Blighia, blī'ĭ-ą, a genus of numerous trees and shrubs of the natural order *Sapindaceæ,* the principal species of which is *B. saoida* (*Cuoania saoida* of some botanists), the akee tree indigenous to west tropical Africa and naturalized in the West Indies since the close of the 17th century. It is also planted in southern Florida. The tree attains a height of 30 feet, bears pinnate ash-like leaves and very fragrant whitish flowers, from which by crude distillation the colored people obtain a cosmetic and which would probably yield a valuable perfume under proper management. The rich, red fruits, as large as goose eggs, are used for dessert and largely also in cookery. In Jamaica the tree is cultivated as high as 3,000 feet above sea-level, although it can withstand slight frosts. *Cuoania anacardioides,* which also bears an edible fruit, has been introduced into California, and *C. elegantissima* is sometimes raised in warm greenhouses for its attractive foliage and racemes of white flowers.

Blight, an indefinite term applied to any diseased state of cultivated plants, but gradually being restricted to plant diseases caused either by bacteria or fungi. See sections on diseases in articles on various plants.

Blight, American, an English and Australian name for the woolly apple louse or "apple blight," one of the aphides (q.v.).

Blight-bird, a small insectivorous bird (*Zosterops caerulescens*) of New Zealand, which devours the "blight" or plant-lice on fruit trees. It is one of the white-eyes (q.v.).

Blimbing, Bilimbi, Cucumber-tree (*Averrhoa bilimbi*), a tropical tree of the natural order *Geraniaceæ,* native of southern Asia, where it is largely cultivated and whence it has been introduced in other tropical countries. It is extensively raised in South America. The tree attains a height of 15 feet, bears racemes of red flowers followed by smooth cucumber-shaped green fruits as large as hen's eggs, which are highly esteemed for their acid pulp. The carambola (q.v.) is a close relative.

Blind, blĭnt, **Karl,** German political agitator and writer on history, mythology, and Germanic literature: b. Mannheim, 4 Sept. 1826;

d. London, Eng., 31 May 1907. He was educated at Heidelberg and Bonn, and from his student days till he settled in England in 1852 he was continually engaged in agitating or in heading risings in the cause of German freedom and union, being frequently imprisoned. The democratic propaganda was afterward supported by his pen; and he wrote political and biographical works: 'Fire-burial Among Our Germanic Forefathers'; 'Teutonic Cremation'; 'Yggdrasil, or The Teutonic Tree of Existence'; biographies of Freiligrath, Ledru Rollin, and Francis Deák.

Blind, Mathilde, German-English poet: b. Mannheim, 21 March 1847; d. London, 26 Nov. 1896. She went to England in 1849, and won fame by her writings: 'The Prophecy of St. Oran, and Other Poems' (Lond. 1881); 'Life of George Eliot' (1883); 'Madame Roland' (1886); 'The Heather on Fire,' a tale (1886); 'Ascent of Man' (1889); 'Dramas in Miniature' (1892); 'Songs and Sonnets' (1893); and 'Birds of Passage' (1895).

Blind. The loss of the sense by means of which man receives an idea of the world that surrounds him, clothed in light and color, is an event as melancholy as it is frequent. Blindness is different: (1) In its degrees, some persons being partially blind, retaining a slight perception of light, with the power of distinguishing very brilliant colors, and the general outlines of bodies; others being entirely deprived of the faculty of seeing. (2) In its causes: some men are blind from their birth; others have become blind by local diseases of the eyes,— for instance, — by inflammation, suppuration, cancer of the eye-ball, spots, films, tumors on the cornea (by which its transparency is destroyed), also by closure of the pupil, by a turbid state of the humors, by a debility of the optic nerve, or by general diseases of the body, violent fevers, nervous fevers, plethora, and tendency of the blood to the head, erysipelas in the face, smallpox, scarlet-fever, etc., or by excessive exertion of the eyes, by which the optic nerve is enfeebled; for which reason, some classes of mechanics and artists, as blacksmiths, laborers in glass and smelting houses, watch-makers, etc., not unfrequently lose their sight, and in northern countries, which are covered with snow for a long time, and which dazzle the eyes by the reflection of the sunbeams, as well as in the sandy deserts of Africa, blindness is a frequent complaint. Old age is sometimes accompanied with blindness, occasioned by the drying up of the humors of the eye, or by the opacity of the cornea, the crystalline lens, etc. There are several causes which may produce blindness from birth. Sometimes the eyelids adhere to each other, or to the eye-ball itself, or a membrane covers the eyes; sometimes the pupil of the eye is closed, or adheres to the cornea, or is not situated in the right place, so that the rays of light do not fall in the middle of the eye; besides other defects. Those who are born blind have no idea of vision, and are entirely destitute of all the ideas derived from the sense of sight. They cannot, therefore, be sensible of their misfortune in the same degree as those who have lost their sight at a later period. Experience has shown that those who acquire the power of seeing after being born blind, or having lost their sight in their childhood, form very different ideas of visible objects from other persons. A young man, whom Cheselden couched for a cataract, at the moment he received sight imagined that all the objects which he saw were in contact with his eyes; he could not distinguish objects, although of very different forms. Those with which he was already familiar by the touch he examined with great attention, in order to recognize them another time; but having too many things to notice at once, he soon forgot all that he had observed. He wondered that those persons whom he loved most were not handsomer than others. Before he received his sight he had expressed a great desire to obtain this sense. The other senses of persons, who have been blind for a long time, become more exquisite, perhaps, because they are not subject to the distraction produced by the sight of so many objects. The blind, therefore, are often distinguished for a remarkable mental activity, and a wonderful development of the intellectual powers. Their touch and hearing, particularly, become very acute. Thus it is related of a blind man, who lived at Puiseaux, in France, and was a chemist and musician, that he could accurately estimate the proportions of objects, could judge of the distance of fire by the degree of heat, determine the quantity of fluid in vessels by the sound it produced while running from one vessel into another, and the proximity of objects by the effect of the air upon his face. He determined very accurately the weights of bodies and the capacities of vessels. The celebrated Saunderson, professor of mathematics at Cambridge, lost his sight in his early youth. He invented several processes to facilitate his studies in arithmetic and geometry. His sense of touch was so acute that he distinguished spurious coins merely by letting them pass through his fingers, though they were so well executed that even skilful judges were deceived by them.

When it is a case of imparting instruction to persons destitute of sight, it is necessary to have recourse to the other senses to supply the want of the eye. If, for instance, we wish to teach them the arts of reading and writing, letters must be prepared which will be palpable to the touch, and the hand guided until they are able to copy them. If we wish to communicate to them a knowledge of the surface of the earth, globes and maps must be prepared with the divisions, etc., in relief. Knowledge obtained in this way must, of course, be acquired much more slowly than that received by the sight. The senses of touch and of sight differ in this respect, that the former ascends by degrees from the perception of parts to the perception of the whole, while the latter views the whole at a single glance. It is therefore evident that the blind cannot be instructed in the common schools destined for those who see: in the first place, because the means of instruction by the touch are wanting; and secondly, because the progress of the other children would be retarded by the slow apprehension of the blind pupils. (See BLIND, EDUCATION OF THE.)

The occupations in which the blind are found capable of engaging are such as the making of baskets and other kinds of wicker-work, brush-making, rope and twine-making, the making of mats and matting, knitting, netting, fancy work of various kinds, cutting fire-wood, the sewing of sacks and bags, the carving of articles in wood, etc. Piano-tuning is also successfully car-

ried on by some, the typewriter is used by others and the cleaning of clocks and watches has also been occasionally practised by them. Skilled musicians are sometimes found among the blind.

Reading Room for the Blind.— By an act of Congress passed in 1879, entitled an Act to Promote the Education of the Blind, $250,000 was set apart to be permanently invested in securities of the United States, the proceeds of which were to be applied, through the American Printing House for the Blind at Louisville, to the making of books and apparatus used in the education of the blind, to be annually distributed to the schools for the blind in the several States in proportion to attendance. For almost a quarter of a century this benefaction has been available for the youthful blind of the country in the schools, and the books in embossed characters have multiplied amazingly. The catalogue now embraces nearly or quite every title in popular literature and technical subjects, and as only the best books are printed in raised letters, the entire catalogue constitutes the finest and best library of equal numbers in the world. There is a steady increase in the number of visitors in the reading room for the blind in the library of Congress. To Helen Marr Campbell is given by many the credit of having taken the initial steps to procure this reading room. She was a frequent visitor to the crowded rooms of the old Congressional Library, and often found the experiences there far from agreeable. The few books for the blind were often difficult to obtain and equally difficult to read in cramped rooms, and too often under the scrutiny of curious and annoying strangers. Going to John Russell Young, then librarian, she made a request for a special reading room in behalf of the blind readers of Washington. He was quick to see the justice of the request, and at once placed the fitting up of Pavilion No. 7 in the new library in charge of the second assistant librarian, David Hutcheson. This is in the extreme northwestern corner of the ground floor of the great building and is a large and well-appointed room, with square bay windows and a groined ceiling resting upon massive pillars. The alcoves along the eastern wall are filled with the specially prepared books for the blind; the Bible, making so many large volumes that it completely fills one of the alcove shelves.

Dictionary for the Blind.— The first general dictionary ever issued in any country or language was published in 1903 by the Maryland School for the Blind. It contains 40,000 words, with complete diacritical marks and definitions and fills 18 volumes. In the last 10 years more books have been printed for the blind than in all previous time. This is due largely to the rapid spread of the New York point system of printing for the blind. The new dictionary, as well as all the books from the Maryland School printing house, is printed in New York point. The American Printing House for the Blind at Louisville expends its annual subsidy of $10,000 entirely in New York point printing. The annual appropriation of $1,000 by the State of New York for the publication of general literature for the blind department of the State Library at Albany goes into New York point. The International Sunday-School Lessons go out weekly over the United States in New York point. Three periodicals are published in it. There is an excellent musical library in it, including a dictionary of 6,000 musical terms. The Society of St. Francis Xavier uses the system in its publishing house for the blind.

Photophonic Books for the Blind.— A sheet of transparent paper contains, printed upon a black background, a number of small white squares, separated from each other by intervals one, two, or more lengths of a square in size. These squares, together with the intervals, represent the letters of the alphabet, exactly as do the dots and dashes of Morse. In order to enable the blind to read these letters, the printed sheet is placed in a frame between two thin plates of glass fully exposed to the light, and an opaque piece of cardboard, or some other material, with a square-shaped opening in the centre, is moved by the reader along the printed lines from left to right. Whenever the opening passes over one of the white transparent squares, the rays of light illuminating the printed sheet pass through this opening, and, by means of a photophonic apparatus, are changed into sound. In this way, the blind reader receives the letters in the form of sounds separated by longer or shorter intervals of silence, and his ear fulfills the functions of the eye.

Blind, Education of the.—When it is stated that prior to 1830 the blind of America were to be found "moping in hidden corners or degraded by the wayside, or vegetating in almshouses," it is the adult blind that is meant. Still blind children were occasionally found in these places, though it could scarcely be said that they were vegetating, as could be said of the untrained deaf children.

The British census of 1851 first showed the world that over 80 per cent of the blind are adults. Our schools for the blind were started, *first,* because of the wide-spread interest in the results of educating the young deaf and dumb, which furnished inspiration for new fields of educational endeavor; *secondly,* because the country was coming to the conviction that all the children of the state should receive education both as a matter of public policy and as a private right; and *thirdly,* because reports of what had been accomplished abroad in schools for the blind were being promulgated in our land. By 1830 the more progressive states of the east were ready to give their blind children school training. In that year the government first included in the national census the deaf and dumb and the blind. The work of the blind was to begin with scientific foreknowledge as to their number. In 1829 certain gentlemen in Boston obtained the incorporation of the "New England Asylum for the Blind." By a most fortunate circumstance, the interest and services were obtained of a graduate of Brown University, Dr. Samuel G. Howe, who after finishing his medical studies had chivalrously gone to the aid of the Greeks. Dr. Howe went at once to Europe to study methods of instruction. Upon his return, in 1832, the school was opened with six pupils. In New York the act of incorporation of the New York Institution for the Blind was passed in 1831; but funds were needed and no one went abroad to study methods. This school opened in March, 1832, antedating by a few months the school at Boston. In the very same year a German teacher of the blind, a Mr. Friedlander, most

opportunely came to Philadelphia, in the hope of starting a school for the blind there. Having trained certain blind children he exhibited their accomplishments, *first,* to a few influential people, *secondly,* before a large audience among whom he distributed a leaflet, "Observations on the instruction of blind persons." A meeting of public-spirited citizens followed, funds were liberally contributed, fairs held, and the success of the cause was assured. The Pennsylvania institution for the instruction of the blind was opened in 1833, fully ten months before an act of incorporation was obtained. The three schools at Boston, New York, and Philadelphia are called the pioneer schools. All sprang from private effort and private funds. All were incorporated as private institutions, and remain so to this day. Two similar institutions for the blind have arisen in this country, that at Baltimore and that at Pittsburg.

The origin of the State schools differs from that of the type above given only in that classes of trained pupils from the earlier schools were exhibited before the state legislatures, as well as before the people. State appropriations followed and the institutions were inaugurated as state institutions. The new schools sprang into being with astonishing rapidity. There were in 1899 forty schools for the blind in the United States, and every State in the union makes provision for its blind of school age either in its own school or in that of a neighboring state. In our sparsely-settled country, especially west of the Alleghenies and south of Maryland, great efforts had to be made to find the children and still greater efforts to persuade the parents to send them to school. In certain states where the amount of the public fund seemed to preclude a special grant for the blind, pupils of this class were brought together in connection with a school for the deaf and dumb, forming "dual schools," as they are called. These institutions could not help being unfair to their blind contingent; for in nearly every such case the blind came to a school already established as a school for the deaf, and under the superintendence of a man especially interested in the education of the deaf; moreover, the number of the deaf pupils usually far exceeded that of the blind. There are still a few of these dual schools, but wherever possible they have been divided into two distinct institutions. In northern schools the colored blind are educated with the white; in southern schools it is best for the colored to have schools of their own. Both the whites and they prefer this arrangement. The first school for the colored blind was opened in North Carolina in 1869.

All the institutions for the blind were in their very inception schools. The pioneer schools imported literary teachers from Paris and handicraft teachers from Edinburgh. At first only the brighter class of pupils came under instruction. Teaching them was easy. They progressed with amazing strides; all was enthusiasm; exhibitions were called for and widely given (Dr. Howe's pupils gave exhibitions in 17 states); large editions of the various annual reports were exhausted. Soon, however, less bright pupils came to be admitted; then the curriculum of studies began to sober down to the practical and comprehensive one prevailing to-day. Whatever occupation the boy or girl expects to follow after leaving school, it is assumed he will follow it better and thus live more happily and worthily if he has a general education. When, as was formerly the case, the period or term of schooling allowed pupils was shorter than it is now, they were not admitted before the age of eight or nine. Now that kindergarten departments have been universally added to the schools, the pupils are urged to enter at an early age; because experience has shown that at home these little blind folks are coddled rather than trained, so much so in fact that by the time many of them come to school their natural growth of body and mind has been so interfered with by inaction, that all the efforts of the schools cannot make up for lost time and opportunity. The principle of periodicity of growth has now come to be understood and the importance of applying the proper stimulus at the period most sensitive to it, comprehended. Children with good sight and hearing have got along without kindergarten training, and so have blind children, but of all the useful means of reaching and developing the average blind child none is so effective as the properly-conducted kindergarten. The practical knowledge of things comes to the blind through the hand, their fingers being veritable projections of their brains. Thus must their hands not only be trained to sensitiveness of touch but to be strong and supple, so that they may, indeed, be dexterous; for as their hands are so are their brains. The kindergarten cultivates ear and heart and hand and brain as nothing else does. Even color is not wholly omitted in kindergartens for the blind. Many see colors, and those who do not love to talk about them and certainly derive some indirect value for considering them.

Blind children with kindergarten training are more susceptible to instruction than those without it. Above this department the course of studies in American schools requires from seven to eight years, which means a primary, a grammar and a high school education, or instruction in object lessons, reading, writing, spelling, grammar, composition, arithmetic, history, physiology, botany, zoölogy, geology, physics, algebra, geometry, civics, English literature, typewriting and sometimes Latin and modern languages. Not a few pupils have fitted for college where they took the regular course with the seeing students, and from which they were graduated usually with distinction. Formerly much of the teaching was oral, which, in many cases, was apt to be more pleasant than profitable to the pupil. Since the general introduction of the embossed text book and tangible writing, the pupil has been forced to depend more and more upon himself, obviously with better results. In fact, the work has been growing more and more practical. The methods of teaching the blind correspond in general to those of teaching other hearing children. The common appliances have but to be raised and enlarged as in maps and diagrams, or simply made tangible, which may be done, for example, by notching an ordinary ruler so that the graduations can be felt.

Industrial training has been an integral part of the school course from the beginning. Recently educational manual training has been generally introduced as preliminary to the

trades. Sloyd has been found especially adapted to the blind. The handicrafts — chair-caning, hammock-making, broom-making, carpet-weaving, and a few others, alone remain of all the many trades taught at one time or another in our schools. Manual occupations of some kind will always be taught, even were it evident that none of them would be followed by the blind as trades; for it is by doing and making that the blind especially learn best. Then, it is essential that they be kept occupied. In the past, before the introduction of such varieties of labor-saving machinery as the last half century has seen, many of the discharged pupils followed some manual trade and succeeded in subsisting by it. To-day this is less and less possible. The mind itself of the blind is least trammeled by the lack of sight; hence some pursuit where intelligence is the chief factor would seem to be best adapted to his condition. Music, of course, opens up his most delightful field. It is said that all the force of the superintendents of the early schools was required to prevent the institutions from becoming mere conservatories of music. To-day only those pupils pursue music in regular course who have talent for it; but even those are not allowed to neglect other studies for it. It is the experience of the American schools, as of the European, that the profession of music offers to the educated and trained musician who is blind, a field in which he can work his way with least hindrance from his lack of sight, and many are they who have found in it a means of livelihood for themselves and their families. A few in nearly every school fit themselves to be tuners of pianos.

The American schools for the blind were founded upon embossed books. Dr. Howe states somewhere that the simple reading from embossed print did more to establish the schools in the country than any other one thing. Extraordinary pains were taken by Dr. Howe and his assistants to perfect a system which should be at once readily tangible to the fingers of the blind and legible to the eyes of their friends. The result was the small lower-case letter of Dr. Howe, the Boston line print, as it is often called. To this the jury gave preference before all other embossed systems exhibited at the great exhibition of the industry of all nations, in London, in 1851. Backed by such indorsement and all the authority of Dr. Howe the system was rapidly adopted into the American schools. It was then the theory that the blind would be further isolated from their friends if their alphabets were dissimilar. The blind of themselves had devised a writable system — arbitrary and composed of dots or points — one which they could both read and write. But the early superintendents would not countenance it. However, many of the blind failed to read the line-letter system; because to read it requires extreme nicety of touch, which all the blind by no means have. Characters composed of points, not of lines, are scientifically adapted to touch reading. In the 33d report of the New York institution, Supt. William B. Wait wrote: "Now, which is the more important, that all the young blind should be able to read, thus being made, in fact, like the seeing, or that they should be taught an *alphabet which in some sort resembles* that used by the seeing, but by doing which only 34 per cent of them will ever be able to read with any pleasure or profit?" This attitude of the New York school was the outcome of statistics gathered from seven institutions, in which 664 pupils were involved, and of experiments made by Mr. Wait with his own pupils, using a system scientifically devised by him, composed of points in arbitrary combination. This was in 1868. At the next convention of the American instructors of the blind, it was resolved "That the New York horizontal point alphabet as arranged by Mr. Wait should be taught in all institutions for the education of the blind." Europe was a long time accepting a writable point system. That of Louis Braille, devised in 1829, though much used by individuals, was not officially adopted into the Paris school where it originated until 1854. In contrast, America devised, printed, spread, and resolved to accept its writable system in less than one-half the time. The benefits of a tangible writable system are vast. It puts the blind more nearly on a par with the seeing, particularly as pupils in school. Its adoption here, next to that of tangible printing, makes obtainable the ideal of American schools for the blind. Every tangible system has its defects. French "braille" as adopted into England has antiquated abbreviations and contractions for the use of adults; and is involved with rules allowing much bad use, like the omission of all capitals. The New York point as printed also laid itself open to much criticism as to "good use." The American braille, the latest system, combining the best features of French braille and of New York point, was devised by a blind teacher of the Perkins institution. It takes full account of "good use," and those who use the system deem it very satisfactory. In 1892, when the American braille system was adopted into several schools, a typewriter for writing braille was invented, and this was followed by the invention of another machine for embossing braille directly on plates of thin brass from which any number of duplicates could be struck off on paper. Here was a means of creating a new library at once. But the chief value of the invention lay in the fact that as the machine was simple and inexpensive and could be operated if necessary by a blind man, any institution could have a printing office of its own. And several schools immediately established such offices, from which they issued at once whatever their school classes demanded. By co-operating in the selection of the books to be embossed these schools have created in the space of seven years a library of books in American braille than which there is no superior in any system in any country, and they have added an immense amount of music in the braille music notation, which is the same all over the world. A typewriter, and a machine for embossing brass plates in the New York point system, have also appeared.

The Association of American instructors was formed in 1871, has met biennially ever since, usually as the guest of one or another of the institutions. The proceedings of each convention have been published. The principles underlying the scheme for educating the blind being to make them as little as possible a class apart from the rest of the community, it has not been deemed wise to attempt to establish a national college for the higher education of

those capable of taking it, but efforts are making towards enabling the brighter and worthier pupils to attend one of the colleges for the seeing, at the expense of the states or the schools from which they come. The school instruction of the blind is comparatively an easy matter. The work is less of a science than the more difficult task of instructing the deaf.

When an exhaustive census of the graduates from all over the country was compiled, it revealed the following encouraging facts: 16 became superintendents of other institutions; 214 became teachers or were otherwise employed in institutions; 34 became ministers of the gospel; 84 authors, publishers, or lecturers; 310 were engaged as teachers of music or were vocalists outside of institutions; 69 had been organists in churches; 125 piano tuners; 937 had been engaged as teachers, employees, and workers in handicraft; 277 were storekeepers, etc.; 45 became owners and managers of real estate; 760 (mostly women) were employed at housework at home or in families, or at sewing with machines, or by hand, and 78 were in homes of employment. Further, according to the 11th census of the United States (1890) when there were 50,568 blind in the land, but 2,560 were found in almshouses. What proportion of these ever attended our schools, will never be known, but it must be remembered that blindness is an affliction of old age.

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Blind Fishes. See CAVE ANIMALS.

Blind Spot. The place of entry of the optic nerve in each retina is insensitive to light. Mariotte in 1668 first demonstrated the existence of the blind spot. Its existence may be easily shown as follows: Pin a large sheet of paper against the wall so that a cross marked thereon may be at the level of the eyes; fix the position of the head by means of a headrest (a ruler about 50 centimeters in length, held by the teeth at one end, the other end resting against the paper, is a convenient headrest); with one eye closed or covered, look steadily at the cross with the other eye; move a pencil, that has been covered with paper so that the point only shows black, from the cross toward the temporal side of the field of vision; mark on the paper the position at which the pencil point disappears; move the pencil farther and mark the position at which the point re-appears. By moving the point in various directions near this place on the paper, and marking the positions where the pencil point disappears, and re-appears, a series of marks may be made which furnish an outline figure of the form of the blind spot. The diameter of the blind spot (1.5 mm.) corresponds to a visual angle varying from 3° 39′ to 9° 47′. The average is about 6°. An image of light sufficiently small thrown upon the optic nerve by means of the ophthalmoscope, gives rise to no sensations. These experiments show that at the blind spot we see nothing, yet, as we look at this page with one eye only the surface appears to be covered with letters in the regular forms; there is no blank space corresponding to the blind spot. In binocular vision the blind spot of one retina is covered with a sensitive portion of the other retina. Why we should not be aware of our inability to see a continuous field with one eye, is a problem for which there are two proposed explanations. The blind spot may be filled out by association, whose nature is determined by the character of the surrounding field, or, by eye movements which serve as retinal local signs for the insensitive region. Propably the two processes are necessary and aid each other in presenting to the mind the continuous visual field. Consult: Ladd, 'Elements of Physiological Psychology'; Helmholtz, 'Physiologische Optik' (1901); Sandford, 'Course in Experimental Psychology' ex. 113, 114; Wundt, 'Physiologische Psychologie' (1893); Titchener, 'Experimental Psychology.'

Blind Tom (BETHUNE, THOMAS), a musical freak: b. about the middle of the 19th century. He was a negro slave in Georgia, and was born blind and with very weak mental development. He showed remarkable aptitude for music and after hearing a piece played once could reproduce it accurately on the piano. He also performed other musical wonders, and for several years was exhibited in various cities. His lack of intellect developed into almost brutal idiocy, and he disappeared from the public eye.

Blindage, in operations against fortresses, the name of all preparations which tend to intercept the view of the enemy. There are several species: (1) A fascine placed across the embrasures, to prevent the enemy from observing what passes near the cannon. (2) Blinds before port-holes are shutters made of strong planks, placed before the port-holes, as soon as the guns are discharged, to obstruct the enemy's view. (3) Single and double blinds. The former consists of three strong perpendicular posts, five feet in height, between which are planks covered with iron plates on the outside, and thus made shot-proof. This screen is furnished with rollers, to enable the laborers in the trenches to push it before them. The latter consists of large wooden chests, on four block wheels, filled with earth, or bags of sand, and serve likewise in the trenches, etc., to cover the soldiers from the fire of the enemy. (4) Chandeliers used to protect the workmen in the trenches. Two square beams of timber are placed parallel, and at a distance of six feet, on the ground, and fastened by two cross beams. Upon the ends perpendicular posts are erected, and the interval is filled up with fascines, at least to a height of five feet. (5) Coverings placed over the most exposed parts in the saps or the fortress.

These are made of beams over which hurdles or fascines are spread, that finally receive a sufficiently thick layer of earth as a covering. During the Boer war of 1899–1902 Ladysmith, Mafeking, and Kimberley were largely defended by means of bomb-proof shelters or blinds.

Blindness, inability to see, resulting from disease or injury of the external eye, of the light-receiving portions of the eye, the retina, of the nerve-conducting paths, the optic tracts, or of the light-perceiving or intellectual centres in the occipital cortex of the brain. It may be transitory or permanent, partial or complete, congenital or acquired, curable or incurable. There is a form of night-blindness, in which dim light fails to give impressions; or of day-blindness, in which excess of light is obstructive to vision. Certain regular or irregular areas on the retina may be blind; one half of one eye or of both eyes may be blind. Blindness to certain colors is a well-known form of this affection. Objects may look too small, or too large, or be distorted. See AMAUROSIS; AMBLYOPIA; BLIND; EYE, DISEASES OF.

Blinds, screens or shutters to prevent too strong a light from shining in at a window, or to keep outsiders from seeing in. Venetian blinds are made of slats of wood, so connected as to overlap each other when closed, and to show a series of open spaces for the admission of light and air when in the other position.

Blindsnake, a family of small serpents (*Typhlopidæ*) having worm-shaped bodies, only a few inches in length, very rigid, and suited for burrowing. These little snakes exist in all warm countries, and lead a subterranean life, worming their way through the loose top-soil, and feeding on earth-worms, grubs, and insects. Their eyes, through disuse, have become minute and weak, and in many species almost covered by overlapping plates. In India they sometimes come out upon the surface after showers, when they are regarded with superstitious dread by the natives; but they are perfectly harmless. Many species inhabit Mexico and tropical America, two or three occurring in New Mexico and Texas, where they are frequently found in ant-hills.

Blindstory. See TRIFORIUM.

Bliss, Aaron Thomas, American politician: b. Smithfield, N. Y., 22 May 1837; d. 16 Sept. 1906. He served in the Federal army during the Civil War, and was for six months a prisoner in Andersonville, Columbia, and other Southern prisons. In 1865 he settled in Saginaw, Mich., where he engaged in lumbering, banking, and other business enterprises. He was a member of Congress, 1889–91, was elected governor of Michigan in 1900, and re-elected 4 Nov. 1902.

Bliss, Cornelius Newton, American merchant and statesman: b. Fall River, Mass., 26 Jan. 1833. He was educated in New Orleans; entered his stepfather's counting room there; engaged in the commission business in Boston, and became head of the dry goods commission house of Bliss, Fabyan & Company, New York, in 1881. He was a member of the Pan-American Conference; chairman of the New York Republican State Committee 1877–8; and treasurer of the National Republican Committee in 1892 and 1896; declined to be a candidate for governor of New York in 1885 and 1891; and was secretary of the Interior Department in President McKinley's Cabinet in 1897–8.

Bliss, Daniel, American missionary: b. Georgia, Vt., 17 Aug. 1823. He graduated at Amherst College in 1852, and at the Andover Theological Seminary in 1855; was ordained a Congregational minister 17 Oct. 1855; engaged in missionary work in Syria in 1855–62; and in 1866 became president of the Syrian Protestant College of Beyrout. His publications include: 'Mental Philosophy' and 'National Philosophy,' both in Arabic.

Bliss, Edwin Elisha, American missionary: b. Putney, Vt., 12 April 1817; d. Constantinople, 29 Dec. 1892. He graduated at Amherst College in 1837, and at Andover Theological Seminary in 1842; was ordained as a missionary in 1843, and joined the American Mission in Turkey, being stationed at Trebizond, 1843–52; Marsovan, Armenia, 1852–6; and at Constantinople after 1856. In addition to the ordinary work of a missionary he edited, 1865–92, the 'Messenger,' published at Constantinople in the Turkish and Armenian languages, and compiled a number of text-books, notably the 'Bible Handbook,' in Armenian.

Bliss, Edwin Munsell, American missionary: b. Erzerum, Turkey, 12 Sept. 1848. He was educated at Robert College, Constantinople; at the high school, Springfield, Mass., and at Amherst College, where he graduated in 1871, later taking a course at Yale Divinity School. In 1872 he was sent to Constantinople as agent for the American Bible Society, and traveled in Turkey and Persia. On his return to the United States in 1888 he edited the 'Encyclopædia of Missions.' He has also written 'The Turk in Armenia, Crete, and Greece,' and 'A Concise History of Missions.' Since 1896 he has been associate editor of the New York 'Independent.'

Bliss, Frederick Jones, American explorer (son of Daniel Bliss, q.v.): b. Mount Lebanon, Syria, 23 Jan. 1859. He graduated at Amherst College in 1880, and at the Union Theological Seminary in New York in 1887; was principal of the preparatory department of the Syrian Protestant College of Beyrout for three years; was appointed explorer to the Palestine Exploration Fund in 1890, and is best known for his excavations and finds in Jerusalem in 1894–7. Here he unearthed an ancient city wall with towers, besides streets, drains, stairways, churches, and other structures. He has published 'Mounds of Many Cities'; 'Excavations at Jerusalem,' etc.

Bliss, George, American lawyer: b. Springfield, Mass., 3 May 1830; d. near Wakefield, R. I., 2 Sept. 1897. He graduated at Harvard College in 1851; studied for two years in Berlin and Paris, and after his return read law principally at the Harvard Law School. He established himself in practice in New York. In 1859-60 he was private secretary to Gov. Morgan; in 1861 was appointed to his staff; in 1862 became paymaster-general of New York; and in that and the following year organized three regiments of United States colored infantry under instructions from the secretary of war. In 1866 he was appointed attorney for the Metropolitan boards of excise and health; in 1872, United States attorney for the Southern District of New York, and in 1881 a

special assistant to the United States attorney-general for the prosecution of the 'Star Route' postal cases. He drafted the New York charter of 1873; drew up the New York Consolidation Act, and was author of the first tenement-house act for the city. He published three editions of the 'Law of Life Insurance' and four editions of the 'Annotated Code of Civil Procedure.'

Bliss, Philip Paul, American singing evangelist: b. Clearfield County, Pa., 9 July 1838; killed in railroad accident, Ashtabula, Ohio, 29 Dec. 1876. He received some musical instruction from G. W. Root, but was very largely self-taught. His evangelistic work was done chiefly in conjunction with Maj. D. W. Whittle and D. L. Moody, who became his warm friend and admirer. He had a fine personal presence, a gift of ready and effective speech, and these, combined with his wonderful voice, which appealed strongly to the hearts of the multitude, gave him great power over his audiences. He frequently composed both the words and music of the songs which have made his name known throughout Christendom. Of these the most popular are: "Hold the Fort, for I am Coming"; "Down Life's Dark Vale We Wander"; "Jesus Loves Me"; "Hallelujah! 'Tis Done"; and "Pull for the Shore, Sailor." His services as a revivalist were in demand throughout the United States and Canada. His songs appeared in the following named collections: 'The Charm' (1871); 'The Song Tree' (1872); 'The Joy' (1873); 'Gospel Songs' (1874).

Bliss, Porter Cornelius, American diplomatist: b. Erie County, N. Y., 28 Dec. 1838; d. New York, 2 Feb. 1885. He was educated at Hamilton and Yale colleges; became private secretary to James Watson Webb, United States minister to Brazil; explored the Gran Chaco for the Argentine government; compiled the various Indian dialects, and investigated the antiquities of that region; and in 1866 became private secretary to Charles A. Washburn, United States minister to Paraguay. He was commissioned by President Lopez to write a history of Paraguay, and while doing so war broke out between that country and Brazil, and he was imprisoned and tortured on suspicion of being a Brazilian spy. It required the presence of an American squadron to effect his release. In 1869–70 he edited the Washington *Chronicle;* in 1870–4 he was secretary of the United States legation in Mexico, and during that time made several archæological explorations and wrote on the opportunities of American enterprise in that country. In 1874–8 he was an associate editor of 'Johnson's Universal Cyclopædia,' and in 1879 went to South America as correspondent for the New York *Herald.*

Bliss, William Dwight Porter, American clergyman: b. Constantinople, 1856. He graduated at Amherst College in 1878, and at Hartford Theological College in 1882; was ordained a Congregational clergyman; became an Episcopal priest in 1887; organized the first Christian Socialist Society in the United States in 1889, and was president of the National Reform League. He edited 'The Dawn' (1889–96); 'The American Fabian' (1895–6); and the 'Encyclopædia of Social Reform,' and published a 'Handbook of Socialism.'

Bliss, William Julian Albert, American physicist: b. Washington, D. C., 1867. He graduated at Harvard University in 1888 and pursued a course of studies in electrical engineering at Johns Hopkins, Baltimore, at which university he became successively assistant in physics (1895–8), associate (1898–1901), and professor in the latter year. He is the author of several works bearing on his profession.

Blister, a local collection of blood serum beneath the cuticle. Blisters may be produced by a variety of agents. In all instances, however, there is irritation of the part; this is followed by dilated blood vessels and an exudation of the serum from the blood vessels near the irritant. Medicinally, blistering agents or irritants may be classified in four principal groups, as follows: rubefacients, when redness alone is produced; vesicants, when blistering is brought about; pustulants, when the blisters are usually small and contain pus; and escharotics, when burning or destruction of tissue may take place. Heat is an excellent illustration. Mild heat will cause redness; temperature above 125° to 400° F. will cause blistering; temperature above 400° will burn; and high temperatures can char. The most commonly used blistering agents are heat (the hot iron being lightly touched to the skin), mustard, capsicum, mezereum, turpentine, and cantharides. The hot iron and cantharides are preferred, because their action can be controlled. Mustard mixed with cold water makes an excellent rubefacient, but it is not advised to be used as a vesicant. Blisters are used to influence deep-seated and chronic joint, muscle, and tendon troubles. For general purposes of counter-irritation rubefacients are more serviceable than vesicants.

Blister-beetle, or **Spanish Fly,** an oil-beetle of the family *Meloidæ,* in which there is a small head and a distinct neck; the wing-covers and sides of the body without any co-adaptation, while each claw of the feet bears a long appendage closely applied beneath it. The integument is soft, flexible, and many of the species contain a substance which forms an active vesicant, called cantharadine. The Spanish fly (*Lytta vesicatoria*) is larger than any of our native species, is of a bright shining green, and when powdered and applied to the skin raises blisters. It inhabits the south of Europe, and is usually imported from Spain. Our native blister-beetles, when dried, can also be used for producing blisters or making blister-plasters. They are black or gray, and occur on potato plants, on the flowers of the golden-rod, etc. Their transformations are wonderfully complicated, since they pass through more than one larval stage (see METAMORPHOSIS). The females lay their eggs in the earth; the young, on hatching, are of a singular primitive shape, called a "triungulin," which is very active, entering the egg-pods and devouring the eggs of locusts. It soon molts, assuming a different but still active larval stage; it molts again, entering its third larval stage, when it resembles the grub of a May beetle (scarabæid stage). In the fourth stage the grub is helpless, lying on one side; it increases rapidly in size, and when fully grown leaves the remains of the egg-pod it has been living on and forms a small cavity near by. Here it lies motionless on its side, but grad-

ually contracting till the skin separates and is pushed down to the end of the body, disclosing the semi-pupa or coarctate larva, which hibernates. In the spring the skin bursts and discloses a sixth larval form like the fourth. In this stage it is again active, burrowing in the earth, but taking no food, and in a few days passes into the pupa state. Other species of the family pass through a similar hypermetamorphosis.

Blister-steel. See STEEL MANUFACTURE.

Blithedale Romance, The, the third of Nathaniel Hawthorne's romances, published 1852. It was the outcome of an intimate acquaintance with the members of the Brook Farm (q.v.) Community, and immortalized the brief attempt of that little group of transcendentalists to realize equality and fraternity in labor. It is more objective and realistic than Hawthorne's other works, and therefore in a sense more ordinary. Its central figure is Zenobia, a beautiful, intellectual, passionate woman; drawn as to some outlines, perhaps, from Margaret Fuller. At the time it opens she has taken up her abode at Blithedale Farm, the counterpart of Brook Farm. The other members of the community are Hollingsworth, a self-centred philanthropist; a Yankee farmer, Silas Forster, and his wife; Miles Coverdale, the relater of the story; and Priscilla, who is Zenobia's half-sister, though of this fact Zenobia is ignorant. 'The Blithedale Romance' is a brilliant instance of Hawthorne's power as a story-teller. No scene in the whole range of fiction is more realistic than the finding of Zenobia's body in the dead of night; drawn from the dank stream, a crooked, stiff shape, and carried to the farm-house where old women in nightcaps jabber over it. Nothing could be more in the manner of Hawthorne than his comment that if Zenobia could have foreseen her appearance after drowning, she would never have committed the act.

Blizzard, a peculiarly fierce and cold wind, accompanied by a very fine, blinding snow which suffocates as well as freezes men and animals exposed to it. The origin of the word is dubious. It came into general use in American newspapers during the bitterly cold winter of 1880–1, although some papers claim its use as early as the seventies. Such a storm comes up very suddenly and overtakes the traveler without premonition. The sky becomes darkened, and the snow is driven by a terrible wind which comes with a deafening roar. One of the most severe of these storms recorded in the West was that of January 1888 which extended from Dakota to Texas. The thermometer in some places fell from 74° to —28° F., and in Dakota to —40°. The number of deaths amounted to 235. Children were frozen on their way home from school, and farmers in their fields, and travelers were suffocated by the fine snow. The blizzard which will long be remembered in the eastern States began 11 March 1888, and raged until the 14th, New York and Philadelphia being the cities most affected. The wind at one time blew at the rate of 46 miles an hour. The streets and roads were blocked, railroad trains snowed up for days, telegraphic communication cut off, and many lives were lost.

Blizzard State, a nickname for South Dakota.

Bloat, Hoven, or **Tympanites,** a diseased condition of sheep or cattle, consisting of distention of the first stomach (rumen) and commonly caused by an overabundance of leguminous diet. Animals unaccustomed to graze in clover are liable to the malady, but over-eating of grain may also produce bloat. The use of cathartic remedies, such as Epsom salts or linseed oil, will often prove effective, except in severe cases. Sometimes the accumulation of gas in the rumen is so abundant and distressing that relief must be obtained by an incision made by a surgical instrument.

Bloch, Karl Heinrich, Danish painter: b. Copenhagen, 1834; d. 1890. He studied at the Copenhagen Academy and in 1852 went to Italy where he spent about 12 years. In 1883 he became a professor in the Academy in which he had been trained. Although his chief paintings are historical, he was also successful in nature-studies, and some of his pictures are notable for their humorous characteristics. Among his works are: 'Peasant's Cottage'; 'Roman Street Barber'; 'James of Scotland Visiting Tycho Brahe'; 'Christian II.'; and two frescoes in the Copenhagen University.

Bloch, Marcus Eliezer, Jewish naturalist: b. Anspach (of poor parents), 1723; d. 1799. In the 19th year of his age he understood neither German nor Latin, nor had he, with the exception of some rabbinical writings, read anything. Nevertheless he became tutor in the house of a Jewish surgeon in Hamburg. Here he learned German and Latin, and besides acquired some knowledge of anatomy. His principal work is the 'Natural History of Fishes' (folio, 1785–99), adorned with many colored plates.

Block, or **Blok, Adriaen,** Dutch navigator who visited Manhattan (now New York) about 1613 and again in 1614 in the Tiger. This ship being accidentally burned he built the Unrest, a craft of 16 tons, in which he coasted as far north as Nahant, discovering the Housatonic and the Connecticut rivers and the island which bears his name. See BLOCK ISLAND.

Block, a mechanical contrivance consisting of one or more grooved pulleys mounted in a casing or shell which is furnished with a hook, eye, or strap by which it may be attached to an object, the function of the apparatus being to transmit power or change the direction of motion by means of a rope or chain passing round the movable pulleys. Blocks are single, double, treble, or four-fold, according as the number of sheaves or pulleys is one, two, three, or four. A running block is attached to the object to be raised or moved; a standing block is fixed to some permanent support. Blocks also receive different denominations from their shape, purpose, and mode of application.

Block Books, before, and for a short time after, the invention of printing, books printed from wooden blocks, each the size of a page and having the matter to be reproduced, whether text or picture, cut in relief on the surface. These were intended for the popular use and were adorned with crude paintings, the makers of block books and card painters being the same till about the opening of the 15th century. As their work increased in favor they devised the process of block printing, cutting into

wooden blocks or metal plates in such a manner as to leave letters and pictures in relief, and after applying color to these, taking impressions from them. One or both sides of the sheet were printed from these blocks. See also PRINTING.

Block Coal, the name of certain kinds of bituminous coal having a tendency to break into forms approaching the cube. See also COAL.

Block Island, an island in the Atlantic Ocean, midway between Montauk Point, L. I., and Point Judith, R. I.; eight miles long, and from two to five miles wide. It belongs to the State of Rhode Island, from the shore of which it is about 10 miles distant. It has become a noted summer resort, and constitutes the township of New Shoreham. Pop. (1900) 1,396.

Block Printing. See PRINTING.

Block System, a system of working the traffic on railroads according to which the line is divided into short sections, each section with a signal and telegraphic connection at the end. The essential principle of the system is that no train is allowed to enter upon any one section till that section is signalled wholly clear, so that between two successive trains there is not merely an interval of time, but also an interval of space. See RAILWAY SIGNALS.

Block Tin. See TIN.

Blockade' is the rendering of intercourse with the seaports of an enemy unlawful on the part of neutrals, and it consists essentially in the presence of a sufficient naval force to make such intercourse difficult. It must be declared or made public, so that neutrals may have notice of it. If a blockade is instituted by a sufficient authority, and maintained by a sufficient force, a neutral is so far affected by it that an attempt to trade with the place invested subjects vessel and cargo to confiscation by the blockading power. The term is also used to describe the state of matters when hostile forces sit down around a place and keep possession of all the means of access to it, so as entirely to cut off its communication with the outside world, and so compel surrender from want of supplies.

To be sufficient, the blockade must be effective and made known. By the convention of the Baltic powers of 1780, and again in 1801, and by the ordinance of Congress of 1781, it is required that there should be a number of vessels stationed near enough to the port to make the entry apparently dangerous. The government of the United States has uniformly insisted that the blockade should be made effective by the presence of a competent force stationed and present at or near the entrance of the port. (1 Kent Com. 145.) But an accidental absence of the blockading force, or the circumstance of being blown off by the wind, if the suspension and reason of the suspension are known, will not be sufficient in law to remove a blockade. But negligence or remissness on the part of cruisers stationed to maintain the blockade may excuse persons, under certain circumstances, for violating the blockade. Taylor ('International Public Law,' p. 767), upon this subject, says:

"Under that rule the government of Great Britain naturally accepted the contention of that of the United States, made during the American Civil War, to the effect that the legal efficiency of the blockade of Charleston,— usually maintained by one ship lying off the bar between the two principal channels, with two or three others cruising outside within signalling distance,— was not destroyed by the absence of the Niagara, a blockading vessel whose withdrawal, in the attempt to intercept a cargo of arms expected at another part of the coast, left the harbor open for at least five days. It was admitted, under the British rule, that there was no cessation of the Charleston blockade, despite the fact that a large number of vessels succeeded in passing it, owing to the peculiar nature of the coast. As there is no rule requiring the blockading squadron to remain within a certain distance of the place blockaded, provided access is really interdicted, Buenos Ayres was held to have been sufficiently blockaded by vessels stationed in the vicinity of Monte Video; and, in like manner, the blockade of Riga was maintained, during the Russian war in 1854, at a distance of one hundred and twenty miles from the town by a ship in the Lyser Ort, a channel three miles wide, forming the only navigable entrance to the gulf."

When on 21 Nov. 1806, the Berlin Decree of Napoleon I. declared the whole British Islands in a state of blockade, that blockade, being ludicrously ineffective, was illegal; so also, though to a somewhat less extent, were the British Orders in Council of 11 and 21 Nov. 1807, which placed France and all its tributary states in a state of blockade. The retaliatory Napoleonic Milan Decree of 27 Dec. 1807, extending the previously announced blockade to the British dominions in all quarters, labored to a still greater extent under the same defect. More effective, as being more limited in area, were the blockades of the Elbe by Great Britain in 1803, those of the Baltic by Denmark in 1848–9 and 1864, those of the ports of the Confederate States of America by President Lincoln on 19 April 1861, and that of the Cuban ports by the United States in 1898.

To involve a neutral in the consequences of violating the blockade, it is absolutely necessary that he have due notice of it. This communication may be communicated in two ways, either actually by a formal notice from the blockading power, or constructively, by notice to his government, or by the notoriety of the fact. Formal notice is not required; any authentic information is sufficient. Phillimore, 'International Law' (page 397); Taylor, 'International Public Law' (1901, p. 768). A violation may be either by going into the place blockaded, or by coming out of it with a cargo laden after the commencement of the blockade. For a master to place himself so near a blockaded port as to be in a condition to slip in without observation is a violation of the blockade, and raises the presumption of a criminal intent. The sailing for a blockaded port, knowing it to be blockaded, is, it seems, such an act as may charge the party with a breach of the blockade. (1 Kent Com. 150; 5 Cranch, 335.) By provision in the treaties between the United States and Greece, Prussia, and Sweden and Norway, it is agreed that vessels arriving at a port supposed at the time of departure to be blockaded shall not be captured and condemned for an attempt to enter, unless on proof that they had or could have learned of the continuance of the blockade, but an attempt to re-enter after warning will subject them to condemnation. Vessels in port before the establishment of the blockade are to be permitted to depart with their cargoes. They are usually allowed from 15 to 45 days in which to make their exit. Any one running a blockade does so at his peril; his government, by international law, cannot protect him from for-

feiting his vessel with its cargo, and his liberty if he be captured by the blockading fleet. See INTERNATIONAL LAW; U. S., DIPLOMACY OF THE.

Blockhouse, in fortification, a house made of beams joined together crosswise, and often doubled, with a covering and loopholes, large enough for from 25 to 100 men. In addition to this, it is commonly covered with earth, to render it entirely bomb- and fire-proof. Forts of this kind are often fitted up to receive cannon. Blockhouses are generally built in the form of a square or a cross. Their use is to afford a feeble garrison of an important place, which is very much exposed, an opportunity of holding out against the cannonade and assault of the enemy till they are relieved. They also serve for bomb-proof guardhouses, and places of last resort, in the interior of intrenchments, and in the covered passages of fortresses, where the cannon are stationed. Blockhouses were much employed as a defense against Indians in America, by the French in Algeria, and by the Spanish in Cuba, where a line of blockhouses connected by wire barricades was built across the island in 1898.

Blocks of Five, a political expression in the United States, originating in the presidential campaign of 1888. A letter purporting to have been written by the treasurer of the Republican National Committee to the chairman of the Indiana State Committee, recommending securing «floaters in blocks of five.» This was construed to mean the bribery of voters at wholesale rates. The Democratic managers circulated the letter as widely as possible, before election. Proceedings for libel were afterward begun, but never brought to trial.

Blocksberg, the name of several elevations in Germany, particularly the Brocken (q.v.), forming the summit of the Hartz Mountains and the highest point in the northern part of the empire.

Blod'get, Lorin, American statistician: b. near Jamestown, N. Y., 25 May 1823; d. Philadelphia, 24 March 1901. He was educated at Hobart College; appointed assistant professor at the Smithsonian Institution, Washington, D. C., in charge of researches on climatology, 1851; was employed on the Pacific Railroad survey for the War Department, 1852–6; and was engaged in the United States treasury department, 1863–77. He was also editor of the Philadelphia *North American,* and secretary of the board of trade of that city, 1858–64. He is credited with having laid the foundation of American climatology. His publications include 'The Climatology of the United States' (1857), a work that met high favor in the United States and Europe; 'Commercial and Financial Resources of the United States'; and about 150 volumes of reports.

Blod'gett, Henry Williams, American jurist: b. Amherst, Mass., 21 July 1821; d. Waukegan, Ill., 9 Feb. 1905. He was educated at Amherst Academy; studied surveying and engineering; was admitted to the bar in 1844; and settled in Waukegan, Ill., to practise, in the following year. He served in the lower house of the legislature, 1852–4, and in the State Senate, 1859–65; and was United States district judge for the Northern District of Illinois, 1869–93, when he retired. He was appointed one of the counsel on the part of the United States before the arbitration tribunal on the Bering Sea fur-seal controversy between the United States and Great Britain, in 1892.

Blodgett, Samuel, American inventor: b. Woburn, Mass., 1 April 1724; d. Haverhill, Mass., 1 Sept, 1807. He took part in the French and Indian war; was a member of the expedition against Louisburg in 1745; and subsequently became a judge of the court of common pleas in Hillsboro County, N. H. He was the inventor of an apparatus by which he recovered a valuable cargo from a sunken ship near Plymouth, Mass., in 1783. His success led him to go to Europe for similar enterprises. He met with no encouragement in Spain, and in England proposed to raise the Royal George, which went down off Spithead with 800 persons on board, but his proposition was not accepted. In 1793 he began the construction of the canal around Amoskeag Falls in the Merrimac which now bears his name, but did not live to complete the work.

Bloede, blē'dē, **Gertrude,** American poet and novelist, better known as STUART STERNE: b. Dresden, Saxony, 10 Aug. 1845; d. Baldwin, L. I., 14 Aug. 1905. She wrote in verse 'Angelo' (new ed. 1879); 'Giorgio and Other Poems' (1881); 'Beyond the Shadow, and Other Poems' (1888); 'Piero da Castiglione'; and 'The Story of Two Lives,' a novel.

Bloemaert, bloo'märt, or **Blom, Abraham,** Dutch painter: b. Gorkum about 1565; d. Utrecht, 1647, or more probably 1657. His paintings are reproached with various faults, yet he is distinguished by the brilliancy of his coloring and the richness of his invention. He painted all sorts of objects, but his landscapes are the most esteemed. He had four sons, of whom Cornelis (b. Utrecht, 1603; d. Rome, 1680), was a distinguished engraver.

Bloemen, Jan Frans van, Flemish painter: b. Antwerp, 1662; d. Rome, 1748 (?). He was surnamed «Orizzonte,» an allusion to the great beauty of the coloring he put into his landscapes.

Bloemen, Pieter van, Flemish painter, brother of Jan Frans: b. Antwerp, 1651; d. 1662. After study in Italy he was appointed dean of the Guild of St. Luke in his native city. His work is chiefly landscapes and military subjects. He is known as STANDAERT.

Bloemfontein, bloom'fŏn-tīn, Orange River Colony, South Africa, the chief town and seat of government of the colony, 680 miles northeast of Cape Town, situated in an elevated and healthy region. It stands on a plain surrounded by low hills, and is regularly laid out, having a large market-square in the centre. It has several fine buildings, including the Anglican cathedral, the Dutch Reformed church, and other places of worship; the presidency; the town-hall; the post-office; the library; the national museum; the new Raadzaal, or council-chamber of the legislature; the old Raadzaal; Grey College and St. Andrew's College for boys; the Eunice Institute for girls; a government hospital and a cottage hospital; a lunatic asylum, etc. It is on the main railway line of the Colony, which is continuous with the Cape Colony and Transvaal systems. Pop. about 8,000, half being whites.

In the war between Great Britain and the South African and Orange Free State republics in 1899–1900 it was the seat of important military operations. In June 1899, a conference was held here between President Kruger of the South African Republic, and Sir Alfred Milner, the British commissioner of Cape Colony, with a view of averting war. After the appointment of Lord Roberts to the supreme command of the British forces operating against the Boers, he led an expedition against the city and forced its surrender on 13 March 1900, President Steyn escaping capture. Soon afterward the part of the republic occupied by the British was formally placed under British administration.

Blois, blwä (anciently BLESUM), France, the capital of the department Loir-et-Cher, 99 miles south-southwest of Paris, situated on the right bank of the Loire, from which it rises in the form of an amphitheatre. It consists of an upper town, with very narrow and crooked streets; a lower town, with many handsome houses, extending along a handsome quay; and of several suburbs, with one of which it communicates by a stone bridge of 11 arches. The city is furnished with spring water through an old Roman aqueduct, in excellent preservation. Thierry, the historian, was born here. The castle of Blois is rich in historical associations. It was long occupied by the counts of the name, and became a favorite residence of the kings of France. Louis XII. was born, Francis I., Henry II., Charles IX., and Henry III. held their courts in it; and the Guises, by a cruel though not unjust retribution, were murdered in it. When Maria de' Medici was, in 1617, exiled from the court, she resided, probably as a prisoner, in this castle, whence, 18 months later, she escaped through a high window, which is also an object of curiosity. In 1814, on the approach of the European armies to Paris, the Empress Maria Louisa and the council of regency repaired for a while to this place. Afterward the castle was entirely neglected, and even used as barracks for cavalry. During the later years of Louis Philippe's reign, this curious specimen of architecture was carefully and tastefully restored. Blois has several literary and scientific societies, a botanical garden founded by Henry IV., a public library with 19,000 volumes, a departmental college, and a diocesan seminary. It trades in wines, spirits, vinegar, staves, and licorice, while it produces serges, hosiery and gloves, cutlery and hardware. Pop. (1896) 23,542.

Blok, Petrus Johannes, pā-troos yō-hän-ĕs, Dutch historian: b. Helder, 1855. He was educated at Leyden; in 1884 became professor of history at Croningen and later at the University of Leyden. He was also Queen Wilhelmina's tutor in history. His work has been chiefly in social-political history of the Netherlands. He is the author of 'History of the People of the Netherlands' (translated into English); 'Eene Hollandsche stad in de Middeleuwen' and 'Eene Hollandsche stad onder de Bourgondisch-Oostenrijksche Heerschappy.'

Blom'field, Charles James, English divine: b. Bury-St.-Edmunds, Suffolk, 1786; d. Fulham, 5 Aug. 1857. He studied for the church at Cambridge, where he took high honors; and after filling several curacies, and acting for a time as chaplain to the bishop of London, was presented to the rectory of St. Botolph, Bishopsgate. In 1824 he was made bishop of Chester, and in 1828 bishop of London. He acquired considerable renown as a classical scholar from the editions published by him of several of the dramas of Æschylus, and he also published an edition of Callimachus, which is much esteemed. Along with Rennel, he edited, in 1812, the 'Musæ Cantabrigienses,' and in 1814, along with Monk, the 'Posthumous Tracts' of Porson, followed two years afterward by the 'Adversaria Porsoni.' In his ecclesiastical capacity he displayed great zeal and energy, more churches having been built in London under his episcopate than under that of any bishop since the Reformation. He incurred, however, some animadversions on his proceedings in relation to the Tractarian controversy by a vacillating policy, which gave satisfaction to neither of the parties.

Blomfield, Edward Valentine, English clergyman (brother of the preceding): b. 1788; d. October 1816. He studied at Caius College, Cambridge, and excited the highest expectations. Among several prizes which he gained was a medal assigned him in 1809 for his beautiful ode 'In Desiderium Porsoni.' In 1812 a fellowship in Emmanuel College was conferred on him. In 1813 he visited Germany, where he acquired a good knowledge of the German language, and became acquainted with Wolf in Berlin, and Schneider in Breslau. After his return he wrote in the 'Museum Criticum,' or 'Cambridge Classical Researches,' remarks on German literature which were received with approbation. The University of Cambridge appointed him one of the preachers of St. Mary's Church. He began a translation of Schneider's 'Griechisch-Deutches Lexicon,' but did not live to finish it. Matthiæ's 'Griechische Grammatik,' however, he translated completely. His translation was published by his brother and was everywhere well received. He was in Switzerland in 1816 with his pupil, a young nobleman, and in his haste to return to Cambridge on hearing that he was appointed proctor for the following year, the fatigue of rapid traveling occasioned a sickness of which he died.

Blomfield, Reginald, English architect: b. 20 Dec. 1856. He was educated at Exeter College, Oxford. He is architect to the Army and Navy Society and among his many important professional works are 'Brocklesby Park,' 'Caythorpe Court,' 'Holbrook House,' 'New Buildings at Haileybury College,' 'Lady Margaret Hall,' 'Portsea Institute.' He has published 'The Formal Garden in England' (1892); 'A History of Renaissance Architecture in England' two works of great value (1897); 'Short History of Renaissance Architecture in England' (1900).

Blommaert, blŏm-märt, **Philip,** Flemish philologist: b. Ghent about 1809. He has done much for the literature of his country

by an edition of the old Flemish poets of the 11th, 12th, 13th, and 14th centuries, with glossaries, notes, and emendations. He has also republished the 'Nibelungenlied,' translated into Dutch iambics. His best work, however, is the 'Aloude geschiedenis der Belgen of Nederduitschers,' in which he vindicates the claims of his country to an independent national existence and national literature. Blommaert also writes French well, and is a contributor to the 'Messager des Sciences Historiques.'

Blommaert, Samuel, Colonial patroon: b. 1590; d. 1670. He bought a tract of land almost equal in size to the present State of Delaware, extending from Cape Henlopen to the mouth of the Delaware River. The deed for this land given him by Peter Minuit, and his Council is the oldest deed for land in Delaware. He formed a company to provide for the settlement of this land, and a colony was started, but destroyed by the Indians after a few years in revenge for an act of the governor, Gillis Hosset.

Blond, Jacques Christophe le, zhäk krĭs-tof lė blondt, printer of engravings: b. Frankfort-on-the-Main, 1670; d. Paris, 1741. He was bred a painter, and in 1711 went to Amsterdam, and some years after to England. He conceived the idea of an establishment to print engravings in colors, and, obtaining means, produced many copies of engravings and pictures, which of course had defects, and the experiment failed. He now devoted himself to producing the cartoons of Raphael in tapestry, but this failed also, and he soon after died.

Blon'del, a confidential servant and instructor in music of Richard Cœur de Lion of England, about the year 1190. While his master was the prisoner of the Duke of Austria, Blondel went through Palestine and all parts of Germany in search of him. He understood, it is said, that a prisoner of rank was confined in Löwenstein Castle, and hastened hither. Placing himself under a grated tower, he began to sing one of the French lays which he had formerly composed for Richard. Scarcely had he finished the first stanza when a voice from the dungeon of the tower responded. Thus he discovered his king, delivered him, and gained the name of the «faithful Blondel.» Grétry's fine opera, 'Richard Cœur de Lion,' is founded on this anecdote.

Blondin, Charles Emile Gravelet, shärl ā-mēl grăv-lā blŏn-dăn, French acrobat: b. St. Omer, Pas-de-Calais, 1824; d. London, 22 Feb. 1897. He was trained at Lyons, where he made such rapid progress that he was designated «The Little Wonder.» After making a several years' tour of the United States, on 30 June 1859, before a crowd of 25,000 persons, he crossed the Falls of Niagara on a tight-rope in five minutes; on 4 July he crossed blindfold, trundling a wheelbarrow; on 19 August he carried a man on his back; on 14 Sept. 1860 he crossed on stilts in the presence of the Prince of Wales. His engagement at the Crystal Palace in 1862, where he performed on a rope 249 yards long, and 170 feet from the ground, drew immense crowds. After several years' retirement he reappeared in 1880, and in 1888 again performed in London, where he died.

Blood, Thomas (commonly called Colonel Blood): b. Ireland, 1618; d. 1680; was a disbanded officer of Oliver Cromwell, and a man distinguished in various audacious enterprises. He made an attempt to steal the crown and regalia from the tower, in which he almost succeeded. Being, however, taken, he confessed his purpose without showing the least fear of death. Charles II. from idle curiosity, went to see him, and Blood persuaded the monarch to pardon him. Charles even bestowed an estate with $2,500 a year upon him, while poor Edwards, the keeper of the jewel-office, who valiantly defended the crown and was wounded, lived forgotten.

Blood, the yellowish to reddish liquid alkaline medium present in the arteries and veins, the chief tissue of oxidation in the animal body. The composition and character of the blood varies very widely in different animals, and hence this description is confined more particularly to the human blood. From the standpoint of cell-structure the blood is a tissue made up of a liquid plasma and solid cells or corpuscles. It contains at least four separate and important ingredients, the plasma, or blood serum; red cells, or erythrocytes; white cells, or leucocytes; and blood plates. About one tenth to one twelfth of the entire body is blood, of which nine tenths is water.

Plasma.— The greater portion (56 per cent) of the blood is plasma. This plasma is composed of 90 per cent water containing gases, mineral salts, fats, nitrogenous bodies, and carbohydrates in solution. It is a clear yellowish fluid. The mineral salts are sodium chloride, common salt, the most abundant; sodium carbonate, which renders the blood alkaline; potassium chloride, potassium sulphate, calcium phosphate, sodium phosphate, magnesium phosphate, and calcium chloride. Traces of other inorganic salts are frequently found. The gases in the blood plasma are oxygen, nitrogen, and carbon dioxide. Of the organic constituents the non-nitrogenous ones are the fats and carbohydrates, with small amounts of fatty coloring matters, lipochromes, cholesterin, and sarcolactic acid. The fats are present in variable quantities, being particularly abundant following a meal. They are the glycerides of stearic, oleic, and palmitic acids. The carbohydrates are at least three, glycogen, dextrose or grape sugar, and animal gums. The non-proteid nitrogenous constituents of the plasma consist largely of the waste extractives. The most important of these are urea, kreatin, kreatinin, uric acid, and hippuric acid. Three ferments or enzymes are thought to be present in the plasma —a diastatic ferment, converting starches into sugars; a glycolytic enzyme, breaking up sugar, and a lipase, or fat-splitting enzyme. In addition, there is the ferment that causes coagulation. Whether this is present in the serum or in the white cells is a matter of inquiry. The proteids of the plasma are serum albumins, globulins (serum globulin and fibrinogen), and nucleo-proteids.

Red Cells.— These are the most abundant of the formed elements of the blood, making up 99 per cent of the corpuscles. There are thought to be in man at least 5,000,000 red blood-cells to every cubic millimetre of blood; their size, therefore, is very small, averaging in man 7.8 m.mm. They are flattened circular disks, with double depressed centres, one fourth as thick as broad. In the embryo and in certain diseased states the red blood-cells have a nucleus, but the normal red blood-cell in man has lost this cell-structure. Practically all of the mammals, save the camel tribe, have circular red blood-cells; the camels and most of the lower animals have oval red blood-cells; in the lower animals they are mostly nucleated. There is also great variation in size in the red cells of the various animals, being largest among the *amphibia* (Amphiuma 75 m.mm.). The red blood-cells are mostly manufactured in the marrow of the long bones. The chemical structure of the red cells is complex, but they contain an iron compound, hemoglobin, which is the most important constituent of the blood in the process of respiration and oxidation; by it the complex processes of chemical interchange in the body (metabolism) are made possible. Poisoning of the hemoglobin and the loss of its function means death by asphyxia. The hemoglobin gives the reddish-yellow tinge to the blood, and the differences in shade between venous blood and arterial blood are due to the state of oxidation of the hemoglobin.

White Cells — Leucocytes.— These are much less numerous than the red cells, varying in number from 5,000 to 20,000 to the cubic millimetre. At least five different forms of white cells are normally present in human blood. These are large and small lymphocytes, polymorpho-nuclear neutrophiles, eosinophiles, and transitional forms. Mast cells are another form of varying occurrence. The polymorph neutrophiles are the most numerous of the leucocytes and make up the greater mass in pus-cells. In shape and size these white cells differ, but all are spherical, some smaller than the red cells (6.7 m.mm.), but mostly larger (about 10 m.mm.), and all have one or more nuclei. The leucocytes are formed in a number of lymphatic tissues, the hæmolymph glands, the spleen, etc., and are among the most interesting of the constituents of the blood, since one of their chief functions is to protect the body from disease-producing micro-organisms. They may be aptly termed the human body's «army of the interior» in the fight with disease-causing agents. They are useful both physically (by eating, as it were, the bodies of invading bacteria — phagocytosis, q.v.) or chemically (in the elaborating of certain counter-poisons — antitoxins, q.v.), or in the manufacture of specific immunizing bodies for the blood-serum (see IMMUNITY). Their careful study in diseased conditions is very helpful in arriving at a diagnosis of the disease process.

Blood Plates.— These are of frequent occurrence, but as yet little is known of their function. They are thought to be globulin-like in their nature, and of use in the phenomenon of coagulation; others claim them as nucleo-proteids, made from the white blood-cells.

Functions of the Blood.— These, as already indicated, are numerous. Through the hæmoglobin, blood is the great oxidizing medium. It carries products for anabolism and products of katabolism, and is the great equalizer, by arterial pressure, of the osmotic pressures of all the cells of the body. As a means of defense in the struggle with parasitic invaders the blood is the most important of the body's bulwarks. See BLOOD DISEASES.

(Consult Ewing, 'Clinical Pathology of the Blood' (1902), with a most exhaustive bibliography on all blood subjects. For physiology see Schäfer, 'Physiology,' Vol. I., 1898.)

Blood, Avenger of, in Scripture, the nearest relation of any one that had died by manslaughter or murder, so called because it fell to him to punish the person who was guilty of the deed. In the political law of Israel the practice of punishment by the nearest relative, which had always been prevalent, was allowed to continue, while rules were laid down to prevent the chief abuses connected with it. The distinction was sharply drawn between murder and manslaughter. For the former no ransom or satisfaction was permitted. In the case of the latter, however, there were six cities set apart out of the number which the Levites occupied, placed at suitable distances over the extent of the land, three on each side of the Jordan, with roads leading to them which were well kept up, and these were cities of refuge to which the manslayer might flee, and within which he might dwell in safety without fear of the avenger. But he was not permitted to return to his own place; in fact, he had no safety, if he left his place of refuge, until the death of the high-priest during whose term of office his misfortune had occurred. See CITIES OF REFUGE.

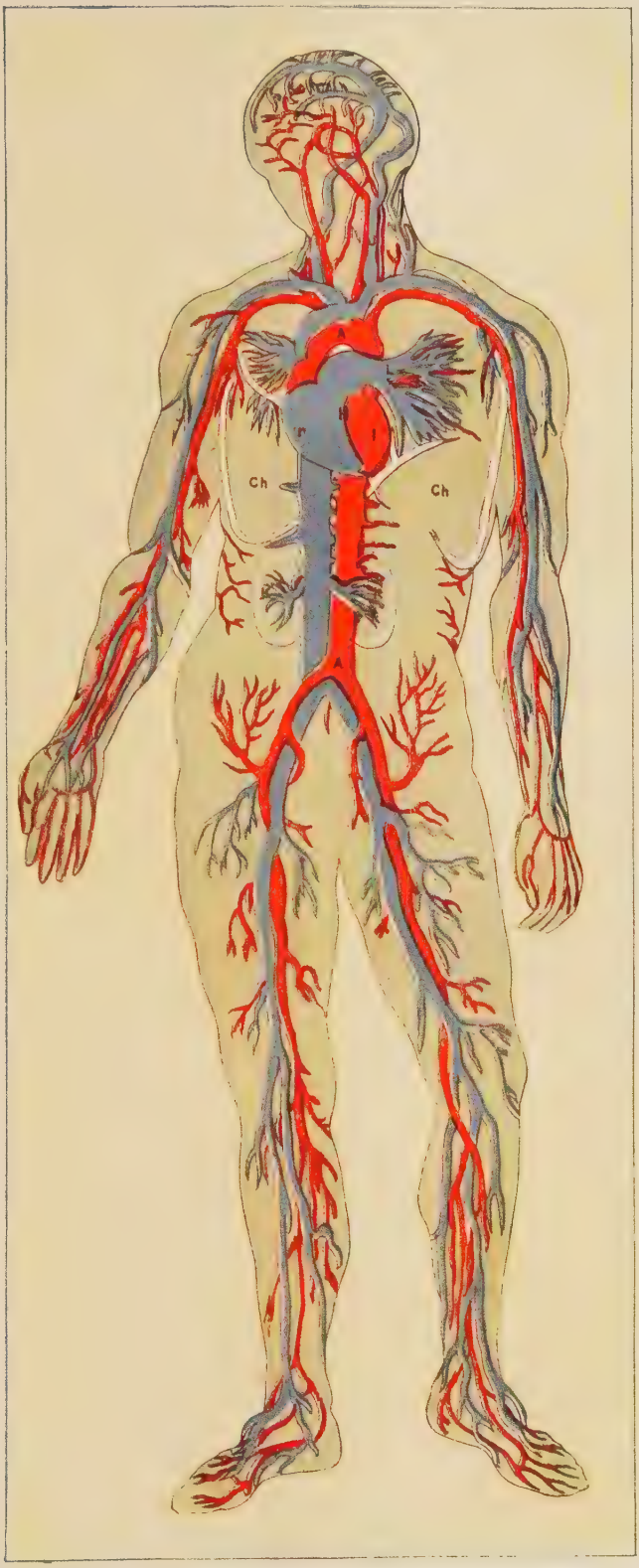
Blood Clam, or **Blood Quohog,** a local name given in Narragansett Bay to *Arca* or *Scapharca, transversa,* a common bivalve ranging from Narragansett Bay to Georgia, in reference to the reddish spots on the inside of the edge of the shell, and to the reddish flesh-color of the ovaries. It is not used as an article of food.

Blood, Council of, the name popularly applied to the Council of Troubles, established by the Duke of Alva, in the Netherlands, in 1567. Although it had no charter or authority from any source, it was omnipotent and superseded all other authorities. In the first three months alone its victims numbered 1,800, and soon there was hardly a Protestant house in the Netherlands that had not furnished a victim.

Blood Diseases. Many disorders are classed under this head. See ANÆMIA; BLEEDING; CHLOROSIS; CIRCULATION; HÆMOPHILIA; LEUCÆMIA; PERNICIOUS ANÆMIA.

Blood Feud, the right of individual, or family, vengeance in cases of bloodshed. In a very primitive state of society the tendency toward private instrumentality in the punishment of crime is largely unchecked. In passing from this stage to the highly organized system of legal penalties enforced by modern

Arteries are shown in red, the veins in blue.



H, the heart. l, left side. r, right side. Arising from the heart is the main artery, Aorta (A). The letter is put on the vessel at some distance from the heart, near where it gives off the branches (in red) for the head and arms, and at the point where it arches backwards and downwards to pass through the chest and the belly till at A, it gives off branches for the legs. Running alongside the arteries are represented in blue, veins. At K, is represented the position of the kidneys and their veins. L, represents veins of the lung. J, jugular vein. Ch. outlines of the chest.

civilized governments, the regulation of the blood feud was a marked step in the advancement of the race. It is true that the right of private vengeance was recognized, but it was put under restrictions and gradually narrowed in its action. The slayer had the right of sanctuary, illustrated by the cities of refuge in Israel under the Mosaic economy, by the altars of pagan deities and by the churches of the Middle Ages. The danger of dragging entire clans into retributive warfare to avenge a single murder was averted by limiting the right of vengeance to the immediate family, or the next of kin to the one slain, and the privilege of purchasing exemption by the weregild tended to check a blood penalty. The acceptance of the blood-money was finally made obligatory. The amount of the fine imposed upon the murderer varied among the Anglo-Saxons according to the rank of the victim. The family feuds among the mountain whites in certain sections of the United States form an interesting modern instance of the survival of the primitive institution of blood feud. See ASYLUM, RIGHT OF.

Blood-flower, or **Blood-lily,** a genus (*Hæmanthus*) of about 60 species of summer- and autumn-blooming bulbous-rooted plants of the natural order *Amaryllidaceæ,* natives mostly of South Africa, named from the general color of their flowers, which are arranged in umbels arising on an often beautifully colored scape either before the foliage or from a rosette of radical leaves. The few species cultivated in American greenhouses have not become widely popular, but are worthy of more extended culture, since the individual flowers are often two inches in diameter and the umbel sometimes a foot across. They may be cultivated like the nerine. Since some of the most attractive species reproduce slowly, the bulbs are often cut in two horizontally and treated like hyacinth bulbs similarly cut. Several new bulbs form around the margin of the cut halves. Consult Bailey and Miller, 'Cyclopedia of American Horticulture' (1900-2).

Blood Indians, or **Kino Indians,** a tribe of North American Indians of the Siksika Confederacy, dwelling in the Northwest Territories of Canada.

Blood-letting. See BLEEDING.

Blood-lily. See BLOOD-FLOWER.

Blood-money, money paid to the next of kin of a man who met with his death at the hands of another, accidentally or with premeditation. The Greeks called it ποινή, the Latins *pœna,* the Franks, Allemanni, and Scandinavians *manbote, wehrgeld,* or *wyrgilt,* the British Celts named it *saarhard,* and the Irish Celts *eric.* The institution still flourishes in many communities of Asia and Africa. In English criminal law the term blood-money was also applied to rewards paid to informers against highway robbers, thieves, burglars, and utterers of false coin or forged bank-notes. Laws empowering such payments were passed between 1692 and 1742. In 1813 the total amount paid in this way was £18,000. By this time a number of persons made a living out of these laws by entrapping unwary and foolish people into the commission of the crime of forging or uttering false coin, and then informing against them. As early as 1756 one McDaniel had brought to the scaffold and earned the blood-money of no less than 70 victims. Parliament, recognizing the abuses the system had engendered, repealed all the laws relating thereto, except in relation to the forgers of bank-bills, in which case the informer can still get his pecuniary reward.

Blood-pheasant, one of the small quail-like pheasants of the Himalayan genus *Ithagenes,* whose throat and breast are blood-red.

Blood-poisoning. From the standpoint of bacteriology blood-poisoning may be of two distinct types: It may be due to the presence of the poisonous toxins taken up by the blood, in which case it is called bacteriæmia or sapræmia, sometimes septicæmia; or it may result from the toxins plus the micro-organisms in the blood itself, a true blood infection, in which case it is termed, septicæmia, or pyæmia. The bacteria most frequently found in the blood in cases of septicæmia or pyæmia are the *Streptococcus pyogenes aureus, Staphylococcus pyogenes aureus, Diplococcus lanceolatus,* in pneumonia, *Bacillus typhosus,* in typhoid, and occasionally others. See PYÆMIA.

Blood Pressure. The pressure of the circulating blood varies very markedly in the three great divisions of the vascular system, the arteries, capillaries and veins, being lowest in the latter, highest in the arteries, and intermediate in the capillaries. The arterial pressure is the most important from the practical standpoint of the physician, and depends on four factors: the strength of the heart's pulsations, the degree of peripheral resistance, the elasticity of the arterial wall, and the volume of the circulating blood. Although subject to not inconsiderable fluctuations, the arterial pressure during health is fairly constant, and in disease its study is of great importance, both for purposes of diagnosis and of treatment. In a general way its variations may be estimated by feeling the pulse and judging the pressure by the resistance of the artery to the fingers, but it has been found of value to make more accurate observations by means of special instruments, or sphygmomanometers. Numerous forms of these are in use, among the newer ones being Gärtner's tonometer, and the various modifications of the Riva-Rocci instrument devised by Cook, Stanton, and Janeway. Elevations of arterial tension are commonly observed in certain diseases of the heart, arteries, and kidneys; while the pressure is low in wasting diseases, after severe hemorrhage or grave injuries, and with impending death. The blood pressure may also be raised or lowered by the administration of appropriate drugs. (See CIRCULATION.) Consult Janeway, 'The Clinical Study of Blood Pressure' (New York 1904).

Blood-rain, showers of grayish and reddish dust mingled with rain, which occasionally fall, usually in the zone of the earth which extends on both sides of the Mediterranean westwardly over the Atlantic and eastwardly to Central Asia; the red color being due to the presence of a red oxide of iron.

Blood-stains, in medico-legal investigations, are subjects of some importance, particularly when murder is suspected and so-called blood-stains are to be investigated. The first question to be determined is whether the suspected stain is blood of any animal; secondly, is it human blood or that of a lower animal. To determine the first question certain tests have been devised. These are (1) the guaiac test, by which blood brought in contact with tincture of guaiac and hydrogen peroxide develops a blue color (not, however, conclusive); (2) the hæmin test, by which crystals are produced from the hæmoglobin and identified under the microscope; (3) the spectroscope test, which gives a spectrum of hæmoglobin; (4) the microscope test, by which the blood-corpuscles are identified. To answer the second question requires either (1) the microscopical examination that determines the size, shape, and qualities of the blood-corpuscles; or (2) a much more reliable serum test, by which human serum, if brought in contact with the blood of an alien animal, causes dissolution of the blood-corpuscles of that animal's blood. By this serum test it is possible to detect any blood of any animal.

Blood-transfusion. See INFUSION; TRANSFUSION.

Blood-vessels. See ARTERIES; CAPILLARIES; HEART-VEINS.

Blood of Our Saviour, an order of knighthood, known also as the Order of Our Redeemer, and the Precious Blood of Jesus Christ. It was instituted in Mantua, Italy, in 1608, by Duke Vincenzo Gonzaga, and consisted of 20 members. Upon the collar was the legend *Domine probasti me,* and on the pendant, *Nihil isto triste recepto.*

Bloodbird, a black honey-eater of southern Australia, whose head, neck, breast, and back (of the male) are scarlet red.

Bloodhound, a dog of the «hound» build, commonly used for tracking fugitives. It usually stands from 25 to 27 inches high at the shoulders and weighs about 90 pounds. In appearance it is of a sedately noble expression, with a wise-looking, wrinkled face. Its color is black, mingled with a rich tan on the legs; a few are all tan. Its coat is short and glossy; the ears large and pendant; and the eyes deeply sunken, and showing a third lid or «haw.» It has a somewhat loose skin for so muscular a dog, and quite a dewlap in front of the throat. It has a wonderful power of scent, by means of which, aided by judicious training, it is enabled to follow the footsteps of a particular man, though they may be crossed and recrossed a thousand times by other footsteps, and though they lead over bare pavements.

The true bloodhound suffers from an unfortunate name, which seems to suggest bloodthirstiness, a quality very far removed from his real disposition. The term «bloodhound» originally meant simply that the dog was thoroughbred in the same sense that a horse or other animal is of «blood» or «blooded» stock. In the early days the Spaniards introduced into Cuba and South America dogs which had some of the characteristics of the bloodhound, but were really a cross between the ferocious war-dog of the ancients and the big Spanish pointer. These dogs had evil dispositions and were capable of great ferocity, and their sins have been visited on the real but innocent bloodhound. The true bloodhound will trail a man to the last of its strength, but will not voluntarily attack him. When it has located him, it will keep guard and prevent his escape; and may, if attacked, use its great powers in self-defense, but not in the savage manner generally attributed to it; it is not in its nature to be cruel.

Bloodroot. See SANGUINARIA.

Blood'stone. See HELIOTROPE; HEMATITE.

Bloodworm, the larvæ of species of *Chironomus,* gnats allied to the mosquito. The worms live in fresh-water pools and sluggish streams. They are long, slender, and worm-like, and certain species are blood-red in color. The flies have very feathery antennæ and do not bite. The larvæ usually have no tracheæ. The red color of these larvæ is due to hæmoglobin, a substance that has the power of attracting and storing oxygen, and giving it off to the tissues as they require it. Such larvæ are able to live in burrows which they construct in the mud. Some of them, provided plentifully with hæmoglobin, are in consequence able to live at great depths (it is said even at 1,000 feet in Lake Superior), and come to the surface only occasionally. A few are able even to tolerate salt water, and have been fished up from considerable depths in the sea. It is a remarkable fact that these physiological capacities differ greatly within the limits of the one genus, *Chironomus,* for some of these species are destitute of hæmoglobin, and have to live near the surface of the water; in these there is a well-developed tracheal system.

Bloodwort. See SANGUINARIA.

Bloody Assizes, the name given by the people to a series of trials held in England by the infamous Judge Jeffreys, in 1685, after the suppression of the Duke of Monmouth's rebellion. Upward of 300 persons were executed after short trials; very many were whipped, imprisoned, and fined; and nearly 1,000 were sent as slaves to the American plantations. See JEFFREYS, GEORGE.

Bloody Bill, in American politics, an act sometimes called the FORCE BILL, passed by Congress 2 March 1833. Its aim was to enforce the tariff-law of 1832, which the legislature of South Carolina had declared null and void. See U. S., TARIFF IN THE.

Bloody Falls, the lowest cataract of the Coppermine River in the Northwest Territories of Canada; so named because of a massacre here of Eskimos by Chippewa Indians in 1770.

Bloody Mary, a popular designation of Mary, Queen of England, on account of the persecutions of the Protestants during her reign (1553–8).

Bloody Shirt, a term used about 1880 in Congress, to revive the memories of the Civil War by impassioned allusions as, «to wave the bloody shirt.»

Bloody Tower, a term popularly applied to that portion of the Tower of London in which Richard III. is alleged to have caused the murder of his nephews, Edward V. and the Duke of York.

Bloom, the powdery or waxy protective film upon fruits, as grape and plum; and upon leaves and stems, as cabbage. It is especially noticeable upon desert plants. See also XEROPHYTES.

Bloom, a lump of puddled iron, which leaves the furnace in a rough state, to be subsequently rolled into bars or other form into which it may be desired to convert the metal. Also a lump of iron made directly from the ore by a furnace called a bloomery. See also IRON.

Bloomer, Amelia Jenks, American reformer; b. Homer, N. Y., 27 May 1818; d. Council Bluffs, 30 Dec. 1894. She was married in 1840 to Dexter C. Bloomer, of Seneca Falls, N. Y., where for several years she and her husband were engaged in publishing a semi-monthly periodical. In 1849 she began publishing 'The Lily' in the interests of temperance reform and women's rights; in 1853, on removing to Mount Vernon, Ohio, she resumed its publication there, and also became associate editor of 'The Western Home Journal.' In 1855 the couple removed to Council Bluffs, Iowa, where Mr. Bloomer became an organizer of the Republican party in that State, and a Federal official and a judge. She carried on her reformatory work for many years. Mrs. Bloomer will be remembered longest because of her personal adoption and her active advocacy of a costume which had been devised by Mrs. Elizabeth Smith Miller, and which became more popularly known as the Bloomer costume. (q.v.)

Bloomer Costume, a style of dress introduced about the year 1849 by Mrs. Amelia Jenks Bloomer (q.v.), who proposed thereby to effect a complete revolution in female dress and add materially to the health and comfort of her sex. It consisted of a jacket with close sleeves, a skirt reaching a little below the knee, and a pair of Turkish pantaloons secured by bands around the ankles. Though adopted rather extensively in America, it was unable to hold its ground against the united strength of prejudice and ridicule, and abroad it scarcely made further way than furnishing a favorite subject of burlesque on the stage, and of ridicule in the pages of the comic papers. One or two «strong-minded» women who ventured to brave public opinion in London by donning the new costume, were persecuted by the mob.

Bloomfield, Joseph, American soldier: b. Woodbridge, N. J.; d. Burlington, N. Y., 3 Oct. 1823. When the Revolutionary War broke out he was studying law, but joined the cause of the colonists with enthusiasm. In 1776 he received a captain's commission in the 3d New Jersey regiment, served with distinction throughout the war, and was mustered out a major. Resuming his legal studies, he acquired a successful practice in Burlington, was elected attorney-general, and twice (1801, 1812) governor of the State. During the War of 1812 he commanded a brigade. From 1817 to 1821 he was a representative in Congress, and as chairman of the Committee on Revolutionary Pensions he reported the bill granting pensions to soldiers of the Revolutionary army. In 1793 he was appointed a trustee of Princeton, and during his eight years' membership of the board, did much to promote the interests of that college.

Bloomfield, Maurice, American educator: b. Bielitz, Austria, 23 Feb. 1855. He came to the United States in 1857; entered the University of Chicago, and was graduated at Furman University, in Greenville, S. C., in 1877; took a course in Sanskrit and comparative philology in Yale College 1877–8; and was a Fellow of Johns Hopkins University 1878–9. He continued his studies in Berlin and Leipsic 1879–81; became an associate in Johns Hopkins University in 1881; and subsequently professor of Sanskrit and comparative philology there. He published numerous grammatical and philological papers; edited for the first time from the original Sanskrit MSS. the 'Sutra of Kauçika'; translated the 'Atharva-Veda' in the 'Sacred Books of the East'; and has since been engaged in compiling a 'Concordance of the Vedas.'

Bloomfield, Robert, English poet: b. Honington, 1766; d. August 1823. He learned to read at the village school, and in 1781 was sent to learn the trade of a shoemaker with his brother in London. The visiting of several places of worship, a debating society, Covent Garden Theatre, and the reading of sundry books, called forth his faculties, and he became almost unconsciously a poet. Hearing him one day repeat a song which he had composed, his astonished brother prevailed on him to offer it to the 'London Magazine,' and it was accepted. The piece was called 'The Milkmaid.' A second, 'The Sailor's Return,' likewise found a place in that journal. Thomson's 'Seasons,' 'Paradise Lost,' and other works of this kind, now became the subjects of his constant study. In the country, where he resided for a short time in 1786, he first conceived the idea of his poem, 'The Farmer's Boy,' which is characterized by a spirit of rural simplicity and innocence. It was written under the most unfavorable circumstances, in a garret. It was first shown to Capel Lofft in 1798, who was so much pleased with it that, in conjunction with his friend Hill, he had it printed in 1800. Bloomfield was patronized by the Duke of Grafton, who bestowed on him a small annuity and made him an under-sealer in the seal-office. This situation he was forced to resign on account of ill health. He then worked again at his trade as a shoemaker, and employed himself in constructing Æolian harps. Engaging in the book trade he became a bankrupt, and in the latter part of his life was afflicted with violent headaches and became nearly blind. He was gradually reduced to such a state of nervous irritability that apprehensions were entertained of his becoming insane. These fears were terminated by his death.

Bloomfield-Zeisler, Fanny, American pianist: b. Bielitz, Austrian Silesia, 16 July 1866. She came to Chicago with her parents in her second year, and at an early age displayed marked musical talent, which was later developed by study abroad, chiefly under Leschetizky at Vienna. Since 1895 she has played regularly in the principal cities of the United States. In

1893–5 she made a tour of the chief cities in Germany, everywhere meeting with great applause. In the spring of 1898 she made a successful English tour.

Bloomfield, N. J., a township in Essex County, on the Delaware, L. & W., and the Erie R.R.'s, the Morris Canal, and trolley lines connecting with Newark, the Oranges, Jersey City, and other cities; 10 miles northwest of New York. It was founded in 1685, under the name of Watsessing, and received its present name from Gen. Joseph Bloomfield in 1796. The oldest church in the town dates from this year. Bloomfield once ranked as an educational centre. Here were located in addition to other similar institutions, the Bloomfield Classical School, Madam Cooke's Female Seminary, and a Presbyterian Theological Seminary, the edifice of the latter being now occupied by a German theological seminary. It has a fine Mountainside Hospital; contains the residences of many New York business men; and is engaged in the manufacture of church and cabinet organs, woolen goods, hats, shoes, rubber goods, tissue and photographic paper, saddlery, hardware, electric elevators, and a variety of brass goods. It has a national bank, daily and weekly newspapers, an assessed property valuation of nearly $4,000,000 and a total debt of about $250,000. Pop. (1900) 9,668.

Bloomington, Ill., city and county-seat of McLean County, situated near the geographical centre of the state, 126 miles south of Chicago and on the Illinois Central, Chicago & Alton, Big Four, and Lake Erie & Western R.R.'s.

Manufactures and Industries.— Bloomington is in the heart of the famous Illinois corn belt, surrounded by one of the richest and most productive agricultural sections in the world, and where the largest nurseries in the state, comprising over 1,000 acres, are located. It is engaged in the manufacture of farm implements, flour and feed, stoves and furnaces, brick and tile, canned goods, harness, store fixtures, and portable elevators; has a coal shaft lifting 700 tons of coal per day, a bevel glass plant, ornamental iron works, paper and cigar factories, a brewery and a pork-packing establishment.

Banks.— There are seven banks — three national and four state — with a combined capital and surplus of $1,700,000, and deposits of $5,000,000.

Parks.— The city has three beautiful parks and is noted for its fine brick pavements, having more than any other city of its size.

Churches, Educational Institutions, Etc.— There are 32 churches of all denominations, a fine public school system, with a high school, 12 grammar schools, 3 parochial schools and several excellent private schools; a commercial college, a college of oratory and one of music. Bloomington has one of the largest and best selected public libraries in the state and several law libraries. The Illinois Wesleyan University (q.v.) and the Soldier's Orphan Home are located here, and the Illinois State Normal University (q.v.), which has long been known as one of the best institutions in the Union for the education of teachers, is situated at Normal, a suburb about two miles distant from the courthouse, and connected by electric railway. Among the public buildings are a large court-house, two opera-houses, and several commodious public halls.

History, Government, Etc.— The city was first settled by pioneers from New England and Kentucky and became a borough in 1831 and was incorporated in 1851. The government is vested in a mayor and board of aldermen, composed of 14 members, who are elected biennially. The city has an electric railway system, operating over 20 miles of track, and a well-trained fire department; is lighted by gas and electricity and controls its water-works. Pop. (1905) 28,286.

ADLAI E. STEVENSON.

Bloomington, Ind., city and county-seat of Monroe County, on the Monon and the Indianapolis Southern R.R.'s; 60 miles south of Indianapolis. It is in a limestone and quarry region; is the seat of the Indiana State University (q.v.); and besides its farming and quarrying interests has important manufacturing concerns, especially in the lines of leather and hardware. The city has the Monroe County Library, a national bank, several daily and weekly periodicals, and a property valuation of over $1,500,000. It was settled in 1818 and was incorporated as a city in 1876. Pop. (1900) 6,460.

Bloomsburg, Pa., a town and county-seat of Columbia Co.; on the Susquehanna River, the Pennsylvania Canal, and several railroads; 40 miles west of Wilkesbarre. It is in an iron and limestone region; contains a number of iron furnaces and foundries, silk mills, brass and copper tube works, furniture and desk factories, carpet factories, etc.; is the seat of the State Normal School and a literary institute, and has an assessed property valuation of about $2,500,000. Pop. (1900) 6,170.

Blouet, Paul, pōl bloo-ā (MAX O'RELL), French lecturer and author: b. Brittany, France, 2 March 1848; d. Paris, 24 May 1903. In early life he was an officer in the French army, but in 1873 went to England and became a teacher. After the publication of his first book, 'John Bull and His Island' (1883), he abandoned teaching and devoted himself to literature. His works include 'John Bull and His Daughters' (1884); 'Jonathan and His Continent' (1888, with Jack Allyn); 'A Frenchman in America' (1891); 'John Bull & Co.' (1894).

Bloundelle-Burton, John Edward, English novelist: b. 3 March 1850. He was educated for the army, has lived and traveled in the United States and many European countries and has been a correspondent of various English and French journals. His published works include: 'The Silent Shore' (1886); 'His Own Enemy' (1887); 'Across the Salt Seas' (1898); 'The Scourge of God' (1898); 'Fortune's My Foe' (1899); 'A Bitter Heritage' (1899); 'The Seafarers'; 'Servants of Sin' (1900); 'A Vanished Rival' (1901); 'The Year One' (1901); 'The Fate of Valsee' (1902).

Blount, James H., American legislator: b. Macon, Ga., 12 Sept. 1837; d. 8 March, 1903. He first came into public notice in 1865, when, after having served in the Confederate army he was a delegate to the Georgia constitutional convention. Thereafter he devoted himself to the practice of law until 1872, when he was elected to Congress from the Sixth District of Georgia. He held his seat by successive re-elections till 1893, when he declined a further term. As he finished his last term the House paid him the unusual honor of suspending its proceedings to give the members an opportunity to testify to

their appreciation of his worth. In his last term he was chairman of the Committee on Foreign Affairs, and his familiarity with American relations with other countries led President Cleveland to appoint him commissioner paramount to Hawaii in March, 1893, for the purpose of investigating the deposition of the royal government and the establishment of the American protectorate over the kingdom. On his arrival in Honolulu he at once caused the American flag to be hauled down from the Provisional Government House, and the United States marines to be withdrawn from the locality. This proceeding led to considerable excitement in the United States; the withdrawal of United States Minister Stevens from Honolulu; the appointment of Commissioner Blount as his successor; and a renewal both in Washington and Honolulu of the agitation for the annexation of Hawaii to the United States. On the completion of his mission Minister Blount retired to his large Georgia estates. See HAWAII.

Blount, William, American statesman: b. North Carolina, 1754; d. Knoxville, Tenn., 21 March 1816. He was a delegate from his native State to the Continental Congress in 1782, 1783, 1786, and 1787; a signer of the Federal Constitution in 1787, and governor of the territory south of the Ohio (1790). In 1796 he was chosen president of the Convention of Tennessee, and was elected the same year by that State to a seat in the U. S. Senate. But in 1797 he was expelled from that body for having, as it was alleged, instigated the Creeks and Cherokees to assist the British in conquering the Spanish territories near the United States. His impeachment merely served to increase his popularity at home, where he was promptly elected a member of the State Senate and chosen president thereof.

Blow, John, English musical composer: b. 1648; d. 1708. He became organist of Westminster Abbey at the age of 21, and in 1676 also organist of the Chapel Royal, and obtained the degree of Doctor of Music. In 1680 he resigned his post in Westminster Abbey to his pupil Purcell. In 1699 he was appointed composer to the Chapel Royal. He was a voluminous composer, but many of his works have never been printed. Among his sacred pieces are upward of 100 anthems, 14 church services, and various other compositions. A number of his secular compositions for one, two, or three voices, with accompaniment, were published under the name of 'Amphion Anglicus.'

Blow-fly, a common fly belonging to the family *Muscidæ*. It is the large, noisy fly which enters houses, and was named *Calliphora vomitoria* by Linnæus. It is black on the head and thorax, while the abdomen is steel-blue. It is similar to the flesh-fly in habits, but instead of living larvæ it deposits its eggs which are long and cylindrical, in stacks («fly-blows») on meat, cheese, etc. The larvæ hatch in 24 hours; they become fully grown in probably five or six days, and transform into pupæ enclosed by a brown shell (puparium), formed by the drying and contraction of the larval skin. Oily or greasy substances are avoided by them, and by all other flies, and a cloth dipped in kerosene oil and suspended in a room will keep them from entering it. Another blow-fly is *Calliphora erythrocephala,* common to Europe and North America.

Blowgun, a weapon formerly used by the Indians inhabitating the shores of the Gulf of Mexico and still employed by some of the Indian tribes of South America, both in war and for killing game. It consists of a long, straight tube in which a small poisoned arrow is placed, and forcibly expelled by the breath. The tube or blowgun, called *gravatána, puncuna,* etc., is 8 to 12 feet long, the bore not generally large enough to admit the little finger. It is made of reed or of the stem of a small palm. A sight is affixed to it near the end. The arrows used are 15 to 18 inches long, made of the spines of another palm, sharply pointed, notched so as to break off in the wound, and their points covered with curari poison. A little soft down of the silk-cotton tree is twisted round each arrow, so as exactly to fit the tube.

Blowing Machines. The term blowing machine or blower is applied to various forms of mechanical arrangements employed for the production of artificial currents of air for ventilating purposes, for forced draught for furnaces, etc. They are also employed as exhausters for the removal of smoke and fumes from smelting works, foundries, etc., for the removal of sawdust and wood planings from saw mills and planing mills, and for handling such material as emery, coffee, metal filings, etc.

The various forms of blowers may be conveniently divided into the following general classes:

Bellows.—These comprise the earliest forms of blowing machines and are also the most familiar at the present time. In their earlier forms, still used in some oriental countries, they consisted of simple bags of skin each equipped with a valve and nozzle. A more elaborate application of the same principle is found in the ordinary domestic bellows and those used in the blacksmith's shops. The only point of interest in this connection is the means employed to maintain a continuous blast. This is accomplished by introducing a third board between the upper and lower boards of the ordinary bellows. The middle board is fixed or arranged to remain stationary. This board and the lower board are provided with valves which open inwardly. A weight attached to the lower board keeps the lower chamber filled with air, so that when the lower board is raised by means of a lever or some similar arrangement, the air in the lower chamber is forced into the upper chamber. The outlet nozzle is attached to the upper chamber, and the upper board is sufficiently weighted to press the air out through the nozzle in a continuous stream, which is maintained by the relatively large quantity of air which is always present in the upper chamber under the uniform pressure of the weighted board. It is obvious that a spring can be used instead of a weight to press out the air from the upper chamber, and this arrangement is the one usually employed in the case of the bellows ordinarily used in blacksmith's shops.

Piston Blowers.—The simplest form of a piston blower consists of a square wooden chamber with a close fitting piston working within it. When the piston is drawn backward, air is sucked into the chamber through a flap

valve, and when the piston is pushed forward this air is compressed and forced out through the nozzle.

Blowing-Engines.—The air pump or air compressor used for producing low pressures represents the modern form of piston blowers. Various types of these machines are extensively used for supplying the air blast to the cupolas of blast furnaces, Bessemer converters, etc. They are driven by either steam, gas, or water power, and are then commonly known as blowing-engines. A machine of this type usually consists of a power cylinder operating a piston either by steam or gas, and an air compressor cylinder which delivers the compressed air into the blast pipes. In the horizontal engines, the two cylinders are placed tandem to each other with the compressor cylinder in front. In the vertical engines, the compressor cylinder is usually placed on top of the power cylinder. The pistons of both cylinders are carried on a common piston rod, and the engines are usually provided with heavy flywheels to insure steady operation.

In many forms of steam blowing-engines, the power cylinders are compounded, while those of gas engine installations are often made double-acting, and sometimes two power cylinders placed tandem to each other and to the compressor cylinder are successfully employed.

The recent discovery of the suitability of blast furnace gas, *i. e.* the gas which passes out of the top of blast furnaces employed for the smelting of iron ores, has greatly tended towards the development of large gas engines specially adapted for blowing purposes. Up to the year 1900, the largest engine of this type was a Cockerill engine of about 600 horsepower, but since then, the capacities of these machines have been greatly increased, and engine units developing as high as 7,000 horsepower are being built both in the United States and in Europe for this purpose. See Gas Engines.

Rotary Blowers.—This type of machines includes various forms of disk blowers and fans which are generally used for ventilating purposes. See Coal Mining Machinery.

The disk blowers are built in sizes ranging from one to ten feet in diameter, and are capable of delivering from 1,000 to 250,000 cubic feet of air per minute, according to their size and the number of revolutions per minute at which they are operated. The accompanying table of capacities of open air delivery, gives some normal values relative to the size of the disks, the speed at which they are run, the cubic feet of air propelled per minute, and the horsepower required to operate them.

Disk blowers are often called fans, but it is well to understand, that in the former the blades are set at an angle to the axle while in a fan blower proper, the blades are set parallel to the axle on radial spokes in a manner similar to the setting of the paddles on a paddle wheel. These blades may be either flat or curved in both cases, and are arranged to revolve in a steel or cast iron casing or shell so designed that the air is sucked in through a larger or smaller orifice at the side and forced out through an outlet leading from the periphery.

The ordinary pressure blowers are merely another form of fan blowers. They were originally designed for use with cupola furnaces, and forges, but are also extensively used for producing mechanical draught for the furnaces of boilers, for use with mechanical stokers, sand blast machines, pneumatic tube delivery systems, etc., or for any work requiring pressures as high as 16 ounces per square inch.

The fan wheels are usually made of thin

TABLE OF OPEN-AIR DELIVERY CAPACITIES.

Velocity of air in ft. per min.	Cu. ft. R.P.M. B.H.P.	Diameter of fan in inches												
		18	24	30	36	42	48	54	60	72	84	96	108	120
750	Cu. ft.	1,478	2,620	4,116	5,030	8,081	10,550	13,874	16,489	23,474	30,323	56,218	53,564	66,444
	R.P.M.	415	300	250	200	175	150	150	125	100	100	100	70	65
	B.H.P.	.03	.06	.10	.15	.20	.24	.40	.39	.60	.90	1.17	1.50	1.70
1,100	Cu. ft.	1,912	3,956	6,615	8,895	12,121	15,826	20,034	24,734	35,620	51,284	64,927	80,150	98,910
	R.P.M.	620	450	400	300	250	225	200	175	150	150	125	100	100
	B.H.P.	.06	.14	.22	.38	.45	.60	1.00	.95	1.40	2.00	2.30	4.00	5.00
1,500	Cu. ft.	2,640	5,275	8,232	11,861	16,162	21,100	26,712	34,378	47,494	64,646	84,437	112,420	131,936
	R.P.M.	850	600	500	400	350	300	275	250	200	175	150	150	125
	B.H.P.	.10	.26	.40	.66	1.00	.90	1.90	2.10	2.50	4.00	4.75	7.50	7.00
1,875	Cu. ft.	3,300	6,594	10,290	15,885	20,202	28,376	34,790	41,223	59,367	81,144	109,746	134,960	164,990
	R.P.M.	1,050	700	600	500	450	400	350	300	250	225	200	175	150
	B.H.P.	.20	.50	.73	1.10	1.67	2.25	3.20	3.50	3.95	7.50	10.50	11.25	12.00
2,500	Cu. ft.	4,400	8,792	13,720	20,230	26,036	34,168	44,520	54,964	79,156	107,744	140,728	178,080	219,940
	R.P.M.	1,400	1,000	800	700	550	500	450	400	350	300	300	225	200
	B.H.P.	.75	1.00	1.40	2.25	3.30	4.00	4.50	6.00	7.00	10.00	13.50	20.00	28.00

Cu. ft. Cubic feet of air delivered per minute.
R.P.M. Revolutions per minute.
B.H.P. Brake horsepower required to operate fan.

galvanized steel, and are enclosed in a shell of cast iron. The larger sizes are usually provided with two driving pulleys, and are usually made to discharge horizontally at the bottom, but they can be built in any other of the four right angles. See Fig. 1.

Positive Blowers.—These machines are a more recent form of the rotary blowers, and are very extensively used for operating high pressure forges, blow-torches, gas furnaces, low pressure sand blasts, small pneumatic tube systems, and similar purposes requiring a capacity ranging from 25 to 150 cubic feet of air per minute at a pressure ranging from four to eight ounces. They can be driven by direct connection engines and electric motors, or by power driven belting, and the principle of rotary motion applied to air under high pressure appears to eliminate a great deal of the incidental friction, so that when high efficiencies can be obtained they are preferable to fans and blowing engines.

These machines consist of an outside casing or cylinder of cast iron provided with massive head plates which carry the journal boxes as shown by Fig. 2, which illustrates a horizontal

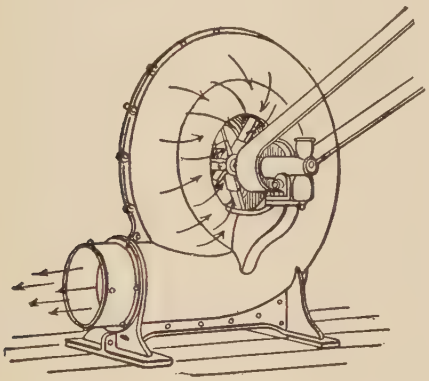


FIG. 1.—Pressure Blower.

blower geared to an electric motor on the same bed plate.

Within this casing, two impellers A and B, Fig. 3, revolve on horizontal shafts which are connected by gear wheels outside the casing, thus giving them an invariable relative motion. The contact surfaces of the impellers are formed on mathematically correct lines, and they revolve together with uniform clearance and without metallic contact either with each other or with the enclosing casing, thus preventing internal friction. There are no waste spaces between the impellers to cause the formation of air pockets, and no sharp corners or edges to produce sound vibrations, and as the impellers are symmetrical relatively to their shaft centers, they remain perfectly balanced at all speeds.

High Pressure Positive Blowers.—In this type, where the heat of compression constitutes an element of danger, the entire casing and journal boxes are water jacketed, and complete water circulation is maintained through the impellers and the casing during operation in order to prevent expansion under the temperatures due to the high pressures of compression. The water is forced into the impellers at one end through a hole drilled into the center of the shaft, and out at the other through a similar passage.

These machines will maintain a pressure ranging from seven to ten pounds per square inch. In some designs a spray of water is used to pack the machines so as to prevent the air from escaping backwards, and also for the purpose of absorbing the heat due to compression.

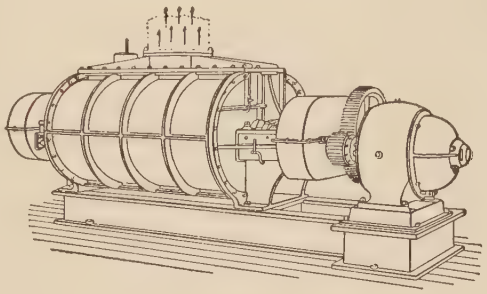


FIG. 2.—Positive Blower.

This water is carried over into a separating tank and drained off automatically. This method enables the attainment of an efficiency under high pressures fully as high as that attained under pressures ranging from three to four pounds.

In operating positive pressure blowers, it is generally estimated that 30,000 cubic feet of air are required to melt a ton of iron, and that under a pressure of one pound per square inch, an energy of five horsepower is required to deliver 1,000 cubic feet. These values form a fair basis for the calculation of the speed or capacity of a blower of this type for any desired purpose.

Jet Blowers.—These arrangements do not strictly belong to any class of blowing machines.

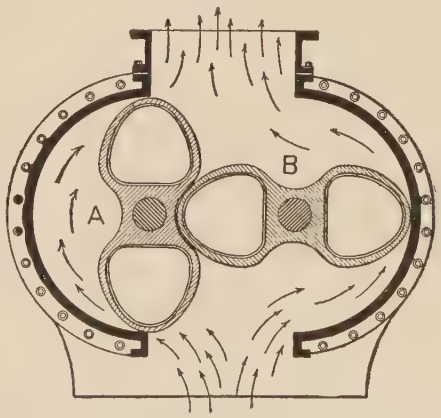


FIG. 3.—Cross Section Through Positive Blower.

They simply represent the utilization of a jet of steam or water to produce an artificial current of air. This is usually accomplished by forcing the jet of steam or water through a pipe of small diameter inserted in a pipe of larger diameter open at both ends, thus creating a current of air through the larger pipe in the

direction of motion of the jet. The steam-jet devices are represented by the exhaust nozzles used in the smokestacks of fire engines and locomotives. See HEATING AND VENTILATING.

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Blowitz, Henri Georges Stéphane Adolphe Opper de, ŏn-rē zhôrzh stā-făn ăd-ôlf ŏp-pĕr dē blō-vĭtz, French journalist: b. Pilsen, Austria, 28 Sept. 1832; d. Paris, 18 Jan. 1903. He settled in France; was successively appointed professor of German in the Lycée of Tours and at Limoges, Poitiers, and Marseilles; was naturalized a French citizen in 1870; and became the Paris correspondent of the London *Times* in 1871. Laurence Oliphant was then the correspondent at Paris, and de Blowitz became his assistant. During the war of 1870–1 Mr. Oliphant was excluded from Paris during the siege by the Germans, but de Blowitz, by means of carrier pigeons, balloons, and numerous ingenious devices, kept his chief outside the city walls informed as to what was going on within the beleaguered city. He was noted for his success in obtaining secret and important information long before it was ready for official promulgation; and for his personal interviews with Thiers, Bismarck, Comte de Chambord, Alfonso XII., Gambetta, the Comte de Paris, the Sultan of Turkey, Marquis Tseng, the King of Rumania, Leo XIII., Jules Ferry, Duclerc, Prince Lobanoff and many other eminent men of the time in Europe. Many of his disclosures in his letters to the *Times,* such as the text of the Treaty of Berlin, which he forwarded before it had been signed, created much excitement throughout Europe. He contributed more than 4,000 columns to the *Times;* was made an officer of the Legion of Honor, an officer of the Institute of France, and doctor of philosophy. He published 'Feuilles Volantes' (1858); L' Allemagne et la Provence' (1869); 'Le Mariage Royal d'Espagne' (1878); 'Une Course à Constantinople' (1884). He retired from his position as *Times* correspondent only three weeks prior to his death.

Blowpipe, an instrument by means of which the flame of a candle, a gas-jet, etc., is made to produce an intense heat, being then employed for a variety of useful purposes. Its most usual form is described in the article on blowpipe analysis (q.v.). It is employed by jewelers and goldsmiths in the work of soldering, and by other workers on small metallic objects; by the glassblower in making thermometers, barometers, and other glass instruments; by the enameler; and indeed wherever it is required to subject a small body to a strong heat. It has undergone a variety of improvements in the hands of the chemist, to whose researches it has proved an excellent auxiliary. Wollaston's portable blowpipe is formed of three pieces fitted into one another when in use, but which may be taken down and made to slide within each other. Most laboratory blowpipes have a hollow bulb or enlarged part at or near the end, the object of which is to condense the vapor of the breath, which often proves injurious in the common form of the instrument. To prevent corrosion from the action of the moisture, the bulb is made either of silver or sheet-tin, and it is capable of being opened in order that it may be more easily cleaned. A little practice is necessary to enable the operator to keep up a constant blast for any length of time, the current of air being propelled through the pipe by the muscular exertion of the cheeks, while respiration is carried on through the nose. But when the process has to be long continued, the current of air is supplied by bellows. This is the form commonly used by glassblowers. The gas blowpipe, commonly called the oxyhydrogen blowpipe, is a very important and intensely powerful variety, whose structure is due to Mr. Newman of London. Sir Humphry Davy suggested the employment of other gases instead of common air, and Dr. Clarke of Cambridge adopted the suggestion. Dr. Clarke found that a mixture of two volumes of hydrogen and one of oxygen produced the greatest effect. These gases are contained in a bladder attached to the end of a pipe which leads into a vertical cylinder, in which is fitted a piston, working through a collar at the top. By the action of this piston the gas from the bladder is compressed into a copper chamber, and thence issues to the flame through an ordinary blowpipe nozzle. To guard against explosions, the gases are kept in separate holders, and by means of a special kind of burner are prevented from mixing until they are just going to be burned. There are various other species of blowpipe, and many uses to which they may be applied. For information on the subject see Plattner, 'On the Blowpipe' to whom the present form of the instrument is due.

Blow'pipe Anal'ysis, a branch of chemical analysis in which the composition of the substance under examination is inferred from its behavior when subjected to certain flame tests. The blowpipe itself commonly consists of a tapering brass tube about eight inches long, provided with a bell-shaped mouthpiece at one end, and at the other with a nozzle that is turned at right angles to the general length of the instrument. The nozzle should be tipped with platinum, and provided with a very minute perforation through which the operator blows a tiny blast of air that drives the flame of his lamp against the object to be analyzed. The flame used in blowpipe work should not be round and colorless, like those of spirit lamps and Bunsen burners, but should be flat and luminous, containing plenty of free, incandescent carbon. A large candle-flame serves very well, although it is not flat. Usually a gas-flame is employed, in connection with a burner formed by flattening a piece of brass tubing, and then cutting it off at the top, at an angle. When the blowpipe is in service its tip is introduced into the flame of the lamp, which the air-blast deflects laterally in the form of a long, almost non-luminous cone, which consists of two visibly different portions. The inner part is somewhat brighter, and is richer in unoxidized gases. The outer layer, being more plentifully supplied with oxygen, consists almost entirely of completely oxidized gases. The outer portion of the blowpipe flame is called the "oxidizing flame," since this part, when directed against the specimen under examination, heats it while it is in contact with the air, and causes it to oxidize, if it is capable of doing so at the temperature that is attainable by the blowpipe. The inner portion of the flame is called the "reducing flame,"

from the fact that when the specimen is exposed to this part, it is heated, not in contact with the air, but while surrounded with an atmosphere of partially unoxidized hydrocarbon gases. Under these circumstances many metallic oxides give up their oxygen to the hot hydrocarbon gases in which they are bathed, and are themselves reduced to the metallic form. If a flame still richer in free carbon and unconsumed hydrocarbons is desired, the tip of the blowpipe is held just outside of the lamp-flame, and a jet of flame with a luminous tip containing particles of solid carbon can easily be thrown down upon the specimen.

In blowpipe analysis there is no recognized «scheme» to be followed out. The method is oftenest used for the determination of minerals, and in such cases the analyst usually has some sort of idea, in advance, of the elements that may possibly be present. The substance to be examined is usually first pulverized, and a portion of it heated in a tube that is open only at the upper end. If it carbonizes, it contains organic matter of some kind, and the odor that is produced is often a good indication as to whether the organic matter is of an animal or vegetable nature. If the substance, when heated in the closed tubes, gives off water which condenses in the upper part of the tube, the moisture so condensed should be tested with litmus paper. If it is neutral, the substance is a hydrated compound, or a hydroxide. An acid reaction indicates acid salts, and an alkaline one may usually be taken to indicate the presence of compounds of ammonia. If the substance melts but does not change its color, it is an alkaline or a hydrated salt. If it melts and turns yellow, remaining yellow even after cooling, it contains oxide of bismuth; while if it melts to a yellow color, but turns red upon cooling, it contains oxide of lead. If it does not melt, but changes color, the indications are as follows: Yellow, both hot and cold, indicates stannic oxide; if yellow while hot, but white when cold, zinc oxide; if black while hot, and reddish-brown when cold, ferric oxide; if black while hot, but bright red when cold, mercuric oxide. If gas is evolved, its nature should be determined. Oxygen may be detected by the kindling of a glowing splinter of wood inserted into the tube; carbon dioxide by its extinguishing such a spark promptly; carbon monoxide by the gas burning with a bluish flame when ignited at the mouth of the tube; sulphur dioxide, ammonia and cyanogen, by the odor. Oxygen indicates chlorates, peroxides, etc.; carbon dioxide indicates carbonates or oxalates; carbon monoxide indicates oxalates or formates; sulphur dioxide indicates certain sulphites or sulphates; cyanogen indicates cyanides; and ammonia indicates some compound of that substance. If the gas is reddish-brown in color, bromides, nitrates, or nitrites, are probably present; if it is violet, an iodide is indicated. A sublimate may also be deposited upon the tube. If the sublimate is black, or nearly so, selenium or mercuric sulphide are indicated; if yellow, sulphur or a sulphide; if white, a salt of ammonia or mercury, a volatile organic acid, or an oxide of antimony or arsenic. Gray metallic globules indicate mercury, and a metallic mirror may represent either antimony or arsenic.

When the substance is heated in an inclined tube, open at both ends, similar indications are to be observed; modified somewhat, however, by the fact that oxygen can now pass up through the tube and come in contact with the specimen under examination. Thus sulphides are commonly oxidized in the open tube, arsenic will sublime as the trioxide and not as the metal, and selenium gives a sublimate that may be gray or red, and also a strong odor of horseradish.

The color that the specimen communicates to the non-luminous part of the flame is likewise of great service in determinations by the blowpipe. A piece of platinum wire, bent at the end into a small loop, is dipped in hydrochloric acid and held in the flame, this process being repeated several times until the analyst is confident that the wire itself is free from any substance that can color the flame. The little loop at the end is then brought into contact with some of the finely pulverized specimen, and introduced into the flame again. Sodium gives a strong lasting yellow; calcium an orange red; lithium and strontium a crimson; potassium a lavender; barium an apple green; thallium, copper, and boracic acid a brighter green; lead and antimony a pale blue; selenium a deep blue. The yellow due to sodium is so powerful, even when that metal is present only in slight amounts, that the colors due to the other metals present are sometimes difficult to observe by the unaided eye. Hence colored glasses are often used, through which to take note of the flame color; the tint of the glass being selected so as to cut off the yellow light of the sodium, while allowing the particular color that is sought to pass through unobstructed. Cobalt blue glass, for example, is used in this way in testing, by flame coloration, for potassium.

When a sample of the specimen to be analyzed is heated upon charcoal, it is often possible to obtain some of the elements that are present, in the form of a metallic bead, by the reduction of their oxides or of the other compounds in which they were originally contained. Lead, tin, and silver give beads that are white and malleable; copper gives a malleable red bead; antimony and bismuth give brittle beads; and iron, cobalt, and nickel may often be obtained in the form of gray, magnetic powders.

While the substance is being heated upon charcoal, an incrustation commonly forms on the charcoal, from the character of which useful inferences can be drawn. Thus antimony gives a white incrustation; bismuth, an incrustation that is deep yellow when hot and lighter yellow when cold; lead, one that is light yellow when hot and deep yellow when cold, and is surrounded by a white border; arsenic gives a white incrustation that is very volatile; and with zinc the color is yellow when hot and white when cold.

Many metallic oxides are soluble in melted borax, and valuable color indications are obtained by heating small quantities of the substance in little beads of melted borax, that are held in the flame upon tiny loops of platinum wire. The phenomena that are observed in this way are quite complicated, however, and for an account of them the manuals on blowpipe analysis should be consulted. See Cornwall, 'Manual of Blowpipe Analysis'; Moses and Parsons, 'Elements of Mineralogy, Crystallography, and Blowpipe Analysis'; Dana, 'Minerals and How to Study Them.'

Blücher, Gebhard Leberecht von, gĕb'härt lā'bĕ-rĕht fŏn blü-kĕr (PRINCE OF WAHLSTADT, väl'stät), Prussian soldier: b. Rostock, 16 Dec. 1742; d. Krieblowitz, Silesia, 12 Sept. 1819. When 14 years of age he visited the island of Rügen, where the sight of some Swedish hussars aroused a desire to become a soldier, and in spite of the opposition of his parents and relatives he took service in a Swedish regiment as cornet. His first campaign was against the Prussians, and he was taken prisoner by the same regiment of hussars which he afterward commanded. The commander of this regiment, Col. von Belling, induced him to enter the Prussian service. An exchange was agreed upon with the Swedes, and Blücher was made lieutenant in Belling's regiment. Discontented at the promotion of other officers over his head, he left the army, devoted himself to agriculture, and by industry and prudence acquired an estate. After the death of Frederick II. he became a major in his former regiment, which he commanded with distinction on the Rhine 1793-4. Orchies, Luxemburg, Frankenstein, Oppenheim (16 Jan. 1794), Kirrweiler and Edisheim in the Palatinate, bear witness to his achievements. After the battle of Kirrweiler, in 1794, which added greatly to his reputation, he was appointed major-general of the army of observation stationed on the lower Rhine. In 1802, in the name of the king of Prussia, he took possession of Erfurt and Mühlhausen. On 14 Oct. 1806, he fought at the battle of Auerstädt. He then, with the greater part of the cavalry, followed the retreat of the Prince of Hohenlohe to Pomerania. His squadron, moving on the left of the main army, became separated from it, and the Prince of Hohenlohe was forced to surrender at Prenzlau. Blücher, cut off from Stettin by this accident, threw himself into Mecklenburg where he joined at Dambeck the corps of the Duke of Weimar, commanded by Prince William of Brunswick-Oels. All the troops, however, were too much fatigued to undertake any enterprise. Having the Grand Duke of Berg on his left flank, the Prince of Ponte Corvo in his front, and Marshal Soult on his right, Blücher was obliged to take post behind the Trave in order to draw off the three great divisions of the French forces from the Oder as long as possible. With this view he entered the territory of the free city of Lübeck, which was soon stormed by the French. Although Blücher escaped with some troops he was obliged to surrender at Ratkau on 6 November, but with a clause in the capitulation that he "accepted it only from want of ammunition, provisions, and forage." He was soon exchanged for the French general Victor, and on his arrival at Königsberg was placed at the head of a corps and sent to Swedish Pomerania to share in the defense of Stralsund and to assist the efforts of the Swedes. After the Peace of Tilsit he labored in the department of war at Königsberg and Berlin. He then received the chief military command in Pomerania, but at the instigation of Napoleon was afterward dismissed from the service. In the campaign of 1812, when the Prussians assisted the French, he took no part; but no sooner did Prussia rise against her oppressors than Blücher, already 70 years old, engaged in the cause with all his former activity. He was appointed commander-in-chief of the Prussian army and the Russian corps under Gen. Winzingerode, which at a later period was separated from him. In 1813 he was created field-marshal. His heroism in the battle of Lützen (2 May 1813) was rewarded by the Emperor Alexander with the order of St. George. The battles of Bautzen and Hanau, those on the Katzbach (26 Aug. 1819) and Leipsic added to his glory. On the Katzbach Blücher defeated the army of Marshal Macdonald and delivered all Silesia. On 3 October Blücher crossed the Elbe at Wartenburg, and encouraged the Bohemian army under Schwartzenberg, and the northern army under the crown-prince of Sweden, to act with more spirit. On 16 October he gained a signal advantage over Marshal Marmont at Möckern, forcing his way as far as the suburbs of Leipsic. On the 18th, in connection with the crown-prince of Sweden, he contributed greatly to the defeat of the enemy, and on the 19th his troops made the first assault upon Leipsic. His promptitude and peculiar manner of attacking had already procured him from the Russians the name of "Marshal Forward." On 1 Jan. 1814, with the Silesian army, which now consisted of two Prussian, two Russian, one Hessian, and one mixed corps, he crossed the Rhine at Kaub, took possession of Nancy on the 17th, gained (1 February), the battle of La Rothière, and pushed forward toward Paris. His detached corps were, however, checked by Napoleon; yet Blücher, though with a great loss, effected his retreat toward Châlons. He then crossed the Aisne at Soissons, joined the northern army, obtained (9 March) a victory over Napoleon at Laon, and, in connection with Schwartzenberg, at the close of the month, pressed forward to Paris. The day of Montmartre crowned this campaign, and on 31 March Blücher entered the capital of France. For this triumph he was created Prince of Wahlstadt, with a suitable income. In England, whither he followed the allied monarchs in June of the same year, he was received with enthusiasm. The University of Oxford conferred on him the degree of Doctor of Laws. He then lived on his estates in Silesia till 1815, when the chief command was again committed to him, and he led his army into the Netherlands. On 15 June Napoleon threw himself upon him, and Blücher, on the 16th, was defeated at Ligny. In this engagement his horse was killed, and he was thrown under his body. In the battle of the 18th Blücher arrived at the most decisive moment upon the ground, and, taking Napoleon in the rear and flank, assisted materially in completing the great victory of Belle Alliance, or Waterloo (q.v.). He refused the proffered armistice, and forced Paris to surrender; opposing with energy, on this second conquest of the capital, the system of forbearance practised on the former occasion. As he was already a knight of all the military orders of Europe, the king of Prussia, to reward his new services, created the new order of the Iron Cross expressly for him. After the Peace of Paris he retired to his estate, where he died. On the anniversary of the battle on the Katzbach, a monument commemorating his glory, executed by Schadow in Berlin, was erected at Rostock. On that of Waterloo (18 June 1826) a bronze statue 12 feet in height, modeled by Rauch, was erected to his memory in Berlin. Blücher was not so eminent for military science as for ability in action. His simplicity, good nature, and bravery endeared him to his sol-

diers, who loved him as a father. His addresses and proclamations are distinguished for their brevity, precision, and simplicity. Consult 'Blücher's Life,' by Varnhagen von Ense (Berlin 1827); and Scherr's 'Blücher's Life and Times' (Leipsic 1862).

Blue, Victor, American naval officer: b. North Carolina, 6 Dec. 1865. He graduated at the naval academy June 1887, and serving through the grades of ensign and junior lieutenant, was promoted lieutenant 3 March 1899. At the outbreak of the war with Spain he was ordered to the gunboat Suwanee, and while on duty off the Cuban coast captured two Spanish patrol sloops having on board a heliographic signal outfit. On 11 June 1898 he landed at Aserraderos, passed through the Spanish lines, proceeded to the hills overlooking Santiago city and harbor, where he located the Spanish fleet commanded by Admiral Cervera. On 25 June he made a further reconnoissance and mapped the position of the Spanish ships. To accomplish these things he traveled a distance of nearly 140 miles, mostly through territory occupied by the intrenchments of the Spanish army. Admiral Sampson highly commended the manner in which these tasks had been performed and recommended that Lieut. Blue be advanced ten numbers as a promotion. He was placed in command of the captured gunboat Alvarado, and on 12 Aug. 1898 bombarded the fortifications of Manzanillo. Subsequently he served in China and the Philippines.

Blue, one of the seven primary colors. The blue pigments commonly employed by artists are few in number, including native and artificial ultramarine, cobalt, indigo, and Prussian blue. Genuine ultramarine, prepared from the mineral lapis lazuli, and ordinary cobalt blue, sold for artists' work, are permanent colors. They are used either alone, or mixed with other pigments, chiefly for skies and distances in landscape, and by themselves, or to make up grays and other mixed tints in figure painting. Owing to the exceptionally high price of real ultramarine, the artificial color, which is of doubtful permanency, is usually substituted for it. Prussian blue and indigo are highly useful colors, since it is only these that yield dark blues, and only from them, mixed with yellows or browns, that strong greens can be obtained. It is unfortunate accordingly that both are more or less fugitive. All the blues above named are used both in oil or water color painting, but indigo less than the others in oil, since it is most apt to fade in that medium.

A number of different names are used in commerce for what is essentially the same pigment, or for pigments closely resembling one another. The following statement gives some explanation of these: Cobalt blues are mixtures of cobalt with earthy or metallic bases, which have been subjected to the action of heat, and have received the following names: Cobalt blue, cerulean blue, royal blue, Dumont's blue, Saxon blue, Thénard's blue, Leithner's blue, Hungary blue, Zaffre or enamel blue, Vienna blue, azure blue, and Paris blue. The last name is also applied to a Prussian blue, and azure is also given to a variety of ultramarine blue. Smalt is a powdered cobalt glass used in illumination and flower painting. Artificial ultramarine is also called French ultramarine, French blue, new blue, and permanent blue. Coarse qualities of this color are largely used by house painters. Intense blue is a refined indigo. Prussian blue (sesqui-ferrocyanide of iron) is otherwise named Berlin blue, Paris blue, and ferrocyanide of iron. The name Paris blue is also given to a cobalt color. Antwerp blue is a variety of Prussian blue made lighter by the addition of an aluminous base, and not so permanent. Blue ochre (hydrated phosphate of iron) is a subdued permanent blue, but not much employed. Blue verditer is a hydrated oxide of copper which changes and ultimately blackens by time. It is used in distemper work and paper staining. Blue was adopted as their distinctive color by the Scottish Covenanters in the 17th century and is the usual color of the uniforms of the soldiers of the United States army. A dark shade of this color is generally worn by the sailors of most countries, whence the term navy blue is derived.

Blue Beech. See HORNBEAM.

Blue Bird, or the North American thrush, is widely distributed throughout the United States, where it holds a similar place, in the hearts of the people, as the redbreast in England. In fact, locally, it is sometimes termed «blue-robin.» It is a smaller bird than the rest of the thrushes. Its whole upper parts are sky blue, shot with purple, with its throat, neck, breast, and sides reddish chestnut, and part of its wings and its tail feathers black. The «soft and agreeable warble» of the bluebird is one of the first and most welcome sounds of bird-music, that we hear in the early spring. The male is remarkably attentive to his more protectively colored mate, and takes exuberent pride in their five or six pale-blue eggs, laid in holes in the trees of gardens, and often also in bird-boxes, and in the crevices in the walls of outbuildings. There are often two broods in a season. The bluebird fights hard to protect his small, neatly constructed nest from the house-sparrow, swallows, wrens, and other birds, which make his life miserable by their intrusion on his domestic privacy. Several other sorts of birds, of other countries, prevailingly blue in color, receive the name «bluebird,» such as the «Oriental fairy-bluebirds» of the genus *Irena,* more particularly *Irena puella,* one of the East Indian bulbuls.

Blue Books, the official reports, papers, and documents printed for the British government to be laid before the Houses of Parliament. They are so called simply from being stitched up in blue paper wrappers, and include bills presented to, and acts passed by, the houses; reports and papers moved for by members or granted by government; reports of committees; statistics of trade, etc. The term is used also in a broad way as descriptive of special reports put forth by the government of any country or its various executive departments. In the United States the published lists of government employees and the navy regulation manual are known as Blue Books and the foreign diplomatic correspondence is commonly issued in Red Books. French official reports, etc., are called Yellow Books; those of Italy are styled Green Books, and those of Spain Red Books.

Blue Boy, The, a celebrated picture by Gainsborough, dated 1679; its subject, a boy dressed in a blue satin 16th century costume.

Blue-coat School. See CHRIST'S HOSPITAL.

Blue Flag. See IRIS.

Blue Grass, Kentucky Blue Grass, June Grass, Meadow Grass, Spear Grass, a species (*Poa pratensis*) of the natural order *Graminæ*, native of the cooler parts of the northern hemisphere. The plant is a perennial with very numerous rootstocks and long, soft radical leaves. The more or less leafy stems which rise from one to two feet are terminated by a loose, pyramidal panicle three to four inches long, which readily distinguishes it from its somewhat larger close relative, Texas blue grass (*P. arachnifera*), in which the panicle is contracted and which is further distinguished by its woolly seeds. Blue grass forms a dense sod, which is very resistant to the trampling of stock, upon soils favorable to its growth, and is ranked as the best pasture and lawn grass throughout its range in districts and upon soils adapted to it. It attains its highest development upon limestone soils, and where found growing naturally, is considered to indicate a superior agricultural soil especially useful for stock raising. The Blue Grass region of Kentucky, which also extends into Tennessee, and from which the former State derives one of its popular names, is of limestone formation, and is noted for its superior, strong-boned, well-formed stock, especially horses. Upon soils other than limestone this grass does not produce so well and upon sandy soils it usually fails. Blue grass hay is of high quality, but is produced in too small amount to pay as well as other hay grasses. The hay cut when the seed is in the milky stage, has the following composition: Nitrogen-free extract, 34.3; crude fibre, 24.5; water, 24.3; ash, 7.0; proteid matter, 6.3; fat, 3.6. If the grass be allowed to mature its seed before being cut it is somewhat less nutritive because of the change in the relative proportion of nutrient material to non-digestible matter. The composition of the fresh grass is as follows: Water, 65.1; nitrogen-free extract, 17.6; crude fibre, 9.1; proteid matter, 4.1; ash, 2.8; fat, 1.3. Texas blue grass (*P. arachnifera*) is a valuable species for the Southern States, where Kentucky blue grass is less resistant to the effects of drouth. Both species may be propagated by sowing seed or by setting out pieces of sod, a method most commonly practised with the southern species, because of the difficulty of spreading its woolly seeds evenly. The method is very popular in lawn-making with the northern species. Since the seed of Kentucky blue grass is often of low vitality, and is frequently mixed with chaff, it should be sown rather thickly. A permanent blue grass pasture requires about three years to become established, after which, without much attention, beyond ordinary fertilizing, it may remain profitable for half a century or more. In long settled districts there are occasional pastures of more than 75 years standing.

Blue Grass State, a nickname for Kentucky.

Blue-green Algæ. See CYANOPHYCEÆ.

Blue Hen State, a nickname for Delaware. During the War for Independence, a certain popular officer of Delaware, named Capt. Caldwell, asserted that a game cock to be unconquerable must be "a blue hen's chicken." This name was at once applied to his regiment and later to the State and its people.

Blue Island, Ill., a city of Cook County situated on the Calumet River and on the Illinois C., the Chicago, R. I. & P., the Chicago & G. T., and the Chicago & C. T. R.R.'s. It forms a southern suburb of Chicago, about two miles south of the city limits, and is an important manufacturing, commercial, and railroad centre. Among its industries are brick-making, stone-quarrying, etc. There are also smelting-works, oil-works, and breweries. It was settled in 1833 and incorporated in 1872. The municipal organization provides for a mayor with a term of two years, and a city council. The city operates its own waterworks and electric light system. Pop. (1900) 6,114.

Blue Jay. See JAY.

Blue John, a name for fluorspar (q.v.).

Blue Laws, a term sometimes applied to the early enactments of several of the New England colonies, but more frequently limited to the laws of New Haven Colony. The origin of the term is not exactly known. Various conjectures have been made, but the most probable derivation is that given by Prof. Kingsley, who thinks the epithet "blue" was applied to any one who immediately after the Restoration of the Stuarts looked with disapprobation on the licentiousness of the times. Thus, in Hudibras,

> For his religion, it was fit
> To match his learning and his wit;
> 'Twas Presbyterian true *blue*.

That this epithet should find its way to the colonies was a matter of course. It was here applied not only to persons, but to the customs, institutions, and laws of the Puritans, by those who wished to render the prevailing system ridiculous. Hence, probably, a belief with some that a distinct system of laws, known as the blue laws, must somewhere have had a local habitation. The existence of such a code of blue laws is fully disproved. The only authority in its favor is Rev. Samuel Peters, whose 'General History of Connecticut' (1781) is a spiteful, satirical work, full of exaggerations. The traditions upon this subject, from which Peters framed his stories, undoubtedly arose from the fact that the early settlers of New Haven were uncommonly strict in their application of the "general rules of righteousness." Judge Smith, in his continuation of the history of New York, published in 'New York Historical Collections,' Vol. IV., gives evidence against the existence of the blue laws, which is particularly valuable, as it was put on record some 15 years before Peters' history was published. He writes: "Few there are who speak of the blue laws (a title of the origin of which the author is ignorant), who do not imagine they form a code of rules drawn up for future conduct, by an enthusiastic precise set of religionists; and if the inventions of wits, humorists, and buffoons were to be credited, they must consist of many large volumes. The author had the curiosity to resort to them when the commissioners met at New Haven for adjusting a partition line between New York and Massachusetts in 1767; and a parchment covered book of demi-royal paper was handed him for the laws asked for, as the only volume in the office passing under this odd title. It contains the

memorials of the first establishment of the colony, which consisted of persons who had wandered beyond the limits of the old charter of Massachusetts Bay, and who, as yet unauthorized by the Crown to set up any civil government in due form of law, resolved to conduct themselves by the Bible. As a necessary consequence, the judges they chose took up an authority which every religious man exercises over his own children and domestics. Hence their attention to the morals of the people in instances with which the civil magistrate can never intermeddle in a regular well-policied constitution, because to preserve liberty they are recognizable only by parental authority.» See Trumbull, 'True Blue Laws of Connecticut and New Haven, and the False Blue Laws Invented by Rev. Samuel Peters' (1876); Prince, 'An Examination of Peters' Blue Laws,' in Annual Report of the American Historical Association for 1898.

Blue Light. See BENGAL LIGHT.

Blue-light Federalists, a term applied to the party in American politics which opposed the War of 1812. In 1813 Decatur made several attempts on dark nights to escape from the blockaded port of New London, Conn. He declared that his failure was due to signals of blue lights flashed from the shore to warn the British. This led to the opponents of the war, who were accused of having shown the lights, being stigmatized as «Blue-light Federalists.»

Blue Lodges, a secret association of advocates of slavery, organized about 1854, in Missouri, for the purpose of aiding the work of establishing slavery in Kansas. The members of the order, although citizens of Missouri, crossed into Kansas in 1855 and forcibly deposited their ballots for the pro-slavery candidates.

Blue-Mantle, one of the English pursuivants at arms, connected with the Heralds' College, so styled from the color of his robe.

Blue-mass. See MERCURY.

Blue Monday, a name formerly given in Europe to the Monday before Lent, when the churches were decorated with blue. It was kept as a holiday by classes whose ordinary avocation required them to labor on Sundays. As this led to violent disturbances the custom was legally abolished. The term now signifies a Monday of depression, or blue spirits, particularly among clergymen, but is very loosely used, and by hard-working persons is applied to Monday in general.

Blue Mountains, (1) a beautiful wooded range of mountains in Oregon, from 8,000 to 9,000 feet high, which, with the Powder River Mountains, separate the Columbia River valley from the Great Basin; (2) a mountain chain of New South Wales, part of the great Dividing Range. The highest peak is Mount Beemarang, which attains an elevation of 4,100 feet above sea-level. The range is now traversed by a railway, which attains a maximum height of 3,494 feet; (3) the Central mountain range of Jamaica, the main ridges of which rise to 8,000 feet; (4) the second main ridge of the Appalachians, known also as the Kittatinny Mountains in Pennsylvania, as the Shawangunks in New York. This range should not be confounded with the Blue Ridge (q.v.).

Blue Nile. See NILE.

Blue Nose, a popular nickname for a native of Nova Scotia.

Blue Peter, a blue flag having a white square in the centre, used to signify that the ship on which it is hoisted is about to sail, and for recalling boats. The term is a corruption of Blue repeater, one of the signal flags in the British code. A flag known as the comet is used as a sailing signal in the United States instead of the blue peter.

Blue-pill. See MERCURY.

Blue Point, N. Y., the southern extremity of Patchogue Bay, Long Island, which lends its name to the well-known oysters, Blue Points.

Blue Print, a positive photographic print from a transparent negative on paper sensitized by potassium ferricyanide and citric acid, giving white lines on blue ground.

Blue, Prussian. See DYES.

Blue-ribbon Army, the name of an English total abstinence society, so called from the color of the membership badge. The organization grew out of the Murphy Movement in America and dates from 1878. About five years later the society become known as the Gospel Temperance Union. See TEMPERANCE SOCIETIES.

Blue Ridge, the most easterly ridge of the Alleghany or Appalachian Mountains, which extends from the Hudson River southwest to Georgia. It first receives the name of Blue Ridge when it enters Virginia, the western portion of which it traverses. In south Virginia, the range becomes a broad plateau, which is at its widest in North Carolina, and is here crossed by the Black, Cowee, Nantahala, and South mountains, extending transversely to the axis of the Blue Ridge. The highest peaks of the range occur in the Black Mountain group, where are found Mount Mitchell or Black Dome, 6,710 feet; Guyot's Peak, Sandoz Knob, Gibbe's Peak, and a few others over 6,000 feet. In Virginia the Blue Ridge nowhere rises much above 4,000 feet, and in Pennsylvania and New Jersey its height is much less. Several large rivers pierce the ridge, such as the Hudson in the Highlands, the Delaware at the Water Gap, and the Potomac at Harper's Ferry. See also APPALACHIANS.

Blue-stone, or Blue-vitriol. See COPPER.

Blue-stocking, a pedantic woman; a lady regarded as too fond of learning. The origin of this name is thus given by Boswell in his 'Life of Johnson': «About this time (1780) it was much the fashion for several ladies to have evening assemblies, where the fair sex might participate in conversation with literary and ingenious men, animated with a desire to please. These societies were denominated blue-stocking clubs, the origin of which name was as follows: One of the most eminent members of these societies was Mr. Stillingfleet, who always wore blue stockings. Such was the excellence of his conversation, that his absence was felt as a great loss, and it used to be said, 'We can do nothing without the blue stockings'; and thus by degrees the title was established.» One of the most famous of these clubs was that which met at Mrs. Montagu's. This was sometimes honored by the presence of Dr.

Johnson, and its principal members have been sketched and eulogized by Hannah More, in her poem entitled the 'Bas Bleu.'

Blue Thistle. See BUGLOSS.

Blue-vitriol, called also **Blue-stone,** the salt, sulphate of copper, composed of sulphuric acid, oxide of copper, and water. It is a natural product of some mines of copper ores, and is also largely prepared for economical purposes. See COPPER.

Blueback, the salmon of the Fraser River, B. C., one of the most valuable of the Pacific salmon (q.v.). The name is given to various other fishes having bluish backs.

Bluebeard, a famous hero of legend and folklore, familiarized to English readers in the 18th century through a translation from the French of Charles Perrault, 1697. This tale of Bluebeard has been regarded by some as partly historic, of which the original was Gilles de Laval, Baron de Retz, who was burned at Nantes in 1440 for his cruelty to children, whom he is supposed to have enticed into his castle, where he sacrificed them to the devil. It is, however, really a märchen, and the leading idea of curiosity punished is world-wide. The forbidden chamber is a counterpart of the treasure-house of Ixion, on entering which the intruder was destroyed, or betrayed by the gold or blood that clung to him; also of Pandora's box, as well as of Proserpine's pyx that Psyche opened in spite of the prohibition. There are several parallels among the German fairy-tales collected by Grimm; and one feature at least is found in the Kaffir tale of the Ox (Callaway's 'Nursery Tales of the Zulus'). Variants are found in Russia, and among Gaelic popular tales; and in the Sanskrit collection 'Katha Sarit Sagara,' the hero Saktideva breaks the taboo, and like Bluebeard's wife, is confronted with the horrible sight of dead women. Possibly in the punishment following the breaking of the taboo may be a survival of some ancient religious prohibition; among the Australians, Greeks, and Labrador Indians, such an error was regarded as the means by which death came into the world. Frescoes of the 13th century have been found in Morbihan, Brittany, representing scenes from the similar legend of St. Trophime. Tales similar to that related by Perrault are found in Straparola's 'Piacevoli Notti' (1569), and in Abbatutis' 'Il Pentamerone,' while a not very dissimilar tale is that of the Third Calendar in the 'Arabian Nights Entertainment.' Operas founded upon it are Grétry's 'Raoul Barbe-Bleu' (1789); Offenbach's 'Barbe-Bleu' (1866).

Bluebell, Bellflower, Hairbell, or **Harebell,** *Campanula rotundifolia,* a plant of the natural order *Campanulaceæ,* native of the colder parts of the northern hemisphere. Its common name is suggested by the shape and color of its flowers, and its specific name from the shape of its root-leaves. The stem leaves are lanceolate or otherwise than round. This is the bluebell of Scotland and of literature. It may be found peeping through the snow and ice which are supposed to be melted by the self-generated heat of these little plants. They have long been favorites in the hardy flower border and are of simplest culture. (See also CAMPANULA.) The name is also applied to a species of Scilla (q.v.).

Blueberry. See HUCKLEBERRY; VACCINIUM.

Bluebill, one of the most common of American fresh-water ducks, which breeds throughout Alaska and the northern part of Canada generally, spending the cold months in the United States, but going only as far south as is necessary to avoid the freezing of the lakes and ponds. The head, neck, and fore part of the body of the drake are black, the head with a green gloss. The back and sides are whitish with finely waved blackish markings. The abdomen and speculum of the wing are white. In the female the head and anterior parts are brown, and the face pure white. The most distinguishing part of the bird is the very broad, spatulate bill, which is light blue, with a black nail. Hence the other names «broadbill,» and «scaup duck.» There are two species, the larger (*Aythya marila nearctica*) the one just described, which is regarded as a variety of the European scaup duck; and the lesser (*A. affinis*), which is very similar to the preceding, but smaller, and rather more southerly in its distribution. These ducks are close relatives of the canvasback and redhead (qq.v.), and resemble them in habits. Other local names for them are «blackhead» and «shuffler.»

Bluebottle, or **Corn-flower** See CENTAUREA.

Bluebottle Fly, a greenish-blue fly, sometimes called by English authors «green-bottle» fly (*Lucilia cæsar*). It closely resembles the blow-fly (q.v.), but is smaller and entirely blue or green. These flies hibernate through the winter, appearing early in spring. Its eggs are deposited upon meat and decaying animal matter. The larvæ are said to be indistinguishable from those of the blow-fly. They are white, footless maggots, of an elongated conical shape, which transform in the ground. It is said that bluebottle flies do not commonly enter houses.

Bluebreast. See BLUETHROAT.

Bluebuck, the name given by English workmen in South Africa to one of the duikers, the pigmy antelope (*Cephalolophus monticola*) of Natal. These tiny creatures, which stand only 13 inches high, are the smallest of the antelopes, and grayish-blue in color, with short, spike-like horns, which hardly show above the tuft of stiff hairs on the top of their heads. They swarm in the thickets of southeast Africa, feeding on herbage berries and buds, scrambling about the rocks, and climbing leaning tree trunks, with amazing agility.

Blue-eye, a small and favorite species of honey-eater (*Entomyza cyanotis*) with a conspicuous patch of blue about the eyes. It frequents the eucalyptus trees, and has the curious habit of depositing its eggs in a neat depression on the top of the big, oven-shaped nest of a certain starling, whenever it can find a deserted one. Otherwise it constructs a nest for itself. See HONEY-EATER.

Bluefields (formerly written BLEWFIELDS), a town of Nicaragua, on the Caribbean coast and at the mouth of the Escondido or Bluefields River. Lat. 12° N., lon. 83° 44′ W. It was the capital of Mosquitia (see CENTRAL AMERICA). In the latter part of 1847 the population was about 600, one sixth white, five sixths black. Slavery was abolished in 1841. The king of Mosquitia, who resided here in one of the few

houses built of boards, claimed sovereignty over a territory 235 miles wide and 340 miles long; also the districts of Talamanca and Chiriqui in Costa Rica. A British agent and consul-general also was stationed at Bluefields, the English government maintaining a protectorate over the Mosquito Indians until 1860. A German colony at Carlsruhe, adjoining Bluefields, was founded in 1844, but abandoned in 1849. The climate is moist and hotter than in the interior. In 1901 the company to which the Nicaraguan government granted a concession and monthly subvention for the establishment of a line of steamers agreed to make six trips a month between Bluefields and New Orleans, and to carry the mails between those points eight times monthly.

Bluefin, or **Blackfin,** a large cisco-like whitefish (*Argyrosomus nigripinnis*) of the deep waters of Lake Michigan and some other of the lakes of Wisconsin and Minnesota, readily known from other species by its black fins.

Bluefish The bluefish or «skipjack» (*Pomatomus saltatrix*) is one of the most widely distributed and abundant of sea-fishes, being found in the Atlantic from the Mediterranean and Novia Scotia to Brazil, and in the Pacific and Indian oceans. It is taken casually at all seasons on the eastern coast of the United States, but becomes numerous irregularly in summer, when its presence or absence seems to be governed largely by the movements of its principal food, the menhaden (q.v.), when seeking their inshore spawning-grounds. The only wonder is that both have not been exterminated many centuries ago, for of all the butchers of the sea the bluefish is the most wolfish and diabolical, snapping its prey in half for a mouthful and passing on in ruthless industry. It is beautifully shaped for swimming, built with the fine lines of the mackerel and the strength of the salmon. It is a near relative of the pompanos and horse-mackerels (family *Carangidæ*), but is set apart in a family (*Pomatomidæ*) by itself, which Jordan considers an offshoot toward the percoids. In color it is steel-blue, and its flesh is very sweet and savory. The weight varies, five pounds being the common run, although 20 pounds are recorded.

The favorite method of fishing for it is «squidding,» or casting from a platform built out into the surf, with a rod and line armed with a spoon, or a bone-baited hook. Its voracity makes it a free biter, and its temperament makes it a fierce one, so that the angler may expect a fight from the strike to the death, and only by sheer strength can the prey be landed. The bluefish is also trolled for from boats, especially in Florida, and off the south coast of New England.

On our Pacific coast the «California bluefish» (*Cynoscion parvipinnis*) is found from Santa Barbara to Guaymas and Mazatlan, and is a near relative of the eastern weakfish (q.v.), locally called «totuava» (*Cynoscion macdonaldi*). In the Gulf of California it congregates at the mouth of the Colorado River and attains enormous size, having been taken in hand-lines as high as 170 pounds. Like other species of this genus, it is erroneously yet frequently called «sea-bass.» The bluefish thrives on sardines and other small fish. Assuming that one bluefish eats 10 small fish a day, it has been figured that it requires ten thousand million sardines to feed the one thousand billion bluefish on our coasts every summer.

Consult Jordan and Evermann, 'Food and Game Fishes of America' (1902); Goode, 'Fishery Industries, Section 1' (10th census, Washington, 1884); Mayer (editor), 'Sport with Rod and Gun' (1892).

Bluegowns, an order of paupers in Scotland, called also the «King's Bedesmen,» to whom the kings annually distributed certain alms on condition of their praying for the royal welfare. Their number was equal to the number of years the king had lived. The alms consisted of a blue gown or cloak, a purse containing as many shillings Scots (pennies sterling) as the years of the king's age, and a badge bearing the words «Pass and repass,» which protected them from all laws against mendicity. Edie Ochiltree, who figures prominently in Scott's novel 'The Antiquary,' is a type of the class, but probably a favorable specimen as compared to those who were to be met with in real life. The practice of appointing bedesmen was discontinued in 1833, and the last of them drew his last allowance from the exchequer in Edinburgh in 1863.

Bluethroat, an Old World bird (*Cyanecula suecica*) related to the European robin, and deriving its name from its bright blue throat, which is separated from the white below it by crescent-shaped bands of rust-red and white. It is one of the most highly migratory birds known, spending its winters in tropical Africa and India, and during the summer breeding in Scandinavia, northern Russia, Siberia, and western Alaska. It makes its nest in bushes and weeds along streams, as far north as 71 degrees. It is extraordinary in never beeing seen in the intermediate countries, between its summer and winter homes, so that it stands to reason that the journey is made at a single flight, either at night, or at an invisible altitude. The bluethroat is celebrated for its fine singing, and powers of mimicry when in its summer home, on account of which the Laplanders call it «the bird of the hundred voices.» Consult Gätke, 'Birds of Heligoland' (English translation 1895); and works on European, Siberian, and Alaskan ornithology.

Bluewing, a duck. See TEAL.

Bluffs, a term of American origin, synonymous with cliffs. It has long been used to designate the high cliffs met with along the Mississippi River; particularly those abrupt banks of loam on its eastern side below the mouth of the Ohio. These are continually washed and undermined by the action of the river, while the opposite side, rising more gently back from the river, is but slightly washed by its waters. On the south shore of Lake Superior, near the Pictured Rocks, is a most remarkable bluff of loose, blowing sand, which rises so steeply from the edge of the water to the height of 200 feet, that one would in vain endeavor to ascend it. The waves and the winds beat against it from the north, and keep its materials continually in motion; but more sand appears to be always supplied to replace that which is borne away.

Bluing, a compound dissolved in water to whiten clothes after washing. The indigo preparation once largely used has been extensively superseded by Prussian blue.

Bluing of Metals, the process of giving a blue color to metallic substances by heat. Iron, when heated, becomes first of a light, then of a darker gold color, and finally blue. Steel heated to redness and suddenly cooled, is rendered hard and brittle. It is restored to any degree of softness, by heating it up to certain temperatures and allowing it to cool slowly. These temperatures are precisely indicated by the color of the film of oxide which forms upon its surface. At 430° F. it is straw yellow of the very hard temper suitable for lancets. At higher temperatures it appears successively a golden yellow, then brown, purple, blue, and finally green. Pale blue at 550° is the temper for swords and watch springs. The common shade of blue, at 560°, is the temper for fine saws and dirks. Deep blue, at 600°, is the soft quality of steel for large saws.

Blum, blŭm, **Ernest,** French dramatist: b. Paris, 15 Aug. 1836. Either alone or in collaboration with other dramatists he is the author of many highly successful plays. The drama of 'Rose Michel' (1877), of his own composition, insured his place among the most successful French dramatists of the time. Among his later compositions are 'Adam and Eve' (1886); 'The Nervous Woman' (1888); 'End of the Century' (1890); 'La rieuse' (1894); 'Le Carillon' (1897).

Blum, Hans, hänts bloom, German publicist: b. Leipsic, 1841. He is a son of Robert Blum (q.v.), was educated in the universities of Leipsic and Bern, sat in the North German Reichstag 1867–70, and was a barrister in Leipsic 1869–97. He has written extensively on contemporary politics and among his works are 'Die Lügen unserer Socialdemokratie' (1891); 'Fürst Bismarck und seine Zeit' (1894–5); 'Das erste Vierteljahrhundert des deutschen Reichs' (1896); 'Persönliche Erinnerungen an den Fürsten Bismarck' (1900). He has also written two dramas and several novels.

Blum, bloom, Robert, German patriot: b. Cologne, 10 Nov. 1807; d. Vienna, 9 Nov. 1848. He served for a short time in the army, and became subsequently connected with the Leipsic Theatre, of which he acted for some time as secretary and treasurer. About the year 1840 he began to come prominently forward as the champion of the Liberal cause, and acquired much renown as a popular orator. On the outbreak of the commotions of 1848 he manifested great enthusiasm, and became soon the rallying-point of democracy in Saxony, and the leading member of opposition in the National Assembly at Frankfort, to which he was sent that year as member for Leipsic. The events of October at Vienna inspired him with fresh energy, and he proceeded thither at the head of a deputation to express the sympathy of the German democrats in the Frankfort Assembly with the Viennese. He took an active part in the conflict of the citizens with the imperialists; but on the surrender of the capital to Windischgrätz, was arrested with several of his companions on 4 November. Brought before a military tribunal, he pleaded in vain his privileges as a deputy from the German diet, and was condemned to be hanged, a sentence which was changed to death by the bullet.

Blum, blŭm, **Robert Frederick,** American artist: b. Cincinnati, O., July 1857; d. 1903. He studied at the Philadelphia Academy of Fine Arts, and among his works are 'Venetian Bead Stringers,' which received a prize of $2,500 at the American Art Association exhibition in New York in 1889. Although he worked in oils he was best known as a water-colorist and painter in pastels. He ranked among the most brilliant of American water-color artists.

Blumenbach, Johann Friedrich, yō'hän frēd'rĭH bloo'mĕn-baH, German naturalist of distinction: b. Gotha, 11 May 1752; d. Göttingen, 22 Jan. 1840. He studied at Jena and Göttingen, and was appointed in the latter, in 1776, extraordinary professor of medicine and inspector of the museum of natural history, and in 1778 ordinary professor. In 1812 he was appointed secretary to the Royal Society of Sciences at Göttingen, in 1816 became physician to the king of Great Britain and Hanover, in 1821 was made a knight-commander of the Guelphic Order, and in 1831 was elected a member of the Academy of Sciences at Paris. In 1825 the jubilee of his graduation as doctor was celebrated. On this occasion a medal was struck, and an endowment founded under the name of the Blumenbach Stipendium or Bursary, to assist talented young physicians and naturalists, and enable them to make scientific travels. In 1835 he retired from public life. The first work which brought him into notice was the 'De Generis Humani Varietate Nativa,' and from its publication in 1775 he continued almost for 60 years to exert a powerful influence on the progress of science, both by the number of distinguished pupils who were indebted for their first training to his admirable lectures, and by his valuable writings, partly inserted in the 'Transactions' of scientific societies, and partly published as separate works. Among the latter, in addition to the thesis, which received important additions in subsequent editions, and may be said to have given a direction to the most important studies of his after life, are the 'Institutiones Physiologicæ' (1787), long a textbook in many of the most celebrated schools of Europe; the 'Handbuch der vergleichenden Anatomie' (Handbook of Comparative Anatomy), and 'Collectio Craniorum Diversarum Gentium.' The last work gives descriptions and figures of his collection of skulls, one of the most extensive in existence, and still preserved at Göttingen. In regard to the important subject of which it treats, Blumenbach held decidedly that the human race formed only one species, and had originally descended from a single pair; but he divided it into the five varieties of Caucasian, Mongolian, Negro, American, and Malay.

Blumenreich, Franziska, fränts'ĭs-ka bloo'mĕn-rīH, German novelist: b. Bohemia, 2 April 1849. Among her very numerous novels the more notable are 'At the Abyss of Marriage' (1888); 'Freighted with Bliss' (1890); 'Storms in Port' (1892). She is a zealous advocate of woman's rights.

Blumenthal, Jacob von, yä'kōb fōn bloo'mĕn-tāl, German pianist and composer: b. Hamburg, 4 Oct. 1829. Going to London in 1849, he became pianist to Queen Victoria, taught music, and was soon well known as a composer of popular pianoforte numbers and equally popular songs such as 'My Queen'; 'The Venetian Boat Song'; 'The Broken

Flower'; 'The Bend in the River.' The familiar hymn tune, 'Blumenthal,' is an adaptation of his composition, 'The Two Angels.'

Blumenthal, Oskar, ōs'kär bloo'mĕn-täl, German dramatist and critic: b. Berlin, 13 March 1852. Sprightliness of dialogue is the most distinguishing character of his plays; the most successful of them are 'The Big Bell'; 'A Drop of Poison'; 'The Black Veil.' He has published several volumes of critical and miscellaneous essays.

Blundell, (Mrs.) **Francis** (M. E. Francis), English novelist: b. Dublin. She is the widow of Francis N. Blundell and has lived for many years in Lancashire, but more recently in Dorsetshire. Her writings, which have steadily increased in popularity, both in England and the United States, are: 'Whither?' (1892); 'In a North Country Village' (1893); 'The Song of Dan' (1894); 'Town Mice in the Country, a Story for Children' (1894); 'A Daughter of the Soil' (1895); 'Frieze and Fustian' (1896); 'Among the Untrodden Ways (1896); 'Maime o' the Corner' (1897); 'Miss Erin' (1898); 'The Duenna of a Genius' (1898); 'Yeoman Fleetwood' (1899); 'Pastorals of Dorset'; 'Fiander's Widow' (1901); 'North, South, and Over the Sea'; 'The Manor Farm' (1902).

Blundell's School, a famous English free grammar school in Tiverton, Devonshire, founded in 1604 by Peter Blundell, who left his fortune to charities, the school being the most important of his benevolences. In connection with it five Balliol College scholarships were founded and many persons who afterward became eminent went to Balliol College, Oxford, from Tiverton School. The school is mentioned in the novel 'Lorna Doone' as the scene of John Ridd's early education. In 1880 new buildings in the Tudor style were built for the school in the outskirts of the town. The late archbishop of Canterbury, Frederick Temple, was a student at Blundell's School.

Blunderbuss, a short, heavy, large-bored firearm, often brass-barrelled, and bell- or trumpet-mouthed. It was used to discharge a heavy load of slugs or small bullets at a short range, and was once generally employed as a weapon for the defense of houses against burglars. As a military weapon, it was used occasionally on shipboard for repelling boarders, or pouring heavy volleys into boats, when attempting to cut vessels out from anchorage. It is now wholly disused. See Small Arms.

Blunt, Edmund March, American author: b. Portsmouth, N. H., 20 June 1770; d. Sing Sing, N. Y., 2 Jan. 1862. He is remembered for his publication of the 'American Coast Pilot' (1796), describing all the coasts of the United States, and containing a vast amount of invaluable information for seamen. More than 30 editions of this work have been published, and it is still in use in the United States and the principal European countries, having been translated into nearly every foreign language. He also compiled a number of nautical books and charts.

Blunt, George William, American hydrographer: b. Newburyport, Mass., 11 March 1802; d. New York, 19 April 1878; a son of Edmund March Blunt (q.v.). He went to sea when 14 years old and served as a sailor till nearly 21; and in 1822–66 was a publisher of charts and nautical books in New York. He made original surveys of many American harbors; was one of the committee that organized the present system of pilotage for New York; made several revisions of the 'American Coast Pilot'; and was influential in causing the Federal government to adopt the French system of lighthouses and to organize the Lighthouse Board.

Blunt, James G., American soldier: b. Trenton, Maine, 1826; d. Washington, D. C., 1881. He settled as a physician in Anderson County, Kansas, in 1856; became prominent in the contest over the introduction of slavery into that State, and was a member of the convention that framed its constitution. Entering the army as lieutenant-colonel of the 3d Kansas Volunteers, he became brigadier-general, 8 April 1862, and was assigned to the command of the military department of Kansas. As such he was engaged in the battle of old Fort Wayne, defeated Marmaduke at Cane Hill, Ark., and, with the aid of Gen. Herron, defeated Hindman at Prairie Grove, and thus checked the Confederate advance into Missouri. He was promoted major-general, 29 Nov. 1862, and in October 1864 gave the final blow to Price's invasion of Missouri.

Blunt, John Elijah, English consular agent: b. 14 Oct. 1832. He entered the English consular service in 1850, and held various consular posts in Turkey, receiving in 1862 and again in 1868 the thanks of the President of the United States for his services to American citizens in the province of Adrianople. Since 1899 he has been consul at Boston, Mass., with the rank of consul-general.

Blunt, John Henry, English High Church theologian: b. London, 25 Aug. 1823; d. there, 11 April 1884. He held various curacies, and in 1873 was appointed to the living of Beverston, Gloucestershire. He wrote much, among his chief works being: 'Dictionary of Doctrinal and Historical Theology' (1870); 'Dictionary of Sects, Heresies, etc.' (1874); 'History of the English Reformation' (1868–82); 'Household Theology' (1865); 'Annotated Book of Common Prayer' (1866; revised and enlarged, 1884).

Blunt, John James, English divine: b. Newcastle-under-Lyme, 1794; d. Cambridge, 18 June 1855. From 1839 he was Lady Margaret professor of divinity at Cambridge. His works include: 'Sketch of the Reformation in England' (1832); 'Undesigned Coincidences in the Old and New Testament, an Argument for their Veracity' (1847); 'On the Right Use of the Early Fathers' (1857); 'History of the Church During the First Three Centuries' (1856); several volumes of sermons; etc.

Blunt, Stanhope English, American military officer: b. Boston, Mass., 29 Sept. 1850. He was graduated at the United States Military Academy and commissioned 2d lieutenant in 1872; rose through the ranks to major in the ordnance department; served at various posts and arsenals in the West; was a member of several boards, including that which selected the Krag-Jorgensen rifle for use in the army; and had command of the Rock Island Arsenal,

1ff. He has written 'Firing Regulations for Small Arms,' and numerous papers on the use of small arms.

Blunt, Wilfrid Scawen, English poet and traveler: b. Crabbet Park, Sussex, 17 Aug. 1840. He was attaché of legation at The Hague, Athens, Madrid, Buenos Ayres, and elsewhere; supported Arabi Pasha in the revolt in Egypt in 1881; and was imprisoned in 1888 for his insurrectionary actions in Ireland. He is author of: 'Sonnets and Songs by Proteus' (London 1875); 'The Love Sonnets of Proteus' (1881); 'The Future of Islam' (1882); 'The Wind and the Whirlwind,' political poems (1884); 'Ideas About India' (1885); 'In Vinculis' (1889); 'A New Pilgrimage' (1889); 'Esther: a Young Man's Tragedy' (1892); 'Stealing of the Marc' (1892); 'Griselda' (1893); 'Satan Absolved' (1899).

Blunthead, a columbrine snake of Java and the East Indies (*Amblycephalus monticola*). It is about three feet in length, and purple in ground color, but this is almost entirely concealed by the brown markings and mottlings, and the cheeks and lip-plates are carnation-red. It is perfectly harmless, and is welcomed by the natives to their houses as a vermin-destroyer. It owes its name to the squarish form of the head, which, as in many other species of the family, looks so much like that of a poisonous snake as to deceive most observers.

Bluntschli, Johann Kasper, yō'hän käs'par blŭnt'shlę, Swiss jurist and statesman: b. Zurich, 7 March 1808; d. Carlsruhe, 21 Oct. 1881. He became professor in the newly founded university in that city in 1833; took an active part in the political struggles that divided his country, and at first inclined to the party of reform, until the events of 1839 induced him to join the Conservatives, of whom he was, for a time, a leader. He was a councilor of state, and became a member of the government and of the Federal Directory, and afterward worked for the formation of a moderate Liberal Conservative Party in Switzerland. In 1848 he went to Munich as professor of civil and international law. There he published his 'Allgemeines Staatsrecht' (5th ed. 1876), on which his reputation as a jurisconsult chiefly rests; 'Deutsches Privatrecht' (3d ed. 1864); and, in conjunction with Arndts and Pözl, 'Kritische Ueberschau der Deutschen Gesetzgebung und Rechtswissenschaft (6 vols. 1853–8). In 1861 he removed to Heidelberg University, and became a privy councilor of Baden, actively forwarding all Liberal measures in the state. Liberty in ecclesiastical matters he had equally at heart; he acted several times as president of the Protestantenverein, and it was after delivering a closing speech at the general synod of Baden that he died suddenly at Carlsruhe. He was the author of valuable histories of Zurich and of the Swiss Confederation, and of a number of works on law, being especially an authority in international law. His library is now possessed by the Johns Hopkins University at Baltimore.

Blushing, a sudden reddening of the face, caused by a rush of blood into the capillary vessels of the skin. A blush is excited by confusion of mind, arising from surprise or diffidence, modesty or shame, or conscious guilt and apprehension, showing the influence of the passions and emotions on the nervous system and the circulation of the blood. Sudden fear and apprehension cause the blood to rush from the external surface to the internal organs, leaving the bloodless lips quite pale, and the whole face suffused with deathly pallor. It is a kind of inverse blushing; the one being a sudden flash of color in the face, the other a sudden flash of paleness.

Blüthgen, August Eduard Viktor, ow'goost ĕd'oo-ärd vĭk'tôr blüt'-gĕn, German novelist: b. Zörbig, near Halle, 4 Jan. 1844. He has won high distinction as a writer for the young. Among his stories for boys and girls are: 'The Rogues' Looking Glass' (1876); 'The Battle of Frogs and Mice' (1878); and with these is to be classed the letter-press (verses) of O. Pletsch's 'Picture Books.' Of novels and romances he is author of a great many; for example, 'The Peace Breaker' (1883); 'The Step-Sister' (1887); 'Madame the Countess' (1892); etc.

Blyden, Edward Wilmot, a negro author: b. St. Thomas, W. I., 3 Aug. 1832. After vainly seeking, in 1845, admission to some college in the United States, he went to Liberia, and graduated at the Alexander High School, of which he afterward was principal. In 1880 he became president of Liberia College, has held important government positions, and was commissioner to the Presbyterian General Assembly of the United States in 1861 and 1880. He is proficient in many languages, including Latin, Greek, Spanish, Hebrew, and Arabic. He has published: 'Liberia's Offering' (1873); 'From West Africa to Palestine' (1873); 'The Negro in Ancient History'; etc.

Blythe, Herbert. See BARRYMORE, MAURICE.

B'nai B'rith, b'nī b'rēth, **Independent Order of the,** an association of German Jews formed in the United States in 1843. Its purpose is the moral improvement of the members. Its organization resembles that of the Free Masons, but it is not a secret society, and has no elaborate ceremonial. The organization has since been established in Germany, and in the East. In 1901 it had over 400 lodges and 28,000 members.

Bo-tree, the sacred fig of India. See PEEPUL.

Boa, a serpent of that section of the family *Boidæ* called *Boinæ*. The boas are mostly of great size, and inhabitants of the forests of tropical America; and, with the pythons, constitute a family of the largest of modern snakes, which are noted for their power to enfold and fatally crush their prey in muscular coils. These serpents are notable not only for great size, but for certain structural peculiarities, of which the most noteworthy and characteristic is the fact that vestiges remain of the pelvis and hinder limbs, which appear externally as claw-like spurs on each side of the vent, which are of service in hanging from trees. The muscular power is very great, the tail is partly prehensile; and the bones of the head, and especially of the jaws, are more than ordinarily loosely joined together (see SERPENT), so that bodies surprisingly large may be swallowed. This family is distributed throughout all tropical regions, and is divided into two sub-families, by diversities of structure. One (*Pythoninæ*) con-

1. Boa Constrictor.

2. Dog-Headed Boa (Xiphosoma Caninum).

tains the Old World pythons (q.v.), which have a pair of supraorbital bones, some teeth on the premaxilla, and the sub-caudal scales in two rows; while the boas lack supraorbital bones, never have premaxillary teeth and but a single row of scales on the under side of the tail. Most of the 40 or 50 species of *Boinæ* are American, but several small species inhabit the warmer parts of the Old World. Several of the American boas are very large snakes, perhaps occasionally reaching 30 feet in length, though few carefully measured have exceeded 20 feet; but such a one would weigh several hundred pounds, and be a very formidable foe to the largest animals exposed to their attacks. They inhabit the forests, and climb to the lower branches of the trees, where they seek or await their prey, usually above a path. There the serpent swings about in the air till some luckless animal approaches; then, suddenly relinquishing its position, he seizes the victim, and coils his body spirally round its throat and chest, till, after a few ineffectual cries and struggles, the animal is suffocated, and expires. In producing this effect, the serpent does not merely wind itself around its prey, but places fold over fold, as if desirous of adding as much weight as possible to the muscular effort; these folds are then gradually tightened with enormous force, and speedily induce death. The animals thus destroyed by the larger boas are sometimes as large as tapirs, deer, and even bullocks, but ordinarily the much smaller mammals and birds of the forest, while one species feeds mainly upon aquatic prey. Having crushed and rolled its prey until its bones are broken into pieces, and it is compacted into the form of a sausage, it takes it into its mouth, and at first by the help of the strong recurved teeth on its jaw bones, and later by reflex movements of its throat and ribs slowly engulfs it, the action being facilitated by a copious flow of saliva; but there is no truth in the reputed preparation of the prey by a covering of slime, etc., related in so many books. The process of digestion is slow, and while it is proceeding, the snake is inert, and easily caught and killed.

Several of the larger species are well known and often seen in menageries, where they are easily distinguished by the shape of the head and by the well-defined pattern of the markings. These are exceedingly handsome in most cases, the colors being yellow, buff, chestnut, and varying browns, set off by black and white; and the skins, which may be tanned into good leather with the scales on, are of high commercial value for making purses, belts, and other ornamental articles. Among the best known species are the common boa — the *Boa constrictor* proper (for that term is ignorantly given to all), which is one of the lesser forms, rarely exceeding 10 feet in length. Its home is the region of the Amazon and Orinoco rivers, and it is pale brown, with a chain-like series of dark-brown markings on each side of the spine, enclosing large oblong-oval spots, and a series of large dark spots along the sides, each with a light centre; on the tail the markings become brick-red. Several other species of this genus, some much larger, inhabit South and Central America. One, the imperial boa, has a Mexican variety, often called the *abonia*, which is believed to be the serpent venerated by the ancient Mexicans, and worshipped with bloody sacrifices. Two species of true boas also inhabit Madagascar. Of a closely related genus is the great water-boa, or anaconda (*Eunectes nuerinus*), which adds to the arboreal habits of the others the custom of crawling into the rivers and swamps of the half-flooded forests, where it lives, and there lying in wait for animals that come down to drink, or seizing those of semi-aquatic life. This is the largest, most formidable, and one of the handsomest of the tribe. Many species are of smaller size, down to only three feet in length, but all have similar habits. One genus (*Lichanura*) has a few species that dwell in the West Indies and Mexico, and are occasionally taken in Arizona and southern California; and small boas of this or an allied sort are frequently brought into the United States from Cuba, tightly coiled about bunches of bananas. They are harmless, of course, unless of a great size, having no poison sacs or fangs, and all the larger ones are susceptible of taming, and seem to acquire a positive regard for their human friends.

Boabdil, bō-ȧb-dēl′, or **Abu-Abdullah,** ä′boo-äbd-ool′ah, last Moorish king of Granada. He gained the throne in 1481 by expelling his father, Mulei Hassan; but being attacked by Ferdinand of Aragon, was defeated and taken prisoner. His father having resumed his crown, Ferdinand set Boabdil at liberty, and promised to assist him against his father, on condition of his agreement to become the vassal of Spain. He accepted the ignominious condition, and his father died of a broken heart. Boabdil was not permitted to reign in peace. By his tyranny he provoked the hostility of his own subjects, and Ferdinand, taking advantage of the dissensions which prevailed, laid siege to Granada. The Moors made a valiant defense, and were prepared to bury themselves under the ruins of the city, but Boabdil capitulated, and retired to a domain of the Alpujarras asigned him by the victor (1491). When on his way he turned round to take a last look of the city, and burst into tears. "Right, my son," exclaimed his mother, Aixa, who was standing by him, "weep like a woman for the throne which you had not the spirit to defend as a man and a king." The spot is still called "El Ultimo Sospiro del Moro" (the last sigh of the Moor). (See GRANADA.) Boabdil soon afterward passed into Africa, and fell in battle while assisting the king of Fez in an attempt to dethrone the king of Morocco.

Boadice'a, queen of the Iceni, a British tribe, inhabiting what are now the counties of Cambridgeshire, Suffolk, Norfolk, and Hertfordshire. She died about 62 A.D. The celebrated earthworks still extant, known as the Devil's ditch, at Newmarket heath, and at Six-Mile bottom, are supposed to be the fortifications of this tribe, and perhaps of this queen, against the Romans. She was a contemporary of Nero, and was a woman of remarkable character, both for firmness and ability. Her husband, the king of the Iceni, Prasutagus, dying, left Nero and his own two daughters joint heirs to his great wealth, hoping thereby to preserve his family and kingdom from the rapacity of the conquerors. But immediately on his death his kingdom was taken possession of by the Roman centurions. For some real or imaginary offense, the British queen was pub-

licly scourged by the executioner, and her daughters were abandoned to the lust of the slaves. Stung to frenzy by this outrage, taking advantage of the absence of Suetonius Paulinus, the Roman governor, from that part of England, Boadicea raised the whole military force of her barbarians, and bursting upon the Roman colony of London, reduced the city to ashes, and put to the sword in that and neighboring places,—of Roman citizens, traders, Italians, and other subjects of the empire,—at least 70,000 individuals. Suetonius lost not a moment in hurrying to the scene of action, although it was well known that the queen of the Iceni was in command of 120,000 men, which gradually increased to 230,000, according to Dion Cassius, while he could bring into the field in all less than 10,000 soldiers. It is true that absolute credit cannot be given to statements of prodigious numbers, such as the above, but at all events the disparity of force was extraordinary. The legion, posted on heights, where its flanks and rear were covered by woods, seems to have received the attack passively, sheltered from the missiles of the Britons by their large, oblong bucklers, until, when the darts and arrows of the barbarians began to fail, by one compact charge they carried all before them. They spared nothing; women, children, the beasts of burden, the dogs, were all cut to pieces. It is said that 80,000 Britons were butchered that day, while of the legionaries only 400 fell, and about as many more were wounded. It is believed that the action took place not far from St. Albans, Verulamium, a Roman colony, which at the first irruption had shared the fate of London. The queen, seeing that her cause was lost, committed suicide, rather than submit to the conqueror. Beaumont and Fletcher's play, 'Boadicea,' is founded upon the resistance made by Boadicea against Suetonius.

Boanerges, bō-ạ-nėr'jēz, an appellation given by Christ to two of his disciples, the brothers James and John, apparently, on account of their fiery zeal. See Mark iii. 17.

Boar, Wild, a ferocious, swift-footed species (*Sus scrofa*) of wild swine, made dangerous by its extreme courage and superior strength. It is found in marshy forest-grounds of Europe, Asia Minor, and North Africa. The boar is much larger than the domesticated swine; and covered with short, grayish-black, woolly hair, thickly interspersed with stiff bristles, assuming the form of a crest along the spine. The great tusks of the lower jaw are formidable weapons in youth, but later becoming useless by curving over the snout, when the teeth of the upper jaw which protrude and curve out take their place as weapons. The boar seeks its food at night and feeds on roots, grain, and small animals, birds' eggs, etc. Besides this species, several others exist, notable among which are *Sus vittatus* of Asia and Africa, *Sus verrucosus* of Java, and the Celebes and *Sus barbatus* of Borneo. Boars were common in England until the time of Henry II., when they seemed to disappear for the time being, reappearing again in the reign of Charles I. Formerly the sport of hunting this animal with the aid of great dogs (boarhounds), was the favorite amusement of the nobles of France and Germany, but is now rarely followed except in a few estates in eastern Europe, where the animal is preserved for the purpose. In India, however, the chase of the wild boars of that country, usually called "pig-sticking," is still foremost among the field-sports of the Anglo-Indians.

Board, the collective name applied to a number of persons having the management, direction, or superintendence of some public or private office or trust; often an office under the control of an executive government, the business of which is conducted by officers specially appointed, as board of admiralty, board of trade, etc.

Boardman, George Dana, American missionary: b. Livermore, Me., 8 Feb. 1801; d. 11 Feb. 1831. He studied at Andover and was ordained in the Baptist Church. In 1825 he went to India, and in 1827 to Burma, where he labored assiduously in spreading Christianity. The mission planted by him became the central point of all Baptist missions in Burma.

Boardman, George Dana, American clergyman and author: b. Tavoy, British Burma, 18 Aug. 1828; d. Atlantic City, N. J., 28 April 1903; son of the American Baptist missionary of the same name. He was educated in the United States, graduating at Brown University in 1852, and at Newton Theological Institution in 1855. He was pastor at Barnwell, S. C.; afterward at Rochester, N. Y., till 1864, when he became pastor of the First Baptist Church in Philadelphia. In 1899 he established a lectureship at the University of Pennsylvania, known as the "Boardman Foundation in Christian Ethics." Besides sermons and essays, his chief works are: 'Studies in the Creative Week' (1878); 'Studies in the Model Prayer' (1879); 'Epiphanies of the Risen Lord' (1879); 'Studies in the Mountain Instruction' (1880); 'The Kingdom' (1899); 'The Church' (1901); 'The Golden Rule' (1901).

Boardman, Richard, English missionary: b. 1738; d. Cork, Ireland, 4 Oct. 1782. He became a member of Wesley's conference in 1763, and volunteered for service in America in 1769. He preached in New York and through the Middle States till 1774, and then, returning to England, continued his itinerant ministry. He is known as one of the founders of Methodism in the United States.

Boarfish, a fish of the family *Caproidæ*, found off the southern coast of Europe. The body is small, oval, compressed, and carmine in color, with seven transverse orange bands on the back, and has a long, hog-like snout.

Boarhound. See Hound.

Boar's Head, The, a tavern in Eastcheap, London, destroyed in the great fire of 1666; its site is now occupied by a statue of William IV. The inn figures in Shakespeare's 'Henry IV.' and 'Henry V.' as the resort of Falstaff and his boon companions.

Boas, Franz, fränts bō'as, German-American ethnologist: b. Minden, Westphalia, 9 July 1858. He studied at Heidelberg, Bonn, and Kiel universities, 1877–82; traveled in the Arctic regions, 1883–4; was assistant in the Royal Ethnographical Museum in Berlin, and privat docent in geography at the University in 1885–6; and teacher of anthropology in Clark University,

WILD BOARS (*Sus porcus*)

Worcester, Mass., in 1888–92. In 1901 he became curator of the American Museum of Natural History. He has spent much time among various American Indian tribes, and, among other works, has published 'Baffin Land' (1885); "The Central Eskimo," in the 'Annual Report' of the United States Bureau of Ethnology (1888); 'Indians of British Columbia' (1888–92); etc.

Boat, properly a small vessel propelled by oars or poles. Boats are made of iron, copper, India-rubber, gutta-percha, skins, and of all kinds of wood. Wooden boats are usually built either smooth or lap-streak, that is, where the upper plank laps over the next lower. Boats differ much in shape and size, depending on the use to which they are to be put. Launch is the largest boat carried by a man-of-war. Long boat, used by merchant vessels for conveying heavy burdens; this name is given to the largest boat, without regard to size. Cutter, shorter and lighter than the launch, and much faster. Jolly boat, smaller than the cutter, and not so fast, used for going on shore, usually rowed with four oars. Gig, a fast-rowing boat nearly the size of the cutter, employed both in the merchant service and navy. Barge, in the English navy, about the size of the cutter. This name is given to the large boats used on occasions of state. On the Mississippi it means a scow, flat-bottomed, and of very light draught. Sometimes also applied to the large 8- and 10-oared race boats. Pinnace, smaller than the barge, used for conveying light articles. In the English navy the pinnace launch is next in size to the launch. Paddle-box boat, so called from the place where they are stowed, commonly built like a whale boat, and smaller than the cutter. Whale boat, a sharp, light boat, very wide amidships, bow and stern alike, rowed with six oars. All surf boats are whale-boat model, or modifications of it. Dory, light, flat-bottomed, very sharp, with sloping sides, from 15 to 20 feet long, used very extensively in the fisheries. Wherry, in the United States, a dory; in England, a race boat for one rower, and from 15 to 30 feet long. Skiff, a little boat for crossing rivers, or going on shore from a vessel. Cobble, a small fishing boat, flat-bottomed. Punt, a flat-bottomed, decked boat, of very light draught, used chiefly by gunners. Shallop, small ship's boat; term not now used. Scow, a broad flat-bottomed boat, with square bow and stern, for conveying heavy weights, propelled by poles or sweeps, from 30 to 50 feet long, and 12 to 18 feet wide. Canal boat, a broad shallow boat, like the scow, except in having a keel and a rather sharper bow, used only on canals. Flats, flat boats, arks, etc., boats resembling scows, save in being decked. They are still to be found on the Mississippi and its tributaries, and are used for bringing all kinds of produce down the river. Bateaux, boats smaller than the scow, and used in the same way. Gondola, in the United States, a scow; properly, a very sharp, fast boat, sculled with one oar. Moses, large flats, used in the West Indies for taking molasses hogsheads from shore to ship. Felucca, a large boat with lateen sails, decked, and rowing from 10 to 16 banks of oars. Life-boats, boats used in storms for saving life. (See LIFE-BOAT.) Dingy, a wooden life-boat, carried by a man-of-war, has wooden air-chambers at each end, and is about 18 feet in length. Waist boats and quarter boats take their name from the part of the vessel where they are kept, and are somewhat smaller than the cutter. Race boats differ very much in shape from any of those before named. Having only speed in view, they are built as light, narrow, and sharp as possible. They are rowed with from 2 to 12 oars, and are from 15 to 70 feet in length, and generally not more than eight inches above water. The two-oared boats are called shells, sculls, or wherries; the larger ones sometimes barges.

Boatbill, a South American heron (*Cancroma cochlearia*), having a remarkable bill, suggesting in its broad, inflated shape an upturned boat, the keel of which is represented by the ridge of the culmen. The bird is about the size of a night-heron, but with shorter legs. Its general color is reddish-gray, with black and white markings. The back of the head and neck are covered with elongated, erectile feathers. A naked gular pouch hangs beneath the lower jaw. It feeds upon worms, crabs, and other small aquatic animals caught in muddy shallows. Another species (*Cancroma zelendom*) inhabits Central America.

Boat-fly (*Notonecta glauca*), an aquatic hemipterous insect which swims on its back; the hind-legs aptly enough resembling oars, the body representing a boat; hence the name. It frequents stagnant waters, swimming rapidly on the surface, but diving below whenever the water is disturbed. In color it is gray and black, with greenish elytra and white wings. The small insects which constitute its food are devoured in very large numbers. The female usually deposits the eggs on the stems and leaves of aquatic plants.

Boatswain Bird, or **Marlin-spike,** either of two species of a sea-wandering bird, so called because of the long, pointed feathers in its tail, which resemble a marlin-spike, the boatswain's badge of office. One is the skua-gull (*Stercorarius parasiticus*), and the other a tropic bird (q.v.).

Bo'az, a wealthy Bethlehemite, who took upon himself the duty of providing for Ruth, as the near relation of her dead husband, Elimelech. From him Jesus Christ was directly descended.

Bob-white. See QUAIL.

Bo'bac, a European and Central Asian gregarious marmot (*Arctomys bobac*), resembling the American woodchuck in habits and appearance, but smaller.

Bobadilla, Francisco de, frän thēs'kō dė bō-bä-dēl'yä, Spanish soldier: d. 29 June 1502. In the year 1500 he was selected as a commissioner to enquire into the condition of the new Spanish colony of Hispaniola, and especially into the complaints which had been made against the administration of Columbus (q.v.). He was entrusted with unlimited powers, which he immediately exercised by arresting Columbus, putting him in chains, and sending him to Spain. He next abolished the regulations which had been enacted by Columbus, and indulged the colonists in all the excesses of power, and, above all, in boundless oppression of the natives. The unexpected outrage upon the most noted man of the time excited general

indignation in Spain, and was regarded as a national dishonor. Orders were accordingly sent for the recall of Bobadilla, and when Columbus, now reinstated in his honors and emoluments, made his fourth landing in Hispaniola, the fleet bearing Bobadilla and other enemies of Columbus started for Spain. A fearful tropical hurricane wrecked the ships, and Bobadilla perished.

Bobbin, a reel or other similar contrivance for holding thread. It is often a cylindrical piece of wood with a head, on which thread is wound for making lace; or a spool with a head at one or both ends, intended to have thread or yarn wound on it, and used in spinning machinery (when it is slipped on a spindle and revolves therewith) and in sewing-machines (applied within the shuttle).

Bobbinet, a lace, with a hexagonal eyelet, manufactured by machinery, in imitation of the lace made on a pillow.

Bob'bio, Italy, a small town in the province of Pavia, the seat of a bishop, with an old cathedral, and formerly a celebrated abbey founded by St. Columbanus, in the library of which was a famous collection of manuscripts now divided between the Vatican and the Ambrosian Library at Milan. The population of the commune is about 5,000.

Boboli (bō'bō-lē) **Gardens,** the grounds of the Pitti Palace at Florence, planned in 1550 by Eleanora of Toledo. They contain many fine statues and the Isoletto fountain, designed by Jean de Bologne.

Bobolina, bō-bō-lē'nä, a heroic Greek woman; d. 1825. Her husband was put to death at Constantinople in 1812 by order of the Sultan, and Bobolina vowed revenge. At the beginning of 1821 she fanned the flames of insurrection among the Greek population in Turkey, equipped at her own expense three ships, herself taking command of one bearing her flag, as admiral, and giving the others to competent captains, while her two sons fought against the Turks on land. In September 1821 she attended the siege of Tripolitza, to meet the Peloponnesian leaders there assembled. She put her ships at the disposal of the government and maintained the blockade of Nauplia for 14 months, until the Turks were forced to capitulate. She then proceeded, with a small Greek fleet, which was entrusted to her charge, to the coasts of Morea, and during the siege of Monemvasia, when one of her nephews lost his life, she did not even waste one hour upon him, but quietly drawing a cloak over his body, avenged his death by continuing to bombard the city. After the war she lived with her brothers at Spezzia. In 1825 her house was attacked by the friends of a young lady who was supposed to have been dishonored by some member of her family, and she was killed by a rifle shot fired by one of the assailants.

Bob'olink, an oriole of the family *Icteridæ,* found in plains, prairie-lands, meadows, and cultivated fields throughout the entire United States, except on the Pacific coast. The male is 7.7 inches long, its tail taking up fully half of its length. It is distinguished from the blackbirds and other orioles by its pointed tail-feathers, long middle toe, and variegated plumage. The male has two distinct sets of plumage, a summer or breeding dress, and a winter one. The former dress is lustrous black, with the neck, scapulars, rump, and upper tail coverts buff, inclining to ochraceous on the neck, and ashy on the tail; the latter is similar to that of the female, who is protectively clothed in much-streaked yellowish-brown neutral tints; the young of both sexes also resemble her, until the young males reach maturity. The gay summer dress of the male, especially the black part, is due to the black margins upon the feathers that come in with the spring renewal of plumage. These edges wear away, and thus, as the season advances, the brownish centres of the feathers are gradually revealed. The song of the male is a varying melody, an incessant outpour of ecstatic music, in which one detects distinctly enunciated the word "bob-o-link." Its excited manners are as peculiar as its song, which often bubbles out of its beak as it flutters and dances in mid-air. As the summer advances and the plumage changes, the song diminishes, and finally ceases altogether.

Their nests consist of grasses neatly and skilfully entwined, and ingeniously hidden among the stems and leaves of plants, and are guarded carefully and most jealously by the male, whose exuberant pride in the four or five dull-white, flecked, and marbled eggs is remarkable. The bobolink goes in summer as far north as the banks of the Saskatchewan, but is most plentiful in the northeastern States, where it renders good service by the destruction of insects and their larvæ. It begins to migrate southward in August, and assembles in huge flocks in early autumn in the great wild-rice marshes that border Delaware and Chesapeake bays and their rivers, where they fatten on the wild rice, and are shot in vast numbers for market, under the name of "reedbird." Later in the season these birds advance southward and assail the cultivated rice plantations, where they are known as rice-birds and would ruin the crops, partly by eating, but mainly by breaking the stalks and shaking out the grain, were they not constantly killed or scared away by thousands, by men and boys who are employed to shoot them. On their return from the tropics in the spring they also attack the young plants. In consequence of this necessary persecution in the rice fields the species has been seriously diminished of late years, and bobolinks are becoming rare in many parts of the United States and Ontario. On account also of their beauty and powers of song, many are caught, caged, and sold in the bird-stores.

Bobruisk, bō-brōō'ęsk, Russia, a fortified town in the government of Minsk, on the right bank of the navigable Beresina, at its junction with the Bobruisk, 108 miles southeast of Minsk, with which it is connected by rail. By steam navigation it is connected with stations on the Dnieper and the Beresina. The chief exports consist of timber and grain. The place was fortified by Alexander I., and the defenses were extended by Nicholas I., who raised it to the position of a fortress of the first rank. In 1902 an extensive conflagration nearly destroyed the town. Pop. (1902) 26,000.

Bobs, a nickname given by English soldiers to Gen. Lord Roberts (q.v.).

Bocaue, bo-kow-a, Philippines, a town in the province of Bulacan, Luzon, situated a few miles east of Manila Bay, near the city of Bulacan, and near the railroad line.

Boccaccino, Boccaccio, bŏk-kächō bŏk-kächē'nō, Italian painter: b. Cremona, 1460; d. 1518. Few details of his life are known. He came under the influence of Mantegna, and in his school in Cremona numbered Benvenuto Garofalo among his pupils. In 1497 he painted a series of frescoes in St. Agostino in his native city, but he is better known by his frieze in the cathedral. This represents the birth of the Virgin and various incidents in her life. Among his paintings are: 'Marriage of St. Catharine,' in the Venice Academy; 'Virgin and Two Saints,' in San Quirilo, Cremona, and a 'Holy Family,' in the Louvre, Paris. He committed suicide.

Boccaccio, Giovanni, jō-vän'nę bōk-käch'ō, Italian novelist: b. 1313, in Paris or Florence; d. Certaldo, 21 Dec. 1375. His family was originally of Certaldo, but his father being engaged in commerce, removed to Florence, where he amassed wealth, and filled several important public offices. Very early in life Giovanni displayed a remarkable aptitude for learning, and before he was seven years old, composed verses with perfect facility. He was placed under the care of an eminent master, Giovanni da Strada, but his father having determined on a commercial career for his son, removed him from his tutor before his Latin course was completed, and as soon as he had acquired a sufficient knowledge of arithmetic apprenticed him to a merchant, with whom he remained six years. His master finding that he profited nothing, although he made in his company several commercial journeys, finally in despair sent him back to his father, and was accustomed to regard him as a very narrow-minded youth. His father discovering that his son would never make a merchant, thought that his studious habits might serve him in the legal profession. But the law proved as distasteful as commerce, and the father, finding that the law had little attraction for Giovanni, forced him to return to commerce, and fix his residence in Naples. The king, Robert of Anjou, a friend and patron of Petrarch, was greatly devoted to literature, and thus drew to his court the most eminent scholars of Italy. Boccaccio was well acquainted with Giovanni Barrili, a man of erudition, and Paolo of Perugia, the king's librarian, and excited by their example and encouragement, he entirely abandoned commerce and gave himself up to the pursuit of learning. His father gave his consent only on the condition that he should study the canon law, and although against his disposition, he applied himself to it for some time, took his doctor's degree, and after that found himself more at liberty to indulge his passion for poetry, while at the same time he devoted himself to the higher branches of philosophy, astrology, then a favorite study, and to the fathers of the Church. He remained eight years in Naples, and during his stay there was filled with desire of distinction by the visit of Petrarch on his way to Rome, where he had been decreed the honor of the laurel crown. Boccaccio marked with delight the splendid reception given to Petrarch, his examination of three days, his noble oration, and the applause which followed, but was far more pleased in after years to make the acquaintance of the illustrious poet, with whom he formed a life friendship. Boccaccio was naturally fond of gay company, and fell in love with the princess Mary, illegitimate daughter of King Robert, and half-sister of the celebrated Joanna of Naples. She was married to a Neapolitan gentleman, but at once ardently returned Boccaccio's love and became his avowed mistress. At her instance, he composed his romance of 'Il Filocopo,' and 'L'Amorosa Fiammetta,' in the latter of which his lady, under the name of Fiammetta, bewails the loss of Pamphilo, supposed to represent himself. The 'Filocopo' is not skilfully constructed, and is filled with spectres and visions of every kind, and the powers of darkness are summoned before the reader to account for its scenes and incidents. Yet it contains passages of that wondrous grace and vivacity afterward so signally displayed in the 'Decamerone,' and touches of human nature in which the whole character is pictured in a single sentence. While thus employed at Naples he was suddenly summoned to Florence by the illness of his father. His separation from the princess Mary appears to have affected both lovers with violent sorrow, and it was only by the composition of the romance of 'Ameto' that he could console himself during his absence. His father's recovery and marriage set him again at liberty to return to the favors of his adored princess. He was not only happy from his connection with the princess Mary, but possessed the favor of Acciajuoli, who had great power in Naples, and even the regard of Queen Joanna herself. It is asserted on respectable authority that many of the most licentious passages in the 'Decamerone' were written in conformity with the taste and by the command of the queen. His father died in 1350, leaving a son by his wife Bice dei Bosticchi, who was also dead, to the care of Boccaccio. The poet faithfully attended to his trust, and becoming acquainted with Petrarch, the latter's example and influence began very shortly to act upon the mind of his younger friend, who from the date of their friendship commenced to turn his thoughts more from licentious pleasures to purer fame. Being now permanently settled in Florence, Boccaccio, by Petrarch's advice, began to take some interest in the affairs of state. His motives were appreciated, however, and he was sent on an embassy to Padua, to invite Petrarch to accept the presidency of the university. Several other missions followed, and in April 1353, he took part in one to Pope Innocent VI., the papal court then residing at Avignon. In the same year was published his 'Decameron' or 'Io Days' Entertainment,' one of the most extraordinary works of genius ever written, and which after the lapse of five centuries is still regarded as one of the purest specimens of Italian prose, as an inexhaustible repository of wit, beauty, and eloquence, although unhappily deformed with licentious descriptions. While occupied with these popular compositions, Boccaccio did not lose sight of higher pursuits in literature. Like Petrarch he was a devoted collector of ancient manuscripts, and a diligent student of the classics. On one occasion Boccaccio visited Monte

Cassino, within whose monastery he knew many works had been collected, which had escaped the ravages of the barbarians, but found, to his amazement, that they were suffered to rot in a damp loft exposed to the weather, and that frequently when the monks were in want of money, they took some of the manuscripts, obliterated the writing, replaced it by copying on the parchment some part of the ritual, and then sold the new productions among the people of the neighborhood. To such collectors as Petrarch and Boccaccio, and to the latter pre-eminently, the world owes a debt of gratitude for the rescue of many of the great classic works which otherwise would have been irretrievably lost. In 1359 the author of the Decameron visited Petrarch at Milan, conversed with him, as he informs us, at great length on the subjects of morality and religion, and determined to devote himself more seriously to holy studies. This resolve received additional stimulus in 1362 from a singular circumstance. A monk from the Carthusian monastery at Sienna came to visit him, saying that he was charged with a message to him from Father Petroni, who on his death-bed, although he had never seen Boccaccio, declared that he knew him in spirit, and commissioned the monk to exhort him to repentance. In order to prove the truth of his words, the monk told Boccaccio of a circumstance in his life which the poet thought known only to himself. So great was the effect of this warning, that he determined to abandon poetry, sell his library, and lead a life of penance and meditation. With this view he wrote to Petrarch, supposing that his sudden purpose would meet with kindred enthusiasm, but his friend answered in a strong, common-sense letter, instructing him to receive the warning to repentance, but informing him that there was no necessity for selling his books or abandoning his studies. Boccaccio accordingly wrote in a strain altogether free from his former one, while he assumed the ecclesiastical habit, and applied himself to theology. With disinterested generosity a large part of his means was dissipated in the collection of Greek manuscripts, his emissaries visiting many parts of Europe to procure them. His fortune was thus gradually impaired, and toward the decline of life he found himself poor and deserted by all his friends, except the noble-minded and constant Petrarch. That great poet wished his friend to take up his abode with him, but Boccaccio preferred independence, and declined the offer, although he visited Petrarch whenever he found an opportunity. In 1363 he was invited to Naples by the grand seneschal Acciajuoli, but was so hurt by his cold reception, that he soon left and went to Venice to meet Petrarch. On returning to Florence he found its turbulent state of society in little accordance with his wish of retirement, and took up his abode in a little cottage in Certaldo, in the vale of Elsa, dear to him as the birthplace of his family. From this retreat he was soon summoned by the chief citizens of Florence, to undertake an embassy to Urban V. at Avignon, and repairing to the papal court he experienced the most flattering reception. He was again sent to Urban in 1367, after the pontiff had removed to Rome, when the character of Boccaccio had so completely changed from his former looseness, that he was characterized by the bishop of Florence as one in whose purity of faith he had the utmost confidence. He was now honored by the Florentine magistrates with a professorship founded in memory of Dante, for the better explication of the 'Divina Commedia.' His lectures commenced in October 1373, and continued until his death, which was doubtless hastened by the demise of Petrarch 10 months before his own. In eloquent language he bewailed his loss. Boccaccio wrote numerous works in Italian and Latin, and both in prose and poetry, few of which are referred to at the present day; his great fame rests upon the Decameron. In these hundred tales of love, displaying the most wondrous fertility of invention, the reader is perpetually delighted with the beauty of the narrative and the variety of the scenes, whether of intrigue, wit, or pathos — no two stories, nor even their introductions, resembling each other. The author's fondness for involving friars in every imaginable scene of mischief and ludicrous mishap, created great scandal to the Church, and his famous romance, the tenth novel of the sixth day, in which "Friar Onion promises some country people to show them a feather from the wing of the angel Gabriel, instead of which he finds only some coals, which he tells them are the same that roasted St. Lawrence," drew down the solemn anathema of the council of Trent. The editions of the Decameron are almost innumerable, and translations exist in all the languages of Europe. The earliest editions are extremely rare, and of that of Valdarfer in 1471, only one copy is known. Boccaccio's poem, 'Il Teseide' is written in the *ottava rima*, of which he is usually considered as the inventor, and is the first Italian poem which presents a specimen of the epopee. Chaucer borrowed from this poem his "Knight's Tale," and Shakespeare a part of his 'Midsummer Night's Dream.' The great English dramatist has also, in some measure, availed himself of Boccaccio's Decameron, as in 'Cymbeline' and 'All's Well that Ends Well.' With all his faults, we may consider Boccaccio one of the great revivers of learning and a benefactor to mankind, as well as worthy of the third place in that great triumvirate with Dante and Petrarch, "which renders the 14th century so splendid an epoch in the history of literature." See Cochin, 'Boccaccio, études italiennes' (1890), Symonds, 'Giovanni Boccaccio as Man and Author' (1895).

Boccage, Marie Anne Fiquet du, mä-rē ăn fē-kā dü bŏk-käzh (Le Page) French poetess: b. Rouen, 22 Nov. 1710; d. there, 8 Aug. 1802. She was educated in Paris, in a nunnery, where she discovered a love of poetry. Her first published work, a poem on the mutual influence of the fine arts and sciences, appeared in 1746, and gained the prize from the Academy of Rouen. She next attempted an imitation of 'Paradise Lost,' in six cantos; then of the 'Death of Abel'; next, a tragedy, 'The Amazons'; and a poem in 10 cantos, called 'The Columbiad.'

Madame du Boccage was praised by her contemporaries with an extravagance for which only her sex and the charms of her person can account. *Forma Venus, arte Minerva,* was the motto of her admirers, among whom were Voltaire, Fontenelle, and Clairaut. There is a great deal of entertaining matter in the letters which she wrote on her travels in England and Holland. She was a member of the academies of Rome, Bologna, Padua, Lyons, and Rouen. Many of her works have been translated into English, Spanish, German, and Italian.

Boccanera, Simone, sē-mō'nā bŏk-kä-nā'-rä, first doge of Genoa: d. 1363. He was born of an illustrious noble family, but early took part with the democratic party and gained great popularity by undertaking the defense of the people against the nobles. During a commotion caused by the severity with which Philip of Valois had punished a mutiny on board some Genoese galleys in the service of France, the people wished to appoint Boccanera their abbé, an office which appears to have been similar to that of the tribunes at Rome. Boccanera declined to accept, on the ground that his noble birth would not allow him to become a plebeian magistrate. The excuse only made the people more determined to place him at their head and as he would not be abbé they by acclamation hailed him doge. The office, thus introduced into Genoa for the first time in 1339, was exercised by Boccanera till 1344, when the ascendency of a faction opposed to him obliged him to abdicate and retire to Pisa. He afterward regained the office in 1356, and had held it for seven years, when his enemies succeeded in destroying him by poison.

Boccherini, Luigi, loo-ē'jē bŏk-kā-rē'nē, Italian composer of instrumental music: b. Lucca, 14 Jan. 1740; d. Madrid, 28 May 1805. He received his first instruction in music and on the violoncello from his father and the Abbé Vanucci, music-master of the archbishop. He further improved himself in the art at Rome, and afterward went, with Filippo Manfredi, his friend and countryman, to Spain, where he met with but indifferent patronage, and latterly suffered greatly from indigence. Previous to 1797 the king of Prussia, Frederick William II., who was a great lover of the violoncello and admired Boccherini's compositions, had paid him a pension on condition of his sending him yearly some of his quartets and quintets. The compositions which Boccherini published himself consist of symphonies, sestets, quintets, quartets, trios, duets, and sonatas for the violin, violoncello, and pianoforte. He never composed anything for the theatre; and of church compositions we find but one, his 'Stabat Mater.' The adagios of Boccherini excited the admiration of the connoisseurs and the despair of the composers of his time. He may be regarded as a sort of minor Haydn, and he was the first who wrote instrumental quartets, of which all the parts are *obbligato,* and determined the true character of this species of music. His melodies are more highly esteemed in England, France, and Spain than in Germany.

Bocchetta, bŏk-kĕt'tä, Italy, a pass of the Apennines, leading from Lombardy to Genoa, and traversed by the road from Novi. In the Austrian war of succession (1746–7), and in the French wars toward the end of the 18th century, it was the scene of several important events.

Bocconia, or **Plume Poppy,** a genus of four or five species of plants of the natural order *Papaveraceæ. P. cordata,* a native of Japan and China, is the only species of special merit. It is a hardy perennial herb with large leaves similar to those of bloodroot, and small usually pinkish apetalous flowers borne in large terminal panicles rising like spires from four to eight feet above the dense foliage. Where known, it is a favorite in borders and shrubberies and is also largely used upon lawns for its remarkable appearance. It is very much sought by bees, and should prove a valuable bee-forage, since it will thrive almost anywhere. It is readily propagated by seeds, divisions of the root, and by suckers. If set in rich soil the plants will attain the greatest size and attractiveness.

Bochart, bō-shär, **Samuel,** French divine: b. Rouen, 1599; d. Caen, 16 May 1667. He was son of a Protestant minister descended from an illustrious family, and gave proof of precocious talents by composing, at the age of 14, a Greek poem in praise of his master, Thomas Dempster, who was so much pleased with it that he published it at the head of his work on Roman antiquities. He afterward studied philosophy and theology at Sedan, visited England and Leyden, and, returning to France about 1628, became Protestant minister of Caen, a post which he held till his death. Shortly after, a Jesuit of the name of Veron, who had been specially trained to controversy, and had received a diploma entitling him to travel the country and debate the points of difference between the Protestant and Roman Catholic churches, challenged Bochart to a discussion. It took place in 1629, in the castle of Caen, in presence of the Duc de Longueville, governor of Normandy, and a large assemblage of nobility and gentry, and had continued for 11 days, when Veron, without waiting to bring it to a close, judged it prudent to take his departure. The debate was published by Bochart under the title of 'Actes de la Conférence Tenue à Caen.' His next work, entitled 'Geographia Sacra seu Phaleg et Chanaan,' added so much to his reputation that Christina, queen of Sweden, sent him a letter in her own hand, inviting him to Sweden. He accepted the invitation, and had for his traveling companion the celebrated Huetius, afterward Bishop of Avranches, and author of an excellent work on the Christian evidences, entitled 'Demonstratio Evangelica.' On his return to Caen in 1653 he learned that an academy had been founded there in his absence. He immediately joined it, and was afterward one of its most distinguished members. Bochart's next great work is entitled 'Hierozoicon, or an Account of the Animals mentioned in Scripture.' It was scarcely completed when its distinguished author, while addressing the academicians of Caen, was struck with apoplexy and died almost instantaneously. His health had previously given way under grief for the loss of a daughter, his only child. Besides the works above mentioned, he wrote several others, among which is a 'Letter to Dr. Morley,' written, it is said, at the request of King Charles II., and discussing three important questions — De Presbyteratu et Episcopatu; De Provocatione a Judiciis Ecclesiasticis; De

Jure et Potestate Regum. Bochart's principal works are still standards on the subjects of which they treat.

Bochnia, bŏH'nē-ą, Austria, a town in the government of Lemberg, Galicia, near the Raba, 25 miles east-southeast of Cracow. It is tolerably well built, with several churches, a gymnasium, a grammar and other schools, and a board for the regulation of mines and saltworks. The salt mines here employ 500 persons, and yield 15,000 tons per annum. Pop. about 9,000.

Bochum, bŏH'oom, Prussia, a town in the government of Arnsberg, province of Westphalia, five miles east-northeast of Essen and between 20 and 30 miles northeast of Düsseldorf. It is on the railway from Dortmund to Duisburg, and has manufactories of iron, steel, hardware, carpets, tobacco, etc. Pop. (1895) 65,980.

Bock, Jerome, German botanist, better known under his Latin name of Cragus: b. Heidesbach, 1498; d. Harnbach, 1554. He was a schoolmaster, and then a physician. Bock may be considered as one of the founders of modern botany; he was the first who endeavored to form a natural botanical arrangement. He is the author of a Herbal of German Plants.

Bock, Karl Ernst, German anatomist: b. Leipsic, 1809; d. 1874. He studied at the University of Leipsic and at the outbreak of the Polish revolution he went to Warsaw, where he acted as hospital physician, first in the Polish service and later in the Russian. On his return home he was elected extraordinary professor in the University of Leipsic. His works attained popularity and have been translated. His title to fame rests chiefly on his 'Handbook of Human Anatomy.'

Bock Beer, a strong beer, the first drawn from the vats in the spring, when the winter's brew of lager beer is broached. See Beer; Brewing.

Böcklin, bĕrk-lĭn, **Arnold,** German painter: b. Basel, 16 Oct. 1827; d. 1901. He studied at the Düsseldorf Academy and also at Brussels, Paris, and in Italy, devoting himself mostly to landscape painting. A contract to decorate the dining-hall of a villa summoned him to Hanover; in 1856 he went to Munich, where Count Schack became his patron. In 1858 he became teacher in the art school at Weimar; in 1866–71 he was in Basel; in 1871 he returned to Munich and lived also in Zurich and Florence. He is in the first rank of landscape painters, showing a real poetic power and wealth of coloring, yet his most poetical conceptions in landscape painting are often marred by the figures introduced. Among his most notable paintings are 'Venus Reposing'; 'Pan in the Rushes'; 'Castle by the Sea Surprised by Corsairs'; 'Villa by the Sea'; and 'The Isle of the Blessed.'

Bocland, Bockland, or **Book-land,** one of the original English modes of tenure of manorland which was held by a short and simple deed under certain rents and free services. This species of tenure has given rise to the modern freeholds.

Bocskay, bŏch'kō-e, **Stephen,** Hungarian national leader: b. 1556; d. 1606. In 1604, when the Emperor Rudolf II. attempted to suppress Protestantism in Hungary, a rebellion broke out, and Bocskay joined the malcontents and became their leader. He was well supported by the people, drove back the emperor's troops, and was made Prince of Transylvania. In 1606 he concluded the Peace of Vienna with the emperor, and this secured religious freedom to Hungary for a long time.

Bode, Johann Ehlert, yō'hän ā'lĕrt bō'da, German astronomer: b. Hamburg, 19 Jan. 1747; d. 23 Nov. 1826. He gave the first public proof of his knowledge by a short work on the solar eclipse of 5 Aug. 1766. The approbation which this received encouraged him to greater labors, and in 1768 appeared his 'Introduction to the Knowledge of the Starry Heavens' (9th ed. 1822). In 1772 the Berlin Academy chose him their astronomer, and 10 years afterward he was made a member of that institution. His best works are his 'Astronomical Almanac' (commencing 1774),—a work indispensable to every astronomer,—and his large 'Celestial Atlas' in 20 sheets, in which the industrious editor has given a catalogue of 17,240 stars (12,000 more than in any former charts). In 1825 he was released, at his own wish, from his duties in the Academy of Science and the observatory in Berlin. His place was filled by Professor Encke. His empirical law as to the distance of the planets is well known. See Bode's Law.

Bode's Law, an empirical law formulated by the German astronomer Bode (q.v.) to give the arithmetical relation subsisting between the distances of the planets from the sun. It may be thus stated: Write, in the first instance, a row of fours, and under these place a geometrical series beginning with 3, and increasing by the ratio of 2, putting the 3 under the second 4; and by addition we have the series 4, 7, 10, etc., which gives nearly the relative distances of the planets from the sun.

4	4 3	4 6	4 12	4 24	4 48	4 96	4 192	4 384
4	7	10	16	28	52	100	196	388

Thus, if 10 be taken as the distance of the earth from the sun, 4 will give that of Mercury, 7 that of Venus, and so forth. The actual relative distances are as follows, making 10 the distance of the earth:

Mercury	Venus	Earth	Mars	Asteroids	Jupiter	Saturn	Uranus	Neptune
3.9	7.2	10	15.2	27.4	52.9	95.4	192	300

Close as is the correspondence between the law and the actual distances, no physical reason has been given to account for it, although there is little room for doubt that such exists. Kepler was the first to perceive the law, and Bode argued from it that a planet might be found between Mars and Jupiter, to fill up the gap that existed at the time in the series. The discovery of the planetoids has proved the correctness of this prediction.

Bodenstedt, Friedrich Martin von, frē'drĭH mär-tēn fŏn bō'dĕn-stĕt, German poet and miscellaneous writer: b. 1819; d. 1892. He studied at Göttingen, Munich, and Berlin, and became tutor to the young Prince Gallitzin at Moscow. Having obtained an educational appointment at Tiflis he published a work on the peoples of the Caucasus (1848), and 'A Thou-

sand and One Days in the East' (1849–50), which were very successful. In 1854 he was appointed professor of Slavic at Munich, and in 1858 was tranferred to the chair of Old English. He subsequently was theatrical director at Meiningen, and traveled and delivered lectures in the United States. Among the best of his poetical works are the 'Songs of Mirza-Schaffy,' purporting to be translations from the Persian, but really original, which have passed through more than 150 editions. He published translations from Marlowe, Ford, Webster, and other contemporaries of Shakespeare, translated Shakespeare's 'Sonnets,' and with other writers joined in a new translation of Shakespeare's dramatic works (1866–72, 9 vols.).

Bodie, or **Body's Island,** an island of sand between the Atlantic Ocean and Albemarle and Roanoke sounds. The sand shifts often, and inlets from the ocean appear and disappear. There is a lighthouse with a first-class light on the island.

Bodieron, bō-dī-ē′rŏn, a fish (*Hexagrammus lagocephalus*) of Puget Sound, similar to the rock-trout (q.v.), but having greenish-colored flesh.

Bodin, Jean, zhŏn bō-dăn, French political writer: b. Angers, 1529 or 1530; d. Laon, 1596. He studied law at Toulouse; delivered lectures on jurisprudence there, and afterward went to Paris and practised. Being unsuccessful in his profession, he turned his talents to literary labors; was invited by Henry III. to his court; and afterward traveled with the king's brother, Francis, Duke of Alençon and Anjou, to Flanders and England, where he had the gratification of hearing lectures in Cambridge on his work, 'De la République,' originally written in French, but afterward translated by Bodin himself into Latin. He died of the plague.

Bodkin, Matthias M'Donnell, Irish novelist and journalist. He has written 'Poteen Punch'; 'Pat o' Nine Tales'; 'The Rebels'; 'White Magic'; etc.

Bod'kin, (1) an instrument used by women of ancient times to fasten the hair, worn at the back of the head; (2) a sharp instrument for piercing holes in cloth; (3) a blunt instrument with an eye, for drawing tape, etc., through hems; (4) a small tool used by printers.

Bodle, a copper coin formerly current in Scotland, of the value of two pennies Scotch, or the sixth part of an English penny. It is said to have been so called after a mint master named Bothwell.

Bodleian (bŏd-lē′an) **Library,** the public library of the University of Oxford, so called from Sir Thomas Bodley (q.v.) who restored it toward the close of the 16th century, many of the previous collections of books and manuscripts having been destroyed during the reign of Edward VI. Beside restoring the building and providing a fund of $10,000 for the purchase of books, he also presented a collection which was valued at $50,000, and left an estate for the maintenance of officers and for keeping the library in repair. For the government of the library he drew up some statutes, which were afterward incorporated with those of the University. The library was first opened to the public 8 Nov. 1602. The liberal example of Bodley was soon followed by the Earl of Essex, who presented part of the Portuguese bishop Osorius' library, which had been captured by Essex in 1596, shortly after the expedition against Cadiz. After the death of Bodley, the Earl of Pembroke added a valuable collection of Greek manuscripts procured by Baroccio, a Venetian. At later dates Sir Thomas Roe, Sir Kenelm Digby, the "learned Selden," Gough the antiquary, and Archbishop Laud, made donations of valuable Greek, Oriental, and German manuscripts to this magnificent library. The library of the Hebrew scholar Oppenheim, rich in rabbinical lore, a great collection of Eastern manuscripts, of early editions of the Bible, original editions of ancient and classic authors, together with 50,000 dissertations by members of foreign universities, and an extensive collection of medals, coins, prints, etc., were also subsequently deposited in this library. In 1809, Clarke, the traveler, gave to it some rare Greek and Latin manuscripts, including a 'Plato' from the Isle of Patmos. In 1818 an exceedingly valuable collection of Hebrew, Greek, and Arabic manuscripts procured from Venice, was added, together with a portion of the famed library of Richard Heber (1834), and lastly, the rare books, manuscripts, and coins of the scholar, antiquary, and Shakespearean commentator, Francis Douce. This renowned library, in fine, is rich in many departments in which other libraries are deficient, and forms altogether the noblest collection of which any university can boast. It is constantly increasing by donations, by copies of every work printed in the United Kingdom, as well as by books purchased from the fund left by Bodley, by fees received at matriculation, and by an annual payment of all persons (servitors excepted) who have the right of admission to the library. It is now estimated to contain upward of 500,000 bound volumes, and between 30,000 and 40,000 manuscripts. The first catalogue of the printed books was issued by Dr. James in 1605.

Bodley, Sir Thomas, English scholar, and founder of the Bodleian Library (q.v.) at Oxford: b. Exeter, 1544; d. London, 1612. He was educated partly at Geneva, whither his parents, who were Protestants, had retired in the reign of Queen Mary. On the accession of Elizabeth they returned home, and he completed his studies at Magdalen College, Oxford. He afterward became a Fellow of Merton College, and read lectures on the Greek language and philosophy. He went to the Continent in 1576, and spent four years in traveling. He was afterward employed in various embassies to Denmark, Germany, France, and Holland. In 1597 he returned home and dedicated the remainder of his life to the re-establishment and augmentation of the public library at Oxford. This he accomplished, procuring books and manuscripts himself, both at home and abroad, at a great expense, and by his influence and persuasion inducing his friends and acquaintances to assist in his undertaking. Sir Robert Cotton, Sir Henry Savile, and Thomas Allen the mathematician, were among the principal contributors on this occasion. The library was so much augmented that Sir Thomas Bodley, who was knighted at the accession of James I., was induced to erect an additional structure for the reception of

the increasing quantity of valuable books and manuscripts. He was interred in the chapel of Merton College, in the university. He bequeathed nearly the whole of his property to the support and augmentation of the library. See 'Reliquiæ Bodleianæ' (London, 1703).

Bodmer, Georg, gā-orH bŏd'mār, Swiss mechanic: b. Zürich, 6 Dec. 1786; d. Zürich, 29 May 1864. He invented the screw and cross wheels; and made valuable improvements in firearms and in various kinds of machinery, particularly in that of wool-spinning.

Bodmer, Johann Jakob, yō'hän yä'kōb, German poet and scholar: b. Greifensee, near Zürich, 19 July 1698; d. Zürich, 2 Jan. 1783. Although he produced nothing remarkable of his own in poetry, he helped to open the way for the new German literature in this department, which was then in a low and barbarous state. He was the antagonist of Gottsched in Leipsic, who aspired to be the literary dictator of the day, and had embraced the French theory of taste, while Bodmer inclined to the English. He has the honor of having had Klopstock and Wieland among his scholars. Bodmer was for a long time professor of history in Switzerland. He was a copious and indefatigable writer, though he entertained many incorrect views.

Bodoni, Giambattista, jäm-bät-tēs'tä bō-dō'nē, Italian printer: b. Saluzzo, Piedmont, 1740; d. Padua, 29 Nov. 1813. His father owned a printing establishment at Saluzzo, and he began, while yet a boy, to employ himself in engraving on wood. His labors meeting with success, he went in 1758 to Rome, and was made compositor for the press of the Propaganda. By the advice of the superintendent he made himself acquainted with the Oriental languages, in order to qualify himself for the kind of printing required in them. He made himself of great service to this press by restoring and putting in place the types of several Oriental alphabets which had fallen into disorder. The Infante, Don Ferdinand, about 1766, had, with a view of diffusing knowledge, established a printing-house in Parma, after the model of those in Paris, Madrid, and Turin. Bodoni was placed at the head of this establishment, which he made the first of the kind in Europe, and gained the reputation of having far surpassed all the splendid and beautiful productions of his predecessors in the art. The beauty of his type, ink, and paper, as well as the whole management of the technical part of the work, leaves nothing for us to wish; but the intrinsic value of his editions is seldom equal to their outward splendor. His Homer is a truly admirable and magnificent work; indeed, his Greek letters are the most perfect imitations of Greek manuscript that have been attempted in modern times. His splendid editions of Greek, Latin, Italian, and French classics are highly prized. He was a member of several academies of Italy and knight of several orders.

Body and Mind, in philosophy, the problems of the reality of mind and body, and of the relations conceived to exist between them. Mind and body, positing temporarily their reality, may first be regarded from the point of view of correlated action. Generally experience reveals indisputably the intimate relation which exists between the constitution and modifications of bodily functions and the character and alterations of consciousness. Consider the following: the dependence of certain forms of consciousness upon the functioning of the senses; modifications due to injury by a blow, on lesion in the cerebral cortex; effect of loss of sleep upon attention; effect of the use of certain drugs; pleasures and pains resulting from functioning of sense; feeling of effort which accompanies bodily work; the phenomena of sleep; diseases of memory and will, double personality; phenomena of hypnotism, hallucination, etc.; the evidence from heredity, sexual differences, and other allied phenomena. All these, as facts, afford an indisputable conclusion concerning the correlated action of mind and body.

But difficulties arise as soon as we undertake to state the nature of the relations which exist between them. The general truth which the phenomena referred to appear to establish, that every psychosis has its concomitant neurosis and every neurosis a concomitant psychosis, is not entirely borne out in fact. The former part of the statement is indubitable; the latter by no means so. Mental activity always involves nervous activity, but the nervous system does work other than that connected with mind. Moreover the precise interconnections of mental fact with cerebral fact, and *vice versa,* is not only not known, but the specific character of the neurosis concomitant with the psychosis is perhaps impossible of final analysis. But until these phenomena are understood, the nature of the relations of body and mind cannot be finally determined. However, physiological psychology has successfully established certain general conclusions concerning the existence of uniform relations between concomitant psychical and neural processes. The most obvious of these is the time-order or synchronous occurrence of the two series of events. The remainder are concerned, in the main, with variations of intensity, quality, combination, and complexity. Qualitative psychical differences, however, are not accompanied by corresponding differences of molecular movement. These are quite different from the corresponding sensational differences.

Philosophical systems, from the days of Greek thought (see ANAXAGORAS; ARISTOTLE) down to the present, have taken up the problem where psychology leaves off. These systems may be divided into dualism and monism. According to dualism, the first and crudest theory of which was promulgated by Descartes, both mind and body are real existences, and their relations must accordingly be determined. The problem assumes two forms, the epistemological and the genetic. According to the former of these a knowledge of both body and mind is posited. Various theories concerning their interaction then arise, such as the causal relation, parallelism, pre-established harmony, and occasionalism. The first of these is not only the most important, but the philosophical conceptions concerning it may be said to strike

at the inmost heart of the problem, and their assumption determine the acceptance or rejection of general theories. Physiological psychology has demonstrated the temporal concomitance of the psychosis with the intermediate central portion of the neurosis. But we have certain neuroses revealing physiological processes devoid of conscious concomitant. Now, the question arises: How may this partial parallelism be accounted for? Is there a causal relation such as our initial phenomena seemed to indicate, or have we only the appearance of it in a general parallelism? Science has failed to afford precise answers to these questions. According to it the series of nervous events is complete in itself and self-sufficient. Hence, since antecedent events fully account for consequent ones, consciousness can have no causal action upon the neural series. Consciousness, then, is a mere accident and without determining power in any series. This gives us the doctrine of human automatism, according to which all our nervous actions are determined, and consciousness is an unnecessary attachment. On the other hand, others regard psychical phenomena as having a reality equal to that of physiological phenomena. They acknowledge, generally, the conditioning effect of nervous processes upon mental ones, but they divide again on the question of the reality of causal connection. Finally the genetic view traces its distinction of mind and body upon the dualism which a developmental theory in general appears to demand; or it accepts it as an hypothesis, uncritically examined, but convenient for practical purposes.

It is the attempted unification of mind and body which brings us to the doctrine of monism. Under this general theory we find spiritual monism, materialism, panpsychism, epiphenomenon, mind-dust, etc. The most obvious means of reconciliation is that of resolving either one of the ultimate factors into the other. The metaphysical conception of materialism is the doctrine by which all substance whatsoever is conceived of as being reduced to matter, of which conscious mind is but a product. The chief objections urged against it are: (1) that it makes our mental states, which of all knowledge we know most immediately and directly, subordinate to our indirect and inferential knowledge of things; (2) that consciousness is a reality distinct from material phenomena, and therefore incapable of being analyzed into it; and (3) that no external world is possible apart from a perceiving subject. Spiritualism, on the other hand, escapes these objections by positing mind as the primordial substance, and further regarding material things as in themselves essentially expressive of spirit. It encounters, however, certain difficulties in the concomitance and juxtaposition of its elements for which, as yet, it has afforded no adequate solution.

According to Spinoza's doctrine of monism, both spirit and matter, or the mental and the material, are posited as real, self-existent realities, but not standing independent of each other. There is a common «substance,» and in this, consciousness and extension, the fundamental attribute of external reality, find themselves connected. Hence the doctrine is neither purely materialistic nor purely spiritualistic, but includes both these theories. The parallelism which physiological psychology demonstrates, then, in the two classes of phenomena, indicates not only their ultimate inseparability, but the fact that they are but different modes of manifestation of a common substance. Manifestly, then, this doctrine calls for no interaction theory and disposes of the troublesome question of causal connection above referred to. There is no interaction, merely a parallelism. This parallelism, indeed, extends throughout all material objects, all of which thus assume a certain *mental* aspect also. It is at this point especially that monism parts company, in its speculation, from the teachings of non-speculative psychology, according to which mind and consciousness are invariably co-extensive.

Bibliography.— Bain, 'Mind and Body'; Höttding, 'Psychology,' II.; Ladd, 'Elements of Physiological Psychology,' Pt. III.; Wundt, 'Physiological Psychology,' c. XXIV.; Wentscher, 'Physische und Psychische Kausalität' (1896); Rehmke, 'Aussenwelt und Innenwelt' (1898); 'Psychological Review,' III. (1896).

Body Color, a term applied to such pigments as have body enough to be opaque, as distinguished from those which are transparent. As a rule, pigments have more body the nearer they approach to white; consequently the light parts of pictures in oil are in body color to give them brightness and strength, while the dark parts are transparent to give them depth. Water color painting, when executed by mixing the pigments with water after the manner of an oil painting, is said to be painted in body color.

Body of Liberties. See LAW.

Body-snatching. See CORPSE.

Boece, bois, **Boeis,** or **Boyce, Hector,** Scottish historian: b. Dundee, about 1465; d. 1536. Boece studied at Dundee, and then at the University of Paris, and became professor of philosophy in the College of Montaigu. Here he became acquainted with Erasmus, who professed a high esteem for him. About 1500 Boece quitted Paris to assume the principalship of the newly founded University of King's College, Aberdeen. He was also made a canon of Aberdeen. The death of his patron in 1514 occasioned his first work — a history of the prelates of Mortlach (the original see) and Aberdeen, including the life of Bishop Elphinstone, which occupies about a third of the volume. It has been reprinted by the Bannatyne and New Spalding clubs. Five years afterward appeared the work on which his fame chiefly rests, the 'History of Scotland.' The first edition is without date, but a commendatory epistle bears the date of 1527. It was written in Latin. He is distinguished by a patriotic zeal to magnify the achievements of his countrymen, and by an enlightened love of political liberty in advance of the age in which he lived. In 1527 Boece received an annual pension of 50 pounds (Scots), which was to be continued «until the king should promote him to a benefice of 100 marks Scots of yearly value.» The pension was paid till 1534, when it is supposed he received the promotion — a very unsafe

inference. The rectorship of Tyrie, which he held at his death, is, however, supposed to have been the promotion in question.

Boeckh, August, ow'goost bĕk, German classical scholar: b. Carlsruhe, 24 Nov. 1785; d. Berlin, 3 Aug. 1867. In 1803 he entered the University of Halle, where he was induced by the influence of Wolf to devote himself to the study of philology. After spending three years here, and more than a year in Berlin, he returned in 1807 to his native state, and in the same year became extraordinary, and two years later ordinary professor in the University of Halle. He had already acquired such renown as a scholar, that in 1810 he was offered the chair of rhetoric and ancient literature in the newly founded University of Berlin; and here he remained enjoying this and other important offices and dignities for the rest of his life. The works of Boeckh have made an epoch in the history of philology and archæology. In his studies of classical antiquities he set forth the principle that philology ought to be an historical method intended to reproduce the whole social and political life of any given people during a given period; and in accordance with this he divided the science into two parts: (1) Hermeneutics and Criticism; (2) the Practical and Theoretical Life of the Ancients. His views were vigorously attacked in various quarters, but the majority of German scholars gathered around him, and he himself carried his views into effect in a number of important works. The most remarkable of these are the following: an edition of Pindar; 'The Public Economy of the Athenians,' which has been translated into English; 'Metrological Investigations of the Weights, Coins, and Measures of Antiquity', and 'Documents Concerning the Maritime Affairs of Attica.' Besides these he was uninterruptedly engaged from 1815 to the end of his life in making a collection of Greek inscriptions, which he published with the title 'Corpus Inscriptionum Græcarum,' and the first four volumes of which appeared at Berlin between 1824 and 1862. The first three volumes of a collection of his minor works, edited by Ascherson, appeared during the lifetime of the author.

Boehler, bē-lĕr, **Peter,** Moravian bishop: b. Frankfort-on-the-Main, 1712; d. London, 1775. He was educated at Jena, joined the Moravians and was ordained to the ministry. He was sent as a missionary to America, working among the negroes in Georgia, the Germans in North Carolina (who later settled Bethlehem, Pa.), and the Indians of Pennsylvania. He went to Europe and returned to Bethlehem with a large number of colonists. In 1742, he was made bishop of the Moravian churches in America, England, Ireland, and Wales.

Boehm, bēm, **Henry,** clergyman: b. Conestoga, Pa., 8 June 1775; d. near Richmond, Staten Island, 28 Dec. 1875. Under the influence of Bishop Asbury, Boehm, whose father was a Mennonite clergyman, became an itinerant minister of the Methodist Church. In this capacity he traveled over 100,000 miles on horseback between the years 1800 and 1842, when he was stationed at Staten Island as a supernumerary. He served 74 years in the ministry, and at the time of his death was the oldest Methodist minister in America. A special service in honor of his 100th birthday was held 8 June 1875. He wrote 'Reminiscences, Historical and Biographical, of Sixty-four Years in the Ministry' (N. Y. 1865; new ed. 1875, ed. by J. B. Wakeley and others).

Boehm, Sir Joseph Edgar, Hungarian-English sculptor: b. Vienna, 1834; d. 12 Dec. 1890. He went to London in 1862, and lived there from that date, becoming a member of the Royal Academy in 1881. Among his important works are the great statue of Queen Victoria at Windsor; statues of Bunyan at Bedford; Wellington at Hyde Park Corner; Dean Stanley at Westminster Abbey; Drake at Plymouth; Carlyle on Thames Embankment, and busts of Ruskin, Gladstone, and Huxley. In 1889 he was knighted. He was the fashionable sculptor of his time, but much of his work fails to reach a high standard and his designs for the jubilee coinage of 1887 were very adversely criticised.

Boehme'ria, a large genus of plants of the natural order *Urticaceæ,* natives of tropical Asia, where various species furnish fibres used in rope- twine- thread- and cloth-making. *B. nivea* (China grass) is a nettle-like, but non-stinging perennial herb which is propagated by seeds or root division. When once established three crops are obtained annually and the fibre removed by hand stripping, machinery, or boiling in water or chemical solutions. None of these methods are wholly satisfactory; for which reason China and India, those lands of cheap hand labor, still supply the world. The fibre is used to make China-grass cloth. *B. tenacissima* (*ramie*) (q.v.) or rhea, is considered by some botanists as a variety of *B. nivea.* Attempts to establish the China-grass and ramie industries in the United States have not been very successful; not because the plants cannot be raised economically, but because of the high price of labor in manufacture, and the inefficiency of machines and degumming methods. Both species and several others of the genus are effective ornamental plants in borders and are hardy as far north as Washington, probably farther. Consult: Dodge, 'Descriptive Catalogue of Useful Fibre Plants of the World'; Royle, 'Fibrous Plants of India.'

Bœo'tia, bē-ō'shĭ-ạ, a country of ancient Greece, bounded north by Phocis and the country of the Opuntian Locrians; east by the Euripus, or Strait of Eubœa; south by Attica, Megaris, and the Alcyonian Gulf, and west by Phocis. Its surface is estimated at 1,119 square miles; but the boundaries were not always the same. In the north it is mountainous and cold, and the air is pure and healthy, but the soil is less fertile than that of the other portion, which, however, is said to suffer from malaria. The mountainous part in the north was called in earlier times Aonia. Among the mountains of Bœotia are several remarkable in history and mythology — Helicon (now Zagora), the mountain of the Sphinx, the Teumessus, Libethrium, and Petrachus. Hypatus (modern name Samata), bounded the Theban plain on the

east. A feature of the country was Lake Copais, the district around which is a valley completely surrounded by hills, and connected with the Eubœan Sea by subterranean passages. The lake was fed by the Cephisus, the largest river in the country, and the water was liable to accumulate more rapidly than the natural drainage of the country could carry it off. Hence the early inhabitants suffered much from inundations, and at a period previous to historical annals subterraneous channels were built to carry off the water, which indicate a very early civilization, and recognized from the ruins which still remain as among the greatest works of antiquity. These works made Bœotia one of the most fertile districts of Greece. Recently the lake has been drained at great expense and a large tract of land reclaimed. The chief occupation of the inhabitants was agriculture and the raising of cattle. Bœotia was first occupied by the Pelasgian tribes. In the time of Bœotus (son of Itonus, and grandson of Amphictyon, from whom it is said to have derived its name) these were subject to the Hellenes. It was divided into small states, until Cadmus the Phœnician founded the government of Thebes. In later times all Greece worshipped the Hercules of Thebes. After the death of Xanthus, king of Thebes, most of the cities of Bœotia formed a kind of republic, of which Thebes was the chief city. Epaminondas and Pelopidas raised Thebes for a time to the highest rank among Grecian states. In Bœotia are several celebrated ancient battlefields, namely, Platæa (now the village Kokla), where Pausanias and Aristides established the liberty of Greece by their victory over the 300,000 Persians under Mardonius; Leuctra (now the village Parapogia), where Epaminondas checked the ambitious Spartans; Coronea, where the Spartan Agesilaus defeated the Thebans; and Chæronea (now Capranu), where Philip founded the Macedonian greatness on the ruins of Grecian liberty. Near Tanagra, the birthplace of Corinna, the best wine was produced; here, also, cocks were bred of remarkable size, beauty, and courage, with which the Grecian cities, passionately fond of cock-fighting were supplied. Refinement and cultivation of mind never made such progress in Bœotia as in Attica. The Bœotians were vigorous, but slow and heavy. Several Thebans, however, were worthy disciples of Socrates, and Epaminondas distinguished himself as much in philosophy as by his military talents. The people were particularly fond of music, and excelled in it. They had also some great poets and artists. Hesoid, Pindar, the poetess Corinna, and Plutarch, were Bœotians.

Boerhaave, Hermann, hĕr'măn boor-hä'vė, Dutch physician: b. Woorhout, near Leyden, 13 Dec. 1668; d. 23 Sept. 1738. Boerhaave received from his father a liberal education. In 1682 he was sent to Leyden to study theology. Here he gave, at the age of 20, the first public proof of his learning and eloquence. In 1678 he received a gold medal from the city for an academic oration, in which he attacked the doctrines of Spinoza. In 1689 he received the degree of Doctor of Philosophy, and maintained an inaugural dissertation, 'De Distinctione Mentis a Corpore,' in which he attacked Epicurus, Hobbes, and Spinoza. He now commenced, at the age of 22, the study of medicine. Drelincourt was his first and only teacher. From him he received little instruction; and by his own solitary study he learned a science on which he was afterward to exert so important an influence. His first study was anatomy, which he pursued from books, rather than from observation. He attended dissections, indeed, but his writings show a deficiency of practical knowledge. Still he exercised a salutary influence on the study of anatomy, as the use he made of mechanical illustrations induced anatomists to apply themselves to a more accurate study of the forms of the organs. After this preliminary study, Boerhaave read all the works, ancient and modern, on medicine, in the order of time, proceeding from his contemporaries to Hippocrates, with whose superior excellence and correct method he was forcibly struck. He also studied botany and chemistry, and although still preparing himself for the clerical profession, was made in 1693 Doctor of Medicine at Harderwyck. After his return to Leyden, some doubts being raised as to his orthodoxy, he finally determined to follow the profession of medicine. In 1701 the University of Leyden chose him, on the death of Drelincourt, to deliver lectures on the theory of medicine. Boerhaave now began to develop those great and peculiar excellences which make him a pattern to all who undertake the office of instruction. Pupils crowded from all quarters to hear him. His method was eclectic, combining the speculations of opposing schools, and led him to attach too much importance to mechanical and chemical theories of vital actions. In 1709 the University of Leyden appointed him successor to Hotton, in the chair of medicine and botany. The course of instruction to which Boerhaave was now devoted, induced him to publish two works, on which his fame still rests, namely, 'Institutiones Medicæ in Usus Annuæ Exercitationis Domesticos,' and 'Aphorismi de Cognoscendis et Curandis Morbis in Usum Doctrinæ Medicinæ.' In the former, which is a model of comprehensive erudition and clear method, he unfolds his system in its fullest extent; in the latter he undertakes the classification of diseases, and discourses separately on their causes, nature, and treatment. The professorship of botany, which he also filled, contributed no less to his reputation. He rendered essential services to botany by his two catalogues of plants in the garden of Leyden, the number of which he had very much increased. We are indebted to him for the description and delineation of several new plants, and the introduction of some new species. In 1714 he was made rector of the university. At the end of this year he succeeded Bidloo in the chair of practical medicine, which he occupied for more than 10 years. In this office he had the merit of introducing clinical instruction, that is, of lecturing to his students at the bedside of patients in hospital, for the first time in Europe. Busily occupied as he already was, the university conferred on him, at the death of Lemort, the professorship of chemistry, which science he had

taught since 1703. 'His Elements of Chemistry' is one of his finest productions, and notwithstanding the entire revolution which has taken place in this branch of science, is still highly valuable. His experiments are remarkable for their accuracy. So extensive a sphere of action gained for Boerhaave a fame that few learned men have enjoyed. People came from all parts of Europe to ask his advice. His property amounted at his death to 2,000,000 florins. Peter the Great visited him on his travels, and a Chinese mandarin wrote to him with the address, «To Boerhaave, the celebrated physician in Europe.» In 1722 illness obliged him to remit his active pursuits. In this he returned in some measure to the principles of Hippocrates, from which, indeed, he had never departed far in practice. Boerhaave was a man of piety as well as learning. He arose early and devoted an hour every morning to prayer and the study of Scripture. He used to say that the life of a patient, if trifled with or neglected, would one day be required at the hands of the physician.

Boers (Dutch *boer*, a peasant or husbandman), the name commonly applied to the South African colonists of Dutch descent. The Cape Colony was founded by the Dutch in 1650. The Dutch were at this period the leading maritime power of Europe, and their African colonies assumed great importance. When Holland was reduced to the last extremity by the invasion of Louis XIV., serious thoughts were entertained of making the Cape Colony the final refuge of Dutch independence, but this crisis passed away with the advancing power of William. The colony subsequently fell into comparative neglect, and the colonists, left to their own resources, began to develop a character of their own. The troubles in which the parent state was involved by European wars now began also to affect them. The colony was taken possession of by the English in 1795, restored at the peace of Amiens in 1802, taken again in 1806, and finally ceded to England in 1815. The last change was highly distasteful to the colonists. Naturally distrustful of a foreign government, they had formed from their experience of the country and its inhabitants a policy and habits of their own, into which the newcomers could not be expected at once to enter. The Boers, moreover, were strongly conservative, believing that they understood the situation better than anyone else, and they had acquired in their struggles with the natives a reckless daring, which, added to the coolness and caution of the Dutch character, was likely to make them formidable opponents to any government which provoked their hostility.

The policy of the British governers was not always adapted to the circumstances, and the attempts of the British missionaries, encouraged by the colonial government, to convert and civilize the natives, excited the jealousy of the Boers, who thought their own interests compromised by the encouragement given to the converts. The government on various occasions sided with the Kaffirs against the Boers, which, whatever the merits of the particular disputes, was not calculated to conciliate the latter. The emancipation of their slaves in 1833, and the cession to the Kaffirs in 1835 of a frontier district of neutral territory in the east, filled up the measure of provocation, and the Boers resolved to place themselves by emigration beyond the British rule. A first band set out by land in 1835 for Port Natal, but being ignorant of the passes of the country, went out of their way. Part of them settled in the district near the Zoutpansberg or Salt-pan Mountain, part proceeded to Algoa Bay, but did not succeed in forming a perfect settlement. Another band also proceeding to Natal was attacked by the Matebele Kaffirs, and obliged to fall back on the Modder River. After receiving reinforcements they again advanced and settling in the Orange River district, formed a commonwealth under Peter Retief. This colony was in 1837 invited to join the British settlers who had in the meantime taken possession of Port Natal. Crossing the Quathlamba Mountains for this purpose, Retief and some of his principal followers were treacherously murdered in an interview with the chief of the Zulu Kaffirs. The remainder turned south, and formed the settlement of Pietermaritzburg. Under the leadership of Pretorius they defeated the Zulus, but the colonial government denied their right to form an independent community in this district.

In 1842, a British force was landed, and the Boers were compelled to retire from the coast and acknowledge the British sovereignty. Many of them recrossed the mountains, and settled in the Vaal district. Further disagreements with the colonial government, which had now possession of Natal, led to another emigration to the north of the Klipp River. Here they struggled successfully with the Kaffirs till 1845, when the colonial government proclaimed the Buffalo River the north boundary of Natal. The Boers openly resisted, but finding their strength unequal to the conflict, again emigrated to the Vaal country. In 1848 the colonial government likewise annexed by proclamation the Orange River settlement. The Boers, headed by Pretorius, took up arms, but being defeated retired beyond the Vaal, and with the previous settlers formed the Transvaal republic. Those who remained continued their resistance to the British authority until, in 1851, on the outbreak of the Kaffir war, the British relinquished the Orange River territory, and recognized the independence of the Orange Free State. In 1877 the Transvaal was annexed by Britain, according to the wish of many of the people, but war broke out in 1880, British forces suffered more than one defeat, and in 1881 the country was accorded a modified independence. Henceforth it was a common feeling among the Boers that they and not the British must be predominant in South Africa, and in October 1899, after a defiant ultimatum, the united forces of the Transvaal and Orange Free State invaded Natal. After nearly three years of warfare the two republics were annexed by proclamation. See JAMESON; KRUGER; MAJUBA HILL; NATAL; ORANGE RIVER COLONY; SOUTH AFRICAN WAR; TRANSVAAL, etc.

Boë'thus, Greek sculptor: b. Chalcedon in the 2d century B.C. He is celebrated for his statues of children. 'The Boy With the Swan' was his most famous work. A girl playing with dice and a boy extracting a thorn were subjects of other masterpieces by him.

Boethius, bō-ē'thĭ-ŭs, **Anicius Manlius Severinus,** Roman statesman and philosopher: b. about 470 A.D., in Rome or Milan; d. 524 or 526. He was educated in Rome, in a manner well calculated to develop his extraordinary abilities. Theodoric, king of the Ostrogoths, then master of Italy, loaded him with marks of favor and esteem, and raised him to the first offices in the empire. He exerted the best influence on the administration of this monarch, so that the dominion of the Goths promoted the welfare and happiness of the people who were subject to them. He was long the oracle of his sovereign and the idol of the people. The highest honors were thought inadequate to reward his virtues and services. But Theodoric, as he grew old, became irritable, jealous, and distrustful of those about him. The Goths now indulged in all sorts of oppression and extortion, while Boethius exerted himself in vain to restrain them. He had already made many enemies by his strict integrity and vigilant justice. These at last succeeded in prejudicing the king against him, and rendering him suspicious of Boethius. His opposition to their unjust measures was construed into a rebellious temper, and he was accused of a treasonable correspondence with the court of Constantinople. He was arrested, imprisoned, and executed. He made many laborious translations of the Greek philosophers, particularly of Aristotle. These translations, and especially his commentaries on Aristotle, caused him to be regarded up till the 14th century as the highest authority in philosophy. His treatise, 'De Musica,' also supplied for many centuries the place of Greek originals. His fame now chiefly rests on his 'Consolations of Philosophy,' written in prison, a work of elevated thought and diction. It is written partly in prose and partly in verse. The oldest edition of this work was published at Nuremberg in 1473. It was translated by King Alfred and Chaucer, and was highly prized during the Middle Ages. Boethius also translated into Latin Euclid and other Greek mathematical works, and wrote short treatises on algebra and geometry, which were used as school text-books during the Middle Ages. The appearance in these works of characters similar to Hindu numerals has raised the question as to whether he was familiar with the works of the Hindu mathematicians.

Bœttcher, bĕ'tĭk-ĕr, **Jean Frederick** (his name is also spelled **Boettiger),** German alchemist: b. Schleiz, 1681; d. 1719. A man of dissolute manners and dishonorable conduct, he is celebrated for his extraordinary adventures, and his fortunate discovery of the famous Dresden porcelain. Apprenticed to an apothecary in Berlin, he spent his time in the pursuit of alchemy, and fraudulently pretended to have made gold. This discovery, as it was believed to be, exposed him to the danger of a prosecution for sorcery, to avoid which he fled. Such was the credulity of the time, that the Prussian government was anxious for his return, and the Elector of Saxony, then king of Poland, supplied him with the means of prosecuting his inquiries, and was entertained by his promises for three years. By the advice of Count Tschirnhausen, the elector was induced to turn the real chemical knowledge and abilities of Bœttcher to account in developing the resources of the country. This sensible advice was rewarded with the discovery of a red clay at Meissen, from which a beautiful porcelain could be made. Bœttcher was intrusted with the direction of the manufacture, but was so little trustworthy that he had almost to be detained a prisoner to prevent his divulging the secrets of the process. He had actually entered into a negotiation with some Prussians to do so, and his death alone saved him from the punishment of his treachery.

Boeuf Bayou, bĕf bī'oo, a stream in Louisiana, formed in times of high water by overflow from the Mississippi, when it affords nearly 100 miles of steamboat navigation. It is an affluent of the Washita River.

Boffin's Bower, in Dickens' 'Our Mutual Friend,' home of the Boffins. The name was given by Mrs. Boffin, who did not approve of its former name, "Harmon's Jail."

Bog, an Irish word, literally meaning soft, applied in Great Britain to extensive districts of marshy land, such as we commonly call in this country swamps. They consist, in Europe, so universally of peat, that this substance is there generally regarded essential to a bog. As we use the word, it is in the sense of a quagmire; any soft and wet spot into which a man would sink in attempting to cross it, being called a bog. The true bog is most commonly found in northern latitudes, and in districts where great humidity prevails. Their situation is not necessarily low, nor their surface level. Some of the great Irish bogs present even a hilly appearance, which, perhaps, is the result of the spread of the mosses in their lateral growth from lower situations over intervening higher grounds. Bogs were formerly supposed to owe their origin to the destruction of forests, and in particular to the obstruction of drainage from fallen trees, causing lodgments of water, and favoring the growth of marsh plants. This theory can only be partially true. Fallen trees and also standing roots are frequently found in a state of great preservation in bogs, but the agency of felled trees in the production of bog has been completely disproved, six or seven feet of bog being found under the roots of remaining trees, showing the previous formation of the bog. The process of bog formation is thus described: When a shallow pool induces the formation of aquatic plants, they gradually creep in from the borders to the deeper centre. Mud accumulates round their roots and stalks, and a spongy semi-fluid mass is formed, well suited for the growth of moss, particularly Sphagnum, which now begins to luxuriate, continually absorbing water, and shooting out new plants above as the old decay beneath; these are consequently rotted, and compressed into a solid substance, grad-

ually replacing the water by a mass of vegetable matter. A layer of clay, frequently found over gravel, assists the formation of bog by its power of retaining moisture. When the subsoil is very retentive, and the quantity of water has become excessive, the superincumbent peat has sometimes burst forth and floated over adjacent lands. This happened near Killarney in 1896, and caused the loss of nine lives. Quagmires are caused by the decay of the roots of plants underneath. The plants thus detached from the bottom, rise to the surface, and are kept floating in moisture. Elastic under light pressure, they yield suddenly to the weight of heavy bodies, their only strength consisting in the interlacing of their decayed fibres.

Throughout the country, along the seaboard to the gulf of Mexico, bog-like swamps are of frequent occurrence. Their outer portions are sometimes wooded swamps, while within they present moss-covered heaths, stretching, like the western prairies, farther than the eye can see, and dotted occasionally with clumps or little islands of trees. In New England, the northwestern States, and Canada, the bogs furnish genuine peat, and some of those bordering on the Great Lakes are of great extent. On Long Island, near New York, the bogs present a marked feature along the sandy coast.

British bogs are generally divided into two classes — red bogs, or peat mosses, and black bogs, or mountain mosses. The former class are found in extensive plains frequently running through several counties. The Chatmoss in Lancashire, and the Allen in Ireland, are examples of this class. Their texture is light and full of filaments, and is formed by the decay of mosses and plants of different kinds. The color becomes darker, and the density increases with the depth of the bog. The lower parts, being more entirely decayed, approach nearer to the nature of humus than the upper portion. They are also more carbonaceous, and consequently more valuable for fuel. The depth of the red mosses varies from 12 to 42 feet. The chief reasons of the unproductiveness of this class of bogs are the acids in which the plants composing them abound, and which are noxious to the higher orders of vegetation, and the circumstance that the decomposition of the plants takes place under water, where they are excluded from the action of the oxygen and nitrogen of the air, and consequently deprived of the power of evolving carbon and ammonia. Black bog is formed by a more rapid decomposition of plants. It is heavier and more homogeneous in quality. It is common in Ireland and Scotland, but is usually found in limited and detached portions. In Ireland these frequently rest on calcareous subsoil, which is of great value for reclaiming them. The black bog is so frequently found at high elevations that its reclamation presents considerable difficulties, but when it is found in plains or gentle inclinations it may be reclaimed with comparative ease. The soil in mountainous districts, being shallow, is not suited for cereals, but if the mistake of sowing these is avoided, they may be made into good pasture land. The reclamation of the extensive red bogs found in various parts of the country, especially in Ireland, which has more than 1,500,000 acres of them, has long occupied attention; but the progress of improvement has been hindered by questions of land tenure, disposal of capital, and other difficulties external to the practicability of the desired reformation. Many extensive experiments have, however, been made with encouraging success, and while it is perhaps doubtful how far reclamation will repay the immediate improver, it appears from a national point of view to offer undoubted advantages.

In the reclamation of bog land three things require to be accomplished. The land must be thoroughly drained, and a permanent system of drainage established. The loose and spongy soil must be mixed with a sufficient quantity of mineral matter to give the requisite firmness to its texture, and to fertilize its superabundant humus. Proper manures must be provided to facilitate the extraction of nutriment from the new soil, and a rotation of crops suitable for bringing it into permanent condition adopted. The difficulties of reclamation lie chiefly in the first and second of these requirements.

The materials best adapted for reclaiming peat are calcareous earths, limestone gravel, shell marl, and shell sand. Caustic lime, although it neutralizes the acids of the soil, causes too rapid a decomposition of the vegetable matter. These materials are frequently found in the subsoil or in the neighborhood, but the labor of raising them from the subsoil is often greater than that of bringing them from other, especially from adjacent quarters.

Paring and burning, or removing a portion of the peat for fuel, when the subsoil is good, are other modes of facilitating improvement. The limited demand for peat fuel prevents the latter system being carried on extensively. Thoroughly reclaimed bogs are not liable to revert to their former condition. For further particulars see CHATMOSS.

Bog-bumper, Bog-jumper, or **Bog-pumper.** See BITTERN.

Bog-butter, a fatty spermaceti-like substance found in masses in peat-bogs, composed of carbon, oxygen, and hydrogen, and for years supposed to have been formed by the decomposition of peat. In 1885 Macadam proved that it is of animal origin, being, in fact, a variety of adipocere, and is formed by the decomposition of animal substances, out of contact with the air.

Bog Iron Ore, a variety of limonite formed in bogs and swamps by the reducing action of decaying vegetable matter on soluble iron salts. It is generally loose textured, and brown or brownish yellow in color. The ore usually contains such a high percentage of impurities, especially sulphur and phosphorus, that it cannot be utilized for iron manufacture; it finds limited application, however, in the purification of illuminating gas. Deposits of bog iron ore are widespread. In the United States extensive beds occur along the Atlantic coast from New York southward, and the first blast furnaces erected in this country were supplied from them. Similar deposits occur in Great Britain and most of the countries of Europe.

Bog-moss. See SPHAGNUM.

Bog-oak, trunks and large branches of oak found imbedded in bogs and preserved by the antiseptic properties of peat, so that the grain of the wood is little affected by the many ages during which it has lain interred. It is of a shining black or ebony color, derived from its impregnation with iron, and is frequently converted into ornamental pieces of furniture and ornaments, as brooches, earrings, etc.

Bog-trotter, a name contemptuously applied to the Irish peasantry on account of their ability to make their way across the bogs where no one else can find footing, which frequently gives them a means of escape from officers of police, and other pursuers.

Bogaers, Adriaan, ä'drĭ-än bō'gärs, Dutch poet: b. The Hague, 1795; d. 1870. He holds an eminent place among the many disciples of Tollens, and surpasses his master in correctness of taste. He long withheld his compositions from publication, and not till 1832 did he become known to his countrymen; he then published his first lyric poem, 'Volharding,' — an appeal to his countrymen to stand fast in the struggle with Belgium,— together with other patriotic pieces. His first poem of any considerable compass, the epic 'Jochebed,' and his masterpiece, 'The Voyage of Heemskerk to Gibraltar,' were first formally published in 1860–1, though they had had for many years a private circulation among friends. He afterward published three volumes, 'Ballads and Romances,' 'Flowers of Poesy from Abroad,' and 'Poem.'

Bo'gan, or **New Year River,** a river of East Australia, rises in the Harvey range, flows northwest, and empties into the Darling River; length over 300 miles.

Bogar'dus Everardus, second pastor of the church in New Amsterdam (New York): d. 27 Dec. 1647. He is noted as the husband of Anneke Jans, whose ownership of 60 acres of land in the business portion of New York has given her descendants occasion for almost continuous law suits, during 200 years, to recover possession of the property which is held by the corporation of Trinity Church.

Bogardus, James, American inventor: b. Catskill, N. Y., 14 March 1800; d. 13 April 1874. He was apprenticed to a watchmaker, and early showed the bent of his mind by improvements in the construction of eight-day clocks, and by the invention of a delicate engraving machine. The dry gas meter is his invention, as is also the transfer machine to produce banknote plates from separate dies; and in 1839 his plan for manufacturing postage stamps was accepted by the British government. Later he introduced improvements in the manufacture of india-rubber goods, tools, and machinery; and invented a pyrometer, a deep-sea sounding machine, and a dynamometer. In 1847 he built the first iron building ever erected in the city of New York.

Bogatzky, Karl Heinrich von, kärl hīn'rĭH fŏn bō-gäts'kę, Protestant theological writer: b. Tankowa, Silesia, 1690; d. Halle, 1774. His principal works are: 'Tägliches Schatz-Kästlein der Kinder Gottes,' published in 1718; 'Geistliche Gedichte,' in 1749. The former has been translated into English under the title of Bogatzky's 'Golden Treasury.'

Bogdo-ola, bŏg-dō-oo'lą, or **Holy Mount,** a hill in Russia, in the government of Astrakhan, near the Aktuba, and 14 miles east of Tchernoiarsk. It forms an isolated cone, nearly 500 feet high, in the middle of a vast steppe. It appears to rest on limestone, overlain by sandstone, which on the northeast side rises perpendicularly like a wall, and is cut into deep clefts, frequented by innumerable birds. The sandstone is succeeded by alternate red and white layers of clay and sand, which have a very singular appearance. The summit is chiefly composed of masses of rock-salt. At the foot of the hill there is a salt lake called Bogdoin Dabassu.

Bogdan, Negrul, governor of Moldavia, son of Stephen the Great, who, at his death in 1522, counseled his son to anticipate by voluntary submission to the Turks, an inevitable conquest. Bogdan did not at first follow this counsel; but having lost within a year the battle of Mohács, and Hungary having been invaded by a large Turkish force, he sent to Solyman offers of submission. He was received with favor by the Sultan, and in return for an annual tribute of 4,000 crowns of gold, beside numerous horses and falcons, Moldavia was allowed to preserve its own religion, an independent administration, and the right to choose its own princes. Bogdan did not long survive this treaty, and his successor refusing to pay the tribute, drew again the arms of the Turks upon the Moldavian principality.

Bogdanóvich, Modést Ivanovich, mō-dāst ē-vän'ō-vĭch bŏg-dă-nō'vęch, Russian military historian and commander: b. 1805; d. 6 Aug. 1882. He was a very able soldier, and even abler with the pen; his 'Bonaparte's Campaign in Italy, 1796,' and 'History of the Art of War,' and particularly his 'History of the Campaign of 1812,' having attracted wide notice.

Bogdanowitch, Hippolyt Federowitch, hĭp'-pō-lĭt fĕd-ĕr-ō'vęch bŏg-dă-nō'vęch, Russian Anacreon: b. Perewolotschna, in White Russia, 1743; d. 1803. His father was a physician. He was designed for an engineer, but the sight of a splendid play, and the reading of Lomonossow's poems, turned his inclination to poetry. He wished to become an actor, but the manager of the theatre, Cheraskow, dissuaded him from his purpose. By his advice he applied himself to the study of the fine arts, and to learning foreign languages. He gained patrons and friends, and in 1761 was made inspector in the University of Moscow, and afterward translator in the department of foreign affairs. In 1762 he traveled with Count Beloselsky as secretary of legation to Dresden, where he devoted his whole attention to the study of the fine arts and of poetry till 1768. The beautiful pictures in the gallery of that place inspired him to write his 'Psyche,' which appeared in 1775, and fixed his fame on a lasting foundation. After this he devoted himself to music and poetry, in solitary study at St. Petersburg, till Catharine called him from his retirement. He then wrote on different occasions several dramatic and historical pieces. In 1788 he was made president of the imperial archives. In 1795 he took leave of the court, and lived as a private man in Little Russia. Alexander recalled him to St. Petersburg, where he lived till his death. He was as

remarkable for modesty as for genius, and a man of childlike goodness and vivacity.

Bogerman, Jan, yän bō'gėr-män, Dutch theologian: b. Oplewert, 1576; d. 1637. He was professor of divinity at the University of Franeker; participated in the Armenian controversy, and was president of the Synod of Dort, 1618. With four others he translated the Bible into Dutch; this translation is at present the common Dutch version. He also wrote 'Annotationes contra H. Grotium,' and translated Beza's 'De-la punition des hérétiques.'

Bogert, George H., artist: b. New York, 1864. His first studies were made under Thomas Eakins; later he studied in Paris under Raphael Collins, Aimé Morot, and Puvis de Chavannes. He won the Webb prize, 1898; the first Hallgarten prize of the National Academy of Design, 1899; and was awarded a bronze medal at the Paris Exposition, 1900. His studio is in New York.

Boggs, Charles Stuart, American naval officer: b. New Brunswick, N. J., 28 Jan. 1811; d. 22 April 1888. He entered the navy in 1826; served on the Princeton in the Mexican war; was assigned to the gunboat Varuna in Farragut's Gulf squadron in 1861. In the attack on forts St. Philip and Jackson, in April 1862, he destroyed six Confederate gunboats and two rams, and in the last moments of the fight his own vessel was sunk. In 1869–70 he served with the European squadron; in the latter year was promoted to rear-admiral; and in 1873 was retired.

Boggs, Frank M., artist: b. Springfield, Ohio, 6 Dec. 1855. He received his art education at the École des Beaux Arts and under Gérôme in Paris. In 1882 the French government bought his picture, 'Place de la Bastille,' for the Luxembourg Museum, and in 1883 his 'Isigny' for the Niort Museum. His pictures are to be found in many of the best French private collections, and in the museums at Havre, Nantes, and Dieppe. In the first prize fund exposition of the American Art Gallery (N. Y.), he received a prize of $2,500 for his picture 'A Rough Day, Honfleur,' now in the Boston Museum.

Bögh, Erik, ē'rĭk bėg, Danish poet and dramatist: b. Copenhagen, 17 Jan. 1822. He is best known for his witty stanzas and epigrams in periodicals, for 'This and That,' a collection of humorous essays, and for a hundred or so of plays and farces. A novel, 'Jonas Tvärmose's Vexations,' has merit.

Boghaz-Keui, bō'găz-kyė'ę, Asia Minor, a village in the vilayet of Angora, commonly identified with the ancient Pterium, though this is now doubtful. The village is insignificant, but important Hittite ruins, including a palace and a number of unusual sculptures, have been discovered near by.

Boghead Coal, a brown cannel-coal, found at Boghead, near Bathgate, Scotland, and very valuable for gas and oil making.

Bognor, bŏg'nėr, an English watering-place on the coast of Sussex, nine and a half miles southeast of Chichester by railway. There is a pier 1,000 feet long, constructed chiefly of iron, and also an esplanade. The place was brought into vogue toward the end of last century by Sir R. Hotham, who spent $300,000 on it. Pop. (1901) 6,180.

Bo'go, Philippines, a town with about 17,000 population, situated on the east coast near the northern end of the island of Cebu. It has a good harbor.

Bog'omiles, a religious sect, said to have been pretty widely spread in Thrace and Bulgaria as early as the 10th century. They were persecuted by the Byzantine emperor, Alexander Comnenos, and their leader, named Basil, was burned alive at Constantinople in 1118. The name of the sect is said to be composed of two Slavonic words, meaning friends of God. The Bogomiles believed that God had two sons, Satanael and Jesus, or Logos. The former rebelled, and created the material world, and also man. God gave a soul to man, but he was left under the control of Satanael until the coming of the Logos. The law was given to Moses by Satanael, and is not recognized by the Bogomiles, who accept of the Old Testament only the Psalms and the Prophets. The Logos, or Christ, came down from heaven to deliver man from the power of Satanael. This sect, which held many extravagancies of doctrine, continued to exist for several centuries. They practised severe asceticism, rejected the sacraments, or put new interpretations on them, and made frequent prayers both by day and night.

Bogos, bō'gōz, a people of Abyssinia, occupying a district to the south of the Anseba, to the east of Habab and Mensa, and to the north and west of Barca. The land is intersected by the broad and beautiful valley of the Anseba, and comprises on the west the elevated and hilly region as far as the sources of the Barca, and on the east the slopes of the plateau of Mensa. The climate and vegetation are similar to those of Abyssinia. The rainy season lasts from March to September, when the Anseba overflows its banks and fertilizes the valley through which it flows. There is a great variety both in the flora and the fauna of the country. Large baobab trees, sycamores, and tamarinds overshadow the banks of the Anseba, which are rendered almost impassable by the number of Euphorbiæ and creeping plants. At the same time there are to be found rhinoceroses, elephants, wild boars, buffalos, antelopes, lions, leopards, wildcats, jackals, wolves, etc., in great numbers. The population is only about 10,000, which is engaged in agriculture and the raising of cattle, and carry on a trade with the neighboring places in corn, butter, ivory, skins, buffalo-horns, and ostrich-feathers. Their language, which is akin to the Agow, is called by themselves Bilin. Their countenance is Greek in its contour, their body light, powerful, and well formed; the color of their skin dark olive-brown; their lips are thin, the cheek-bones not prominent, and they have generally bushy whiskers. The patriarchal institutions of the Bogos are peculiar. The members of each union of families are pledged to apprehend any one of their number who is charged with the commission of a crime. The laws relating to dowries, inheritance, and murder are regularly codified. The religion is the Christian, but Mohammedanism, which is increasing, has a considerable number of adherents.

Bogoslov, bō-gō-slōf', a small volcanic island of the Aleutian archipelago, lying northwest of Unalaska. It was formed in 1795–6 by a series of volcanic upheavals; on the site previously there had been low rocks and reefs.

Bogotá, bō-gō-tä', or **Santa Fé de Bogota',** the capital of the Republic of Colombia, has a population of about 120,000; and despite the fact that it is but 4° 41′ north of the equator, the elevation of the plateau on which it stands is so great that the breeze is cool and invigorating. A fertile plain or table-land of exquisite beauty extends for a distance of about 30 miles on three sides, while directly above rise two mountains of moderate height, and surrounding the whole scene are snow-capped peaks of the Andes — among them the extinct volcano of Tolima. Water is supplied by two mountain streams flowing through the town itself. Unfortunately the overcrowding of buildings occupied by the poorer classes, and the absence of a good system of drainage, offset the conditions otherwise favorable to health. Bogotá is lighted by gas and electricity; its streets are well laid out; and the houses, though low, are substantially built. There is a valuable library of over 50,000 volumes; and the university, founded in 1867, is considered the best in the Andean region north of Peru. On 12 Sept. 1902, the government decreed the establishment of a museum and academy, to increase the popularity and efficiency of the National School of the Fine Arts. Founded in 1538 by Gonzalo Ximénes de Quesada, a native of Santa Fé, a small town near the city of Granada, and in the Spanish province of that name, Bogotá became the capital of New Granada, as the country was first called by the Spaniards. For history, industries, etc., see COLOMBIA.

MARRION WILCOX.

Bogue, David, the originator of the London Missionary Society: b. Hallydown, Berwickshire, 18 Feb. 1750; d. Brighton, 25 Oct. 1825. In 1771 he removed to London, and became minister of an Independent chapel at Gosport. In 1780 he became tutor to an establishment for directing the studies of young men destined for the ministry in the Independent communion. He now began the formation of a missionary scheme, which afterward resulted in the London Missionary Society. The influence which the establishment of this institution had on the public mind was great, and the springing up of the British and Foreign Bible Society and the Religious Tract Society, at short intervals, proves how much good was effected by the impetus it imparted. In the establishment of both of these he took an active part, contributing to the latter body the first of a series of publications which have been of great use. In 1815 Mr. Bogue received the degree of Doctor of Divinity from Yale College. The only works of any extent for which we are indebted to the pen of Dr. Bogue are: 'An Essay on the Divine Authority of the New Testament,' 'Discourses on the Millennium,' and a 'History of Dissenters,' which he undertook in conjunction with his pupil and friend, Dr. Bennet. The first of these has been translated into the French, Italian, German, and Spanish languages, and has been widely circulated on the continent of Europe.

Boguslawski, bō-goo-släv'skę, **Palm Henry Louis von,** astronomer: b. Magdeburg, 1789; d. Breslau, 1851. He was educated in the Cathedral School of Magdeburg, and early displayed a particular turn for astronomical pursuits. The comet of 1807 gave him the first opportunity of making special observations. In 1809, having been appointed bombardier in the Silesian Artillery Brigade, he passed his examination in Berlin with so much distinction that he was named lieutenant, and remained in attendance on the general military school in Berlin, where he took part in Bode's observations on the great comet. The campaigns of the war of independence procured him, through his connection with Bode, access to the best observatories and the acquaintance of the most distinguished astronomers. His military career terminated at the battle of Waterloo, after which, in consequence of a supervening weakness in his eyesight, he became unfit for further active service. He afterward turned his attention to agriculture, and in course of time his eyesight was completely restored. His love for astronomy had always remained, though he had wanted proper opportunity for cultivating it; but in 1829, on resuming his residence in Breslau, his studies again took that direction, and he became first conservator and then director of the observatory. By his discovery, in 1834, of the comet named after him, and his observations on Saturn's rings, and the comets of Biela, Encke, Halley, etc., he rendered important services. As no chair was connected with his position at the observatory, he at first merely delivered popular lectures. A regular professorship, however, was given him in 1836. As a writer he made himself known by the publication of the 'Uranus.'

Boha-eddin, bō-ha-ĕd'dĭn, or **Bohaddin,** Arabian scholar and historian: b. Mosul, 1145; d. 1235. Having attained proficiency in Moslem law, he became, at the age of 27, a lecturer at Bagdad. In 1186 he made the pilgrimage to Mecca, and returned through the holy land, visiting Jerusalem, Hebron, and other sacred cities. While in Damascus, he was summoned to the Moslem camp by Saladin, who was desirous of availing himself of the services and influence of so able a scholar, and a man of such reputed Moslem piety and zeal. He accordingly brought his learning and talent to the work of glorifying the wars of that ambitious monarch, in a treatise on the 'Laws and Discipline of Sacred War.' Saladin appointed him cadi of Jerusalem and of the army, and a strong attachment from the commencement existed between them, which the scholar knew well how to turn to good account. On the death of Saladin he transferred his attachment to the son, Malek-al-Dhaher, whom he was instrumental in establishing in the succession of the throne. In return, the new prince of Aleppo appointed Boha-eddin to the office of cadi of the city, which brought him constantly to reside in the royal court. Aleppo now became the resort for men of science and learning. At this period of his life Boha-eddin founded a college, and he continued to give lectures until he was 90 years old. His great work was, however, the 'Life of Saladin.' It is a work pronounced, on the whole, free from the extravagance which so generally renders Oriental productions distasteful to the more practical scholars of the West. It is written from the standpoint of a zealous Moslem, rather than from that of the practised soldier or the politic statesman.

Bohea, an inferior kind of black tea. The name is sometimes applied to black teas in general, comprehending Souchong, Pekoe, Congou, and common Bohea.

Bohemia, Böhmen (anciently BOHEIM), a province with the title of kingdom in the Austro-Hungarian monarchy, bounded on the southwest by Bavaria, on the northwest by the kingdom of Saxony, on the northeast by the Prussian province of Silesia, and on the southeast by Moravia and the archduchy of Austria. It contains 20,051 square miles, and has (1900) 6,318,697 inhabitants, of whom above three fifths are Czechs, nearly 90,000 Jews, and more than 2,000,000 are Germans. Bohemia is surrounded on all sides by mountains, possesses large forests and many small lakes or ponds. Its plains are remarkably fertile. The largest rivers are the Elbe and the Moldau. All sorts of grain, flax, hops (the best in Europe), and fruits are exported. Wine is not abundant, but in the neighborhood of Melnik is of pretty good quality. The raising of sheep, horses, swine, and poultry is carried on to a considerable extent. The mines yield silver, copper, lead, tin, garnets, and other precious stones, iron, cobalt, arsenic, uranium, and tungsten, antimony, vitriol, alum, calamine, sulphur, plumbago, and coal in abundance. There are also numerous mineral springs, but little salt.

The industry of Bohemia, favored by its central situation, has long rendered it one of the most important governments of the Austrian empire. Spinning and weaving are extensively carried on in the northern and southeastern districts; manufactures of lace, ribbons, metal, and wood work, chemical products, and other branches of skilled industry are also largely developed. Pottery, porcelain, glassware, cutting of precious stones, give employment to many hands. The glassware of Bohemia alone, which is known all over Europe, employs 50,000 workers. Large quantities of beer (Pilsener) of the kind known as lager are exported. Prague, the capital, is the centre of the manufactures and of the commerce of the country. The largest towns are Prague, Pilsen, Reichenberg, Budweis, Teplitz, Aussig, and Eger. For internal intercourse there are excellent highways, extending to 10,000 miles, and several important lines of railway leading both southeast to Vienna and northwest toward Dresden. The Bohemians of all ranks are distinguished for public spirit. Among the public establishments for education are a German and a Czech university at Prague, two technical high schools, four theological academies, many gymnasiums, and over 5,000 schools. The prevailing religion is the Roman Catholic; other sects, however, are tolerated. The language of the country is Bohemian, a dialect of the Slavonic; in some districts, and in most of the cities, German is spoken. See BOHEMIAN LANGUAGE AND LITERATURE.

History.— Bohemia received its name from a tribe of Gallic origin, the Boii, who were expelled by the Marcomans at the commencement of the Christian era; the latter were in turn obliged to give place to the Germans, and these to the Czechs, a Slavonic people who had established themselves in Bohemia by the middle of the 5th century. The country was at first divided into numerous principalities, which were temporarily united into a monarchy in 627 under Samo, but the work of this prince did not survive himself. Charlemagre attempted the conquest of Bohemia without permanent result, although he succeeded in rendering it tributary; and the Emperor Louis had his army nearly destroyed by the Bohemians in 849. Christianity was introduced into Bohemia in the reign of Borzwog I. (894–902), a descendant of Přzemysl, whose family held sway in Bohemia for about six centuries (722–1306). In 1092 Bohemia was finally recognized as a kingdom under Wratislas II. Up to 1230 the monarchy was elective and then became hereditary; the right of election, however, was suspended, not abrogated. The monarchs received investiture from the German emperor, held one of the great offices in the imperial court, and were recognized as among the seven electors of the empire. Separated from Germany, however, by a rampart of mountains, by origin, language, and national customs, the Bohemians kept aloof from the general politics of the empire, and their kings frequently received dispensations from attending the diet. The peasantry were in a state of villenage, but there was a numerous and powerful nobility, the diet assembled frequently, and the nobles came armed to defend their rights. The royal authority was limited by the coronation oath. Bohemia was frequently at war with Poland, the emperor, or some of the surrounding states; it was successively united and disunited with Hungary, Silesia, Moravia, etc., according to the course of wars and alliances. Ottokar II. (1253–78) had extended his conquests almost from the Adriatic to the Baltic, when he lost them and his life in contest with Rudolph, the founder of the too successful house of Hapsburg. His grandson Wenceslas III. was assassinated at Olmütz, and with him closed the dynasty of Přzemysl. The house of Luxemburg succeeded in 1310, and governed Bohemia till 1437. Under Charles IV. (1346–78), who also held the sceptre of the German empire, Bohemia prospered, and advanced in civilization and science. Toward the close of this second dynasty civil wars were excited by the promulgation of the doctrines of Huss and the persecution of his followers. These wars were protracted by the genius of John Ziska, the leader of the Hussites, a man who, although latterly quite blind, has for military genius been compared to Hannibal. Ziska was rarely defeated, and his success inspired the utmost enthusiasm in his followers. He has been called the inventor of the modern art of fortification, and by his skill in this art he made Mount Tabor an impregnable fortress. After the death of Ziska the moderate party of the Hussites, who were called Calixtines, from their insisting on the retention of the sacramental cup for the laity, united with the Roman Catholics, and Sigismund was acknowledged king in 1433. The conditions of this compact being ill observed, George Podiebrad, a nobleman of the reformed party, was by them elected king in 1458. On his death in 1471 they chose Wladislas, son of Cassimir, king of Poland, who also obtained the crown of Hungary. His son Louis lost both crowns with his life in the battle of Mohács against the Turks, and Ferdinand of Austria became, in 1527, sovereign of both kingdoms. Bohemia then lost its separate existence, being declared hereditary in the house of Austria. Its subse-

quent history pertains to that of the Austrian empire. It was desolated by the Thirty Years' war, and it suffered severely from religious persecutions, by which, indeed, the reformed faith was almost entirely suppressed in it. The Emperor Joseph II. gave some protection to the Protestants. In 1848, when Europe was convulsed with revolutionary movements, a momentary attempt was made to assert the ancient independence of Bohemia against the Austrian dominion; a conflict took place between the army and the people, Prague was bombarded, and the insurrection suppressed. Since then the most prominent feature in the history of Bohemia has been a constant struggle for ascendency between the Slavonic Czechs and the Germans. See AUSTRIA.

Bohemia Manor, the name given to a tract of some 5,000 acres bordering on the Elk River, Maryland, granted by Lord Baltimore in 1666 to Augustine Herman. The latter was a Bohemian surveyor who pledged himself to make a map of Maryland in return for the land. Obtaining denization papers, he and his family were naturalized under the first legislative act of that kind in the province.

Bohemian Brethren, a Christian sect which arose in Bohemia about the middle of the 15th century from the remains of the Hussites. Dissatisfied with the advances toward the Catholic Church by which the Calixtines had made themselves the ruling party in Bohemia, they refused to receive the compacts, as they were called, that is, the articles of agreement between that party and the council at Basel (30 Nov. 1433), and began about 1457, under the direction of a clergyman, Michael Bradatz, to form themselves into separate parishes, to hold meetings of their own, and to distinguish themselves from the rest of the Hussites by the name of Brothers, or Brothers' Union. Amidst the hardships and oppressions which they suffered from the Calixtines and the Roman Catholics without making any resistance, their numbers increased so much, through their constancy in their belief and the purity of their morals, that in 1500 their parishes amounted to 200, most of which had chapels belonging to them. The peculiarities of their religious belief are seen in their confessions of faith, especially their opinions with regard to the Lord's Supper. They rejected the idea of transubstantiation, and admitted only a mystical spiritual presence of Christ in the eucharist. In other points they took the Scriptures as the ground of their doctrines throughout, and for this, but more especially for the constitution and discipline of their churches, received the approbation of the reformers of the 16th century. This constitution of theirs was framed according to what they believed to have been that of the oldest apostolic churches. They aimed at restoring the primitive purity of Christianity by the exclusion of the vicious from their communion, and by making three degrees of excommunication, as well as by the careful separation of the sexes, and the distribution of the members of their society into three classes — the beginners, the proficients, and the perfect. Their strict system of superintendence, extending even to the minute details of domestic life, did much toward promoting this object. To carry on their system they had a multitude of officers of different degrees; ordaining bishops, seniors, and conseniors, presbyters or preachers, deacons, ædiles, and acolytes, among whom the management of the ecclesiastical, moral, and civil affairs of the community was distributed. Their first bishop received his ordination from a Waldensian bishop, though their churches held no communion with the Waldenses in Bohemia. They were destined, however, to experience a like fate with that oppressed sect. When, in conformity with their principle of not performing military service, they refused to take up arms in the Smalkaldic war, Ferdinand took their churches from them, and in 1548, 1,000 of their society retired into Poland and Prussia, where they first settled in Marienwerder. The agreement which they concluded at Sendomir (14 April 1570) with the Polish Lutherans and Calvinistic churches, and still more the Dissenters' Peace Act of the Polish Convention (1572), obtained toleration for them in Poland, where they united more closely with the Calvinists under the persecutions of the Swedish Sigismund, and have continued in this connection to the present day.

Their brethren who remained in Moravia and Bohemia recovered a certain degree of liberty under Maximilian II., and had their chief residence at Fulneck in Moravia, whence they have been known as the Moravian Brethren. The issue of the Thirty Years' war, which terminated so unfortunately for the Protestants, occasioned the entire destruction of their churches, and their last bishop, Comenius, who had rendered important services in the education of youth, was compelled to flee. From this time they made frequent migrations, the most important of which took place in 1722, and occasioned the establishment of the new churches of the Brethren by Count Zinzendorf (q.v.). Although the old Bohemian Brethren must be regarded as now extinct, this society will ever deserve remembrance, as a quiet guardian of Christian truth and piety, in times just emerging from the barbarity of the Middle Ages; as a promoter of pure morals, such as the reformers of the 16th century were unable to establish in their churches; and as the parent of the esteemed and widely extended association of the United Brethren, whose constitution has been modeled after theirs. See UNITED BRETHREN.

Bohemian Forest (BÖHMERWALD), a mountain range or ridge of central Europe, extending from the Fichtelgebirge southward toward the confluence of the Ilz and the Danube, and separating Bavaria from Bohemia. The Bohemian forest in ancient times formed a part of the Silva Hercynia, the highest peaks being the Arber (4,840 feet high) and Rachel. The great abundance of wood has occasioned the establishment of many glass houses, forges, etc., in this region. The inhabitants have acquired in their seclusion from the world, many characteristic virtues and vices.

Bohemian Language and Literature. The language of Bohemia, otherwise called Czech, is one of the Slavonic group of the Aryan or Indo-European family of tongues, and accordingly allied to Polish, Russian, Servian, Bulgarian, etc. (See SLAVS or SLAVONIANS.) The Czech (Bohemian) language or dialect was the first of the Slavonic idioms which was cultivated scientifically. It is spoken in Bohemia, Moravia, with slight variations in Austrian Silesia, in Hun-

gary, and in Slavonia. Three chief dialects of this language are recognized, namely the Bohemian or Czech proper, the Moravian of Moravia and Silesia, and the Slovak of Hungary. The Bohemian alphabet consists of 42 letters, expressing a great variety of sounds. The English sound of *ts* the Bohemian expresses with *c*, the English *y* with *g*, the *sh* with *ss* or *s*, the Italian *ce* or *ci* with *c* modified, the French *ge* and *gi* with *z*, the Italian *u* with *y*, the *gn* with *n*, the English *w* with *w*, particularly at the end of words. The sound of entire words, not that of the single letters which compose them, determines the roughness or smoothness of their pronunciation. The terminations of the various declensions and conjugations are mostly vowels, or the smoother consonants. In general, the Bohemian has a natural melody like that of the Greek.

The Bohemian language, moreover, has much expressiveness and energy, as it is not weakened by a number of articles, auxiliary words, conjunctions, and words of transition, but is able to represent the objects of imagination, of passion, and all the higher emotions of the poet and orator, in a lively manner; by its brevity, heaping together the most significant words, and arranging the connection of the parts of speech according to the degree of feeling to be expressed, so as to give the style, spirit, and energy, or gentleness and equability. Like various other tongues, it designates many objects by imitation of natural sounds. Thus the names of many animals are taken from their voices, as *kruta,* the turkey; *kachna,* the duck. Many plants are named from their effects, as *bolehlaw,* hemlock (from headache). The conciseness of the language is increased by the absence of auxiliaries in the greater part of the verbs. The preterites, in the third person singular and plural, express a meaning still further condensed, as the variation in the last syllable is made to designate the sex; for example, *psal, psala, psalo,* he, she, it, has written; *psali, psaly, psala,* they have written. In like manner the Bohemian saves many prepositions and much circumlocution of other kinds, by the use of the *instrumental,* agreeing with the Latin ablative; for instance, *secenjm mece hlawu mu st' al* (*t* read like *te*), "with a blow of the sword he has cut off his head." This language is, therefore, very well fitted for the translation of the Latin classics. By the use of the past participle active the Bohemian can designate, as well as the Greek, who has really performed the action contained in the predicate of the accessory clause, which the Latin, with its ablative absolute or participle passive, must leave always undefined and dubious. The same kinds of actions performed with different implements are often expressed by peculiar words; for example, the verbs *zjti, strjhati, krágeti, rezati,* denote to cut with the scissors, with the sickle, with the knife, and with the scythe. In the subtlety of grammatical structure the Bohemian is like the Greek, and has the advantage over the Latin and other languages. In speaking of two hands, two eyes, etc., the dual number is used; for example, *ruce, oci,* etc. The language is also capable of expressing the idea of duration, referring to an indefinite past time, like the Greek aorist; for instance, *kupowal dum, ale nekaupil ho,* he was engaged in buying the house, and did not buy it. The language affords several preterite tenses, distinguished with great subtlety, as *kaupil,* he has bought once; *kupowal,* he had purchased for a long time; *kupowáwal,* he had purchased formerly several times; *kupowáwáwal,* he seldom had purchased in former times; moreover, by adding the auxiliary verb *byl,* a time still longer passed may be expressed, though this is very seldom used; for instance, *byl kupowáwal,* he had purchased in times long past. Another advantage of the language consists in the various future tenses by which the Bohemian denotes not only the time but also the duration, and the more or less frequent repetition of the action; for instance, *kaupjm,* I shall purchase once; *budu kupowati,* I shall be purchasing for a long time; *budu kupowáwati,* I shall purchase several times; and *budu kupowáwati,* I shall be purchasing very often. Not less manifold in signification, and equally subtle in the determination of time, are the participles and the participial constructions. The determination of sex and number by the final syllable of the participle gives the Czech language no small advantage over others. Small connective particles of speech the Bohemian has in common with the Greek. The Greek *alla, men, gar, de, te,* etc., agree with the Bohemian *ele, pak, wsak, li, z, t';* only the three latter are always affixed to a word. Finally, the free, unrestrained arrangement of the words contributes much to perspicuity, as the Bohemian is less fettered than almost any other modern language to a particular order.

Bohemian Literature has been divided historically into five periods. The first extends from mythological times to 1409. It affords no written documents of remote antiquity. We know, however, that the language at an early period was similar to the present from the names of the gods, dukes, rivers, cities, and mountains which have been preserved, such as Perun, Przemysl, Borzwog, Wltawa, Bila, Praha, Tetin. The Salvonian apostle Method, and the philosopher Constantine, called *Cyril,* made the Slavonians in Moravia acquainted with Christianity. Thence it penetrated to Bohemia, and thus the people of this country received the Græco-Slavonic ritual in the year 845. The same Constantine invented for the sounds of the Slavonic language the Cyrillo-Slavonic alphabet, borrowed mostly from the Greek. In later times the Glagolitic alphabet sprang up, of which, however, less use was made. When the Latin Church supplanted the Greek in Moravia and Bohemia, the Latin alphabet came also into use instead of the Cyrillic. In Bohemia the Cyrillic character remained in use only with the monks of Sazawa, who observed the Slavonic ritual. As the Latins endeavored to annihilate all the writings of the old ritual, and the Slavonic language was, in many cases, obliged to give way to the Latin, Bohemian literature suffered incalculable injury; hence we possess from the earlier centuries but a few insignificant remains in the characters above-mentioned. In the 10th century the Bohemians had a school at Kudet, in which they learned Latin. Their most ancient relic is the hymn (Hospodine Pomiluyny) of Bishop Adalbert (Wegtech), a native Bohemian, sung to the present day even by the Russians and Poles. The Bohemians possess some remains of a collection of lyrico-epic national songs, without rhyme, which seem to have been of great merit. The manuscript appears to have been written in 1290 and 1310. Goethe

found these national songs worthy of particular attention. Under the Emperor Charles IV., who promoted the cultivation of the Bohemian language, the University of Prague was founded in 1348. In the Golden Bull he commanded the sons of the German electors to learn the Bohemian language. Under his son, the Emperor Wenceslas, all decrees were written in Bohemian, which formerly were in Latin. Prague was then not only the most populous city in this part of Europe, but also, on account of its splendid court and the wealth of its citizens, the centre of the arts and sciences. Almost all the intellectual currents of the West found entrance into Bohemia, and German literature in particular had a powerful influence. The heroes of the Alexandrian and Arthurian cycles of romance became familiar to the Czechs in their own language. Dalimil Mezericky wrote a history of Bohemia in verse; Ondreg Z. Dube, a collection of Bohemian laws, in three volumes; Warinec Z. Brezowa, a history of the Roman emperors, and translated Mandeville's 'Travels'; and Pribik Pulkawa, a Bohemian history. This period affords also many vocabularies, poems, songs, and translations.

With Huss began the second period, from 1409 to 1500. The prevalence of religious disputes caused the Bible to be generally read and understood. Huss of Hussinetz translated Wickliffe's book, 'Trialogus,' into the Bohemian tongue, and sent it to the laymen as presents. The 'Treatise of the Six Errors' he caused to be inscribed in Bohemian on the walls of the chapel of Bethlehem. He wrote his first collection of sermons when at the castle of Kozy (1413), besides an 'Appeal to the Pope,' 'Commentary on the Ten Commandments,' an 'Explanation of the Twelve Articles,' two sermons on the Antichrist; the 'Triple Cord,' and several excellent hymns. His letters from the dungeon in Constance to the Bohemians were translated by Luther into Latin, accompanied with a preface, and printed at Wittenberg in 1536. He and Jakobellus and Jerome improved and distributed the Bohemian Bible, of which several copies have been preserved to our times. Of Ziska of Trocnow, one of the greatest generals in history, several letters and his rules of war have been preserved. From this period have come down to us, several war songs of the Taborites, also some songs of Prague. Martin Lupac undertook, with the assistance of some learned men, the labor of retranslating the whole New Testament. The church service was now performed entirely in the Bohemian language. Mladienowic, an eye-witness of the execution of Huss, wrote an account of his life. This used to be read in the Bohemian churches. Procopius continued the rhyming chronicles of Dalimil. Lodkowic related his 'Journey to the Holy Sepulchre,' Sasek of Mezyhor wrote 'Notes and Travels Through Germany, England, France, Spain, Portugal, and Italy of the Bohemian Baron Loew of Rozmital and Vlatna' (whom he accompanied), a contribution to our knowledge of the manners of the 15th century, published in a German translation at Brunn (1824). M. Gallus, Albjk, Chrislan, Zidek, J. Cerny, J. Blowic, and Sindel, wrote on medicine, astrology, and agriculture. As early as 1447 we have an anonymous work on the grafting of trees. We have also the rhyming legend of the 10,000 knights, a translation of the fables of Æsop, the council of the beasts and birds, in prose and verse, in three volumes (Placj Rada). Each lesson, which flows in rhyme from the mouths of the animals, is preceded by the natural history of the animals and the moral. It was printed three times in the Bohemian language, and published at Cracow in Latin verse (1521, 4to). Of the Bible 14 translations have come down to us, besides 10 of the New Testament. The oldest, of the year 1400, is in Dresden. The typographic art made a rapid progress in Bohemia. The first printed work was the Epistle of Huss from Constance, in 1459; the second, 'The Trojan War,' in 1468; the third, a 'New Testament,' in 1474; the whole Bible, in 1488; the first almanac, in 1489.

The third age, from 1500 to 1620, may be called the golden age of the Bohemian language. The cultivation of learning — in other countries, with only a few exceptions, the monopoly of the clergy — was in this favored land open to the whole nation. All branches of science were elaborated, and brought to an uncommonly high degree of improvement for that time. Gregory Hruby of Geleni translated the work of Petrarch 'De Remediis utriusque Fortunæ.' W. Pisecky translated from the Greek the 'Exhortation of Isocrates to Demonikos.' John Amos Comenius wrote 54 works, some of which were very excellent. He published his 'Janua' and an 'Orbis Pictus,' which were translated in his lifetime into 11 languages, have passed through innumerable editions, and are not yet surpassed. In all the north of Europe Comenius attracted attention by his projects for improving education, which were deliberated upon even by the diet of Sweden and the Parliament of England. The hymns of this and the earlier ages, part of which have been translated by Luther, may serve as standards for all languages. In Prague alone there were at this period 18 printing presses, in the country towns of Bohemia 7, and in Moravia also 7; many Bohemian books, too, were printed in foreign countries, as in Venice, Nüremberg, Holland, Poland, Dresden, Wittenberg, and Leipsic.

The fourth period begins with 1620 and ends with 1774. After the battle at the White Mountain, the whole Bohemian nation submitted entirely to the conqueror. The population of most of the cities and of whole districts migrated in order not to be false to their faith. More than 70,000 men, and almost the whole of the nobility, all the Protestant clergy, scholars, and artists, in general the most cultivated part of the nation, left their native country. Of these emigrants the greater part formed the flower of the army of Count Mansfield. Hence the Thirty Years' War depopulated Bohemia more than any other country, since these fugitives endeavored to regain their native country by repeated invasions. The fugitives established at Amsterdam, Dresden, Berlin, Breslau, and Halle printing presses, and sent to their brethren in Bohemia, Moravia, and Hungary a number of books, mostly new editions. Some Bohemians who observed the decay of their language strove to remedy it; as Pesina Z. Cechorodu; Joh. Beckowsky, who continued the Bohemian history to 1620; W. Weseley, who wrote a work on geometry and trigonometry, etc.; but the decay was too great to admit of being checked; the nobility had become strangers, and the government encouraged only German literature. From this time, there-

fore, the Bohemians wrote more in the German language.

In the fifth period, from 1774 to the present time, a new ray of hope shone on Bohemian literature, when, under the Emperor Joseph II., a deputation of secret Bohemian Protestants, trusting to his liberal views, made him acquainted with the great number of their brethren of the same faith. He perceived the necessity of introducing toleration, and hundreds of thousands of Protestants in Bohemia and Moravia came to light: their concealed works were printed anew, their classical language was again acknowledged and cultivated. Under this protection many men of merit, mindful of the fame of their ancestors, endeavored to cultivate anew all branches of the sciences, and to rival, if possible, the results attained by their more advanced neighbors. From about the year 1820 great activity was manifested by the Bohemian writers in the various departments of literature. A little before this Milton's 'Paradise Lost' was translated into Bohemian, and subsequently Shakespeare's dramas, or most of them, were likewise translated, the native drama being also cultivated. Kollar and Chelakovsky distinguished themselves in poetry, and perhaps even more Hynek Macha, whose poem «May» is said to still maintain an influence over Bohemian poetry. Kollar and Chelakovsky were advocates of the Panslavic movement. The chief work of the former was 'Slava's Daughter,' a long lyrico-epic poem. Several writers became well known as novelists, some of them following the lead of Sir Walter Scott. Jungmann (the translator of Milton), brought out a valuable 'History of Czech Literature,' and Schafarik his 'History of the Slavonic Language and Literature' and his 'Slavonic Antiquities.' Among more recent poets of note may be mentioned the names of Halek Heyduk and Neruda, but it must be admitted that few Bohemian writers have become generally known, even by name, to the European reading public.

Bo'hemond I., the son of the Norman adventurer Robert Guiscard, who rose to be Duke of Apulia and Calabria: b. 1056; d. 1111. He became familiar with warfare when a mere boy, took a prominent part in various expeditions to Greece and Illyria against Alexis Comnenus, and repeatedly defeated his troops with a very inferior force. As eldest son Bohemond naturally expected to succeed his father, but when the succession opened in 1085 Bohemond was absent in Greece, and his younger brother Roger, having obtained possession of the paternal inheritance, declared his determination to maintain it. A war between the brothers was followed by an arrangement which gave Bohemond nothing more than the principality of Tarentum. While assisting his brother at the siege of Amalfi he resolved to become a crusader, and without waiting to complete it he harangued the troops so effectually on the glory to be gained in the Holy Land that the great body of them at once joined his standard. Bohemond was soon on his march, and after encountering considerable difficulties reached the scene of action. The Crusaders had laid siege to Antioch, but had made little progress and were beginning to despair of success, when Bohemond found means to gain over an Armenian renegade, who undertook to introduce him and his men by night, and thus give them possession of the town. Bohemond laid the matter before his fellow-chiefs, and in doing so stipulated that in the event of success he himself should be prince of Antioch. The Armenian kept his promise, and accordingly in 1098 Bohemond was installed in his sovereignty, which he retained ever after, and at his death transmitted it to his son, who assumed the title of Bohemond II.

Böhlau, bė'lăn, **Helene,** German novelist: b. Weimar, 22 Nov. 1859. She shows now and then a leaning toward the romantic school, but on the whole her high power of description is realistic and her writings are imbued with passion. Among her novels are 'Under Death's Ban' (1882); 'Guilty of a Pure Heart' (1888); 'In Fresh Water' (1891).

Bohlen, Peter von, pā'tėr fŏn bō'lĕn, German Orientalist: b. Wüppels, Oldenburg, 9 March 1796; d. Halle, 6 Feb. 1840. He spent the first 20 years of his life in straitened circumstances, but his talents and perseverance attracted attention, and he obtained admission to the Hamburg gymnasium. He afterward studied the Eastern languages at Halle and Bonn; and he obtained an appointment at Königsberg, first in 1825 as extraordinary, and afterward in 1830 as ordinary professor of Oriental literature. Bohlen has left many works, which fully support his title to the high place which he held among Oriental scholars. One of the most important is a work entitled 'Das alte Indien' (1830–1), not yet superseded by any other work on the same subject. The details of his life are given with great minuteness and honesty in an 'Autobiography' (1841), which is full of interest, and cannot be read without producing a full conviction that he was no less distinguished by his amiability in private life than by his literary acquirements.

Bohlen Lectures, a lecture course established in 1875 on a foundation of $10,000 bequeathed by John Bohlen, a lay member of the Protestant Episcopal Church. They are delivered each year in Philadelphia, Pa., by eminent representatives of that Church. Among the most notable are those upon «The Influence of Jesus,» by Bishop Brooks, and the «Fitness of Christianity to Man,» by Bishop Huntington.

Böhm, bėm, **Theobald,** Bavarian musician: b. Munich, 9 April 1798; d. Munich, 25 Nov. 1881. He is best known for his improvements in the construction and fingering of the flute. He wrote 'Ueber den Flötenbau und die neuesten Verbesserungen desselben' (1847), and 'Die Flöte und das Flötenspiel.'

Böhme, or **Böhm, Jakob,** yä'kōb bė'mė, one of the most renowned mystics of modern times: b. 1575, Altseidenberg, a village in upper Lusatia; d. Görlitz, November 1624. Boehme being the son of poor peasants, remained to his 10th year without instruction, and employed in tending cattle. Raised by contemplation above his circumstances, and undisturbed by exterior influences, a strong sense of the spiritual, particularly of the mysterious, was awakened in him, and he saw in all the workings of nature upon his mind a revelation of God, and even imagined himself favored by divine inspirations. He became afterward a shoemaker; and this sedentary life seems to have strengthened his contemplative habits. In 1594 Böhme became a master shoemaker in Görlitz, married, and continued a shoemaker during his life, but with-

drew himself more and more from the world. If we take into view his retirement, his piety, his rich and lively imagination, his imperfect education, his philosophical desire for truth, together with his abundance of ideas, and his delusion in considering many of those ideas as immediate communications of the Deity, we have the sources of his doctrine and his works. His first work, 'Aurora, oder die Morgenröte,' was written in 1616, and contains his revelations on God, man, and nature. This gave rise to a prosecution against him; but he was acquitted, and called upon from all sides to continue writing. One of his most important works is 'Description of the Three Principles of the Divine Being.' His works contain profound and lofty ideas, mingled with many absurd and confused notions, but the basis of his thought is the theory that everything exists and becomes intelligible only through its opposite. The first collection of his writings was made in Holland in 1675 by Henry Betke; a more complete one in 1682 by Gichtel (10 vols. Amsterdam), from whom the followers of Böhme, a religious sect highly valued for their silent, virtuous, and benevolent life, have received the name Gichtelians. Another edition appeared in Amsterdam in 1730 under the title 'Theosophia Revelata,' (2 vols.); the most complete in six volumes. In England, also, Böhme's writings have found many admirers. William Law published an English translation of them, two volumes. A sect, taking their name from Böhme, was likewise formed in England, and in 1697 Jane Lead, an enthusiastic admirer of his, established a particular society for the explanation of his writings, under the name of the Philadelphists. In very recent years his views have taken on fresh importance, his fundamental principle having been perceived as akin to that underlying the philosophical systems of Spinoza, Schelling, and Hegel. See Hartmann, 'Life and Doctrines of Böhme' (1893).

Bohn, bōn, **Henry George,** English publisher, of German parentage: b. London, 4 Jan. 1796; d. Twickenham, 22 Aug. 1884. On completing his education he worked for a time under his father, but about 1831 started business on his own account as a second-hand bookseller, and in 1846 he began the issue of his famous libraries. The first of these was the Standard, succeeded in the following year by the Scientific and the Antiquarian, in 1848 by the Classical, and from then till 1853 by the Illustrated, the Shilling, the Ecclesiastical, the Philological, and the British Classics libraries. The whole number of volumes contained in these series exceeded 600. In 1864 and subsequent years he sold all his copyrights and other business property, thus realizing a sum of nearly $500,000. Among his own works were: 'The Origin and Progress of Printing' (1857); 'Biography and Bibliography of Shakespeare' (1863); 'Dictionary of Quotations' (1867); 'Handbook of Proverbs'; 'Handbook of Games'; 'Guide to the Knowledge of Pottery and Porcelain'; and editions of Lownde's Bibliographer's Manual and Addison's Works.

Bohol, bō-hōl', Philippines, an island belonging to the Visayas or Bisayas group. It has an area of about 1,300 square miles and an estimated population (1900) of 245,000. Sugar-cane is grown and the island is reputed rich in gold deposits. The most important town is Tagbilaran, a port on the southwest coast. In the north is Calape. These ports were officially declared open to commerce 11 Dec. 1899. The Visayas dialect prevails throughout Bohol.

Bo'hor, an east African antelope (*Cervicapra bohor*), one of the reitboks.

Bohtlingk, bet'lĭnk, **Otto von,** German Sanskrit scholar: b. St. Petersburg, 11 June 1815; d. 16 April 1904. He received his education in his native city, and in 1853 removed to Germany. In 1842 he returned to St. Petersburg, but subsequently lived much in Jena and Leipsic. His chief work is a Sanskrit-German dictionary in seven volumes, prepared in conjunction with Prof. Roth of Tübingen (1853–75). In 1879–89 he issued a smaller edition giving the meanings (with considerable additions), but omitting the quotations.

Boiardo, Matteo Maria, mä-tā'ō mä-rē'a bō-yär'dō (Count of Scandiano), Italian poet: b. near Ferrara, 1434; d. Reggio di Modena, December 1494. From 1488 to 1494, the period of his death, he was commander of the city and castle of Reggio, in the service of his protector, Ercole d'Este, Duke of Modena. This accomplished courtier, scholar, and knight was particularly distinguished as a poet. His 'Orlando Innamorato' (1496) is continued to the 79th canto, but not completed. He immortalized the names of his own peasants and the charms of the scenery at Scandiano in the persons of his heroes and his descriptions of the beauties of nature. In language and versification he has been since surpassed by Ariosto, whom he equaled in invention, grace, and skilful conduct of complicated episodes. Domenichi, Berni, and Agostini new modeled and continued the work of Boiardo without improving it. One continuation only will never be forgotten — the Orlando of Ariosto. In some of his works Boiardo was led by the spirit of his times to a close imitation of the ancients — for example, in his 'Capitoli'; also in a comedy borrowed from Lucian's 'Timon'; and in his Latin eclogues and translations of Herodotus and Apuleius. In his sonnets and *canzoni* (first printed at Reggio, 1499) he has displayed great talents as a lyric poet.

Boiars. See Boyars.

Boieldieu, Adrien François, ä-drę-ĕn fräṅ-swą bwäl-dyė, French composer of distinction: b. Rouen, 15 Dec. 1775; d. Groshois, 8 Oct. 1834. He early displayed great musical talent, and at 18 wrote an opera, 'La fille coupable,' which was performed with great applause. In 1795 he went to Paris, and rose rapidly in reputation, producing several operas and various other pieces which have become classical. Such as 'Le deux lettres'; 'La famille Luisse'; 'Calife de Bagdad'; and 'Ma tante Aurore.' When the Conservatoire de Musique was established he was nominated a professor. In 1803 he went to Russia as *maître de chapelle* to the Emperor Alexander, but returned to Paris in 1811, and subsequently composed 'Jean de Paris' (1812); 'Le chaperon rouge' (1818); 'La Dame blanche,' his masterpiece (1825); 'Les deux nuits' (1829). The 'Calife de Bagdad'; 'Jean de Paris,' and 'La Dame blanche' still hold the stage and continue popular.

Boies, Horace, American statesman: b. Aurora, N. Y., 7 Dec. 1827. He went to Wisconsin in 1844; and after working on a farm returned, studied law and was admitted to the bar in 1849. He practised at and near Buffalo till 1867, becoming active in Republican politics during this period; and in the last year removed to Waterloo, Iowa, where he continued law practice. His opposition to the tariff and prohibition policy of the Republican party caused him to unite with the Democrats; and, in 1890–4, he served two terms as governor of Iowa, being defeated for a third term in 1893. He was a conspicuous candidate for the presidential nomination in the National Democratic conventions in 1892 and 1896; and in the campaign of 1896 he supported Bryan.

Boii, bō'ī-ī, a Celtic people, who at first inhabited Transalpine Gaul. Their original seat is supposed to have been between the upper Saône and the higher parts of the Seine and Marne. They migrated to Cisalpine Gaul, crossed the Po, and established themselves between it and the Apennines, in the country previously occupied by the Umbrians. They are found, 396 B.C., engaged along with the Insubres and the Senones, two other tribes of Cisalpine Gaul, in the capture and destruction of Melpum, a neighboring city, of which the site and history are unknown. They united their forces with the Etruscans, 283 B.C., after the defeat of the Senones, and were defeated by the Romans at the Vadimonian Lake, the scene of a previous defeat of the Etruscans. After another defeat they made a peace with the Romans, which was preserved for 45 years, when the occupation of the territory of the Senones by the latter led to another war, in which the Boii were again defeated. At the commencement of the second Punic war, 218 B.C., they again attacked the Romans and supported Hannibal. From this period they were engaged in almost constant war with the Romans till they were completely subdued by Scipio Nasica, 191 B.C. Many of them were put to the sword; the remainder were at length compelled to migrate, and crossing the Alps found a refuge among the Tauriscans, a kindred tribe in the territory of modern Bohemia, to which the Boii have given their name. They were afterward driven out or exterminated by the Dacians (some say the Marcomans). Part of them migrated about 58 B.C. to Bavaria. The Boii, like the other Gauls, were a people of considerable civilization, possessing a strong love of independence, and formidable from their military disposition and virtues.

Boil, a superficial or deep localized inflammatory process of the skin leading to the destruction of tissue and the formation of pus. In practically all instances some form of infection by a micro-organism, usually the *Staphylococcus pyogenes aureus,* is present in boils. In the superficial varieties, the bacteria enter the hair follicles or the sebaceous glands and travel down beneath the skin and here either set up a process of destruction or continue one already begun by a wound. There results a local swelling; with exquisite tenderness, and later a pointing and discharge of the purulent detritus from the boil. In the deep-seated varieties similar processes are in action, but the heading and discharge of the boil is delayed. The marked tenderness is due to the involvment of the nerve fibres in the tissues immediately surrounding the inflammatory centre. The predisposition to the formation of boils varies widely, some people being particularly prone to them. They are apparently more liable in those who are "run down," or in those whose tissues are non-resistant. Boils are of commoner occurrence following the winter time of housed individuals, combined with the renewed activities of the skin in the warm spring atmosphere, and they occur following the depressed states of many diseases, and particularly as a result of excessive athletic exercise, "overtraining." Faulty diet and hygiene are responsible for many of them. In their treatment attention to the intestines is imperative. Tonics, particularly those containing some forms of sulphur, are of value. Proper hygiene of the skin is imperative. For the immediate treatment heat is helpful. This is usually applied as a hot flax-seed poultice, preferably, combined with a mild antiseptic; two per cent carbolic acid, being excellent. Early and complete incision is also advisable.

Boileau Despréaux, Nicolas, nik-ō-la bwä-lō-dā-prā-ō, French poet of distinction: b. Paris, 1 Nov. 1636; d. there, 13 March 1711. He applied himself at first to the study of the law and afterward of theology, but devoting himself eventually to the pursuit of literature, he produced, within the space of 40 years, a vast number of works, the most important of which is that on the art of poetry, establishing an æsthetic code for all forms of poetical composition. His satirical poem, 'Le Lutrin,' and the 'Dialogue des héros de roman,' must also be particularly mentioned. His other writings comprise translations of the classics, miscellaneous effusions on art, music, and poetry, and his famous epistles, of which those treating of 'Le respect humain,' 'La connoissance de soi-même,' and 'Plaisirs de la campagne' are the best. When Boileau began to write, Montaigne, Pascal, Malherbe, Corneille, Molière, La Fontaine, and other eminent authors, had already made their appearance; yet the people were slow to appreciate the genius of the new school, to which they preferred the previous mediocre and imitative writers. Boileau's great achievement was to cure this perversion of taste. Like his friend Racine, he was historiographer of Louis XIV., and the recipient of an annual pension of 2,000 francs. His admission to the French Academy did not take place before 1684, owing to his attacks upon some of the members. The latter part of his life was passed in neglect and troubles, which accelerated his death. He left the reputation of a genial, high-minded, and generous man. The best edition of his works is by Gidel (1870–3). See Deschanel, 'Le romantisme des classiques,' 4th series (1888); Faguet, 'XVII. Siècle, Etudes littéraires' (1887); Hemon, 'Cours de littérature' (1889–95); Lanson, 'Boileau' (1892); Morillot, 'Boileau' (1892).

Boiler, in steam engineering, a closed vessel for the generation of steam under pressure. In days when steam pressures did not exceed a few pounds to the square inch, many forms of boiler were used, that are now out of the question, on account of the intrinsic weakness of their forms. At the present time,

when steam pressures are often carried as high as 150 or 250 pounds to the square inch, the strictest attention must be paid to every trifling detail of design and construction, in order to ensure the safety of the structure. The fanciful shapes that prevailed in the days of Watt and other early steam engineers have perforce disappeared, and given place to a limited number of standard types that have been found to be capable of withstanding the severe conditions of modern practice. The types at present in use may be divided into two general classes, according as they are «internally fired» or «externally fired»; that is, according as the fire which furnishes the energy for the formation of steam is contained within the general contour of the boiler, or is situated externally to it. Internally fired boilers are the rule in England, but a large majority of the boilers in use in the United States are fired externally.

Internally Fired Boilers.— The Cornish and Lancashire boilers are the commonest internally fired types. Each consists of a cylindrical shell with flat ends or «heads.» In the Cornish type the boiler is traversed from end to end by a large flue, which is often corrugated, to increase

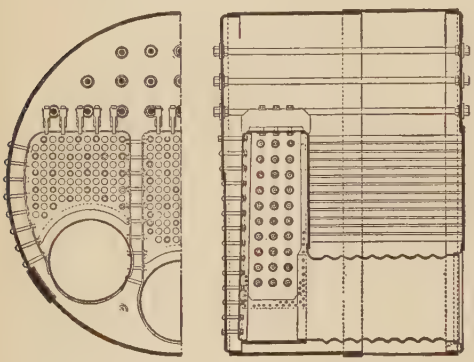


Fig. 1. The "Scotch," or Cylindrical, Marine Boiler.

its strength. The fire is built within this flue, upon a suitable grate at one end of the boiler; and the gaseous products of combustion, after passing through the flue, are returned along the outside of the shell, so as to give up still more of their heat to the water in the boiler. The large flue in the Cornish type is an element of weakness, since the tendency of a flue to collapse through the action of an external pressure increases very rapidly with the diameter of the flue. To guard against collapse, the long flue is often provided with strengthening rings, which are riveted to it externally at short intervals. The Lancashire boiler differs from the Cornish type chiefly in having two comparatively small flues in the place of a single large one. Such a construction is intrinsically stronger, and since there is a fire in each of the flues, the fuel can be replenished, and the fires cleaned, alternately. This implies a greater steadiness of pressure, and less strain upon the boiler from the chilling action of the comparatively cold air that enters and strikes against the heated flue-walls when the fire doors are opened. The Cornish boiler is cheaper to build, and the Lancashire boiler is harder to fire, owing to the smaller size of its flues. The Galloway boiler does not differ in any essential particular from the Cornish or Lancashire types, except that its flues are crossed by conical-shaped water tubes, which serve the double purpose of increasing the heating surface, and of stiffening the flues that they traverse. The conical shape is adopted for the cross-tubes chiefly on account of the ease with which tubes of this form can be put in position, by passing the flange of the smaller end through the opening to which the larger end is to be riveted.

The Scotch, or cylindrical marine boiler, shown in Fig. 1, is a very common type in marine practice. It contains several furnaces (three in the illustration), which are usually corrugated. These furnace-flues do not pass through the entire length of the boiler, as in the Cornish and Lancashire types, but each is connected, within the boiler, to a separate «combustion chamber.» The products of combustion pass from the furnace back into the combustion chamber, and then return to the front end of the boiler through banks of small tubes which occupy the water space of the boiler, above the furnace. A «breeching» (or hood) of sheet steel, secured to the front of the boiler, then receives them, and conducts them to the stack.

Among the kinds of internally fired boilers that are more familiar to the engineers of the United States, the vertical tubular boiler and the locomotive boiler deserve special mention. The vertical tubular boiler consists of a cylindrical shell, with flat heads at the top and bottom, and traversed by a large number of small vertical tubes. The Manning boiler, shown in Fig. 2, is a good example of this type. At the lower end, the shell of this boiler is enlarged to provide a greater space for the fire-box than could be had if the shell were of the same diameter all the way. Another object that the designer had in view, in increasing the diameter of the shell in this way, was to give the boiler a certain degree of elasticity. The tubes are often hotter, in service, than the outer shell; and hence they tend to expand more, and thus throw stresses upon the heads and the tube ends. The reversed flange by which the main shell is secured to the fire-box is supposed to yield sufficiently, under the bending stress thus thrown upon it, to relieve the more vulnerable parts of the boiler from the expansion strains to which they would otherwise be subjected. The fire-box of the Manning boiler is surrounded by an annular space containing water, the inner plates of this space (or «water leg») being secured to the outer ones by screw stay bolts that are spaced evenly, at short distances, so that they form the corners of a system of small squares. These bolts are supposed to be screwed into each of the shells of the water leg, and afterward riveted over at both ends. They are also commonly made hollow, or drilled through lengthwise with a small hole, so that if one of them should break or corrode away seriously, the escaping steam or water would attract the attention of the fireman. Vertical tubular boilers are particularly useful when the available floor space in the boiler room is small; but they are often hard to clean out, and hence are not to be recommended when the water supply is known to form considerable deposits of scale matter. Such scale matter, in whatever part of

the boiler it is formed, will eventually fall upon the lower tube sheet, or else into the water leg. That which falls into the water leg will do no great harm unless it is allowed to accumulate to an unreasonable extent. Handholes are

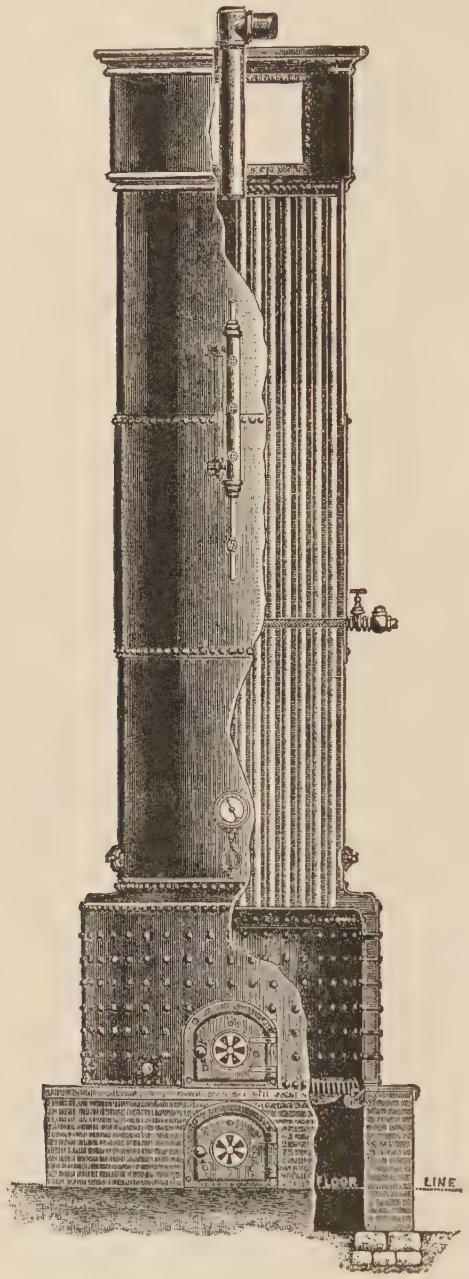


Fig. 2. The Manning Boiler.

provided along the bottom of the water leg, on the outer shell, and these should be opened as often as experience with the particular feed water that is used indicates to be necessary, and the water leg thoroughly freed from scale and mud. Handholes should also be provided on the same level as the lower tube sheet, for a like purpose; but it is not so easy to remove the scale from this sheet as it is to remove it from the water leg. That which lodges around the edges of the tube sheet can be removed without any great trouble, but the deposit that lies toward the middle of the tubes can hardly be got at from the handholes. Yet it is of the highest importance that the tube sheet should be kept free from such deposits, because otherwise the ends of the tubes will become overheated and loosened, and serious mischief, or even disastrous explosion, may follow.

The locomotive boiler is built in a great variety of forms and proportions, but the fundamental principles of design are substantially the same in most of them. Like the vertical tubular boiler, it has a fire-box that is surrounded by a water leg on all sides, though it is open at the bottom for the discharge of ashes, and for the admission of air for combustion. The inner and outer walls of the fire-box are connected by stay-bolts, and the upper sheet of the furnace (technically known as the "crown-sheet") is supported in some efficient manner, so that the pressure of the steam shall not force it down out of position. The support thus necessary for the crown-sheet is sometimes afforded by running "sling stays" from it to the neighboring parts of the outer shell, and sometimes by providing parallel, horizontal girders over the sheet, these being secured to the crown-sheet, at short intervals, by means of hangers, or long, thimbled rivets. Not infrequently these two methods of support are combined in the same boiler, as suggested in the illustration (Fig. 3). The products of combustion pass forward from the furnace, through a bank of small tubes that conduct them to a "smoke-box" or "extension" at the front end, to which the stack is attached. When the locomotive type of boiler is used in stationary practice, the draft required for combustion is provided by a chimney or tall stack, as in other types of stationary boiler; but when used in railway service it is impossible to obtain the draft in this manner, and a "blast-pipe" is therefore provided, through which the exhaust steam from the engine cylinders is discharged up the stack. The gaseous products of combustion are expelled from the "front extension" by the blast of steam, and an equivalent quantity of air is drawn up through the fire. The draft produced in this way is quite powerful. "Baffle plates" are therefore provided in the furnace, in many cases, to deflect the hot gases that come from the fire, and bring them into contact with a considerable portion of the surface of the fire-box, before they pass out into the tubes. The weakest points about the locomotive type of boiler are the crown-sheet and the stay-bolting. If sediment lodges upon the crown-sheet, and thereby keeps the water from direct contact with the metal there, overheating is sure to occur, and the sheet may become so softened and burned as to lose its strength, tear away from its fastenings, and permit the entire contents of the boiler to be discharged into the furnace. Many of the explosions of locomotive boilers are due to this action. The stay-bolting at the sides of the fire-box is likewise a source of frequent trouble, because it is found that the stay-bolts sometimes corrode away very rapidly, so that they are in reality badly wasted and weakened,

when the engineer in charge believes them to be still sound and strong. As in the vertical boiler, the stay-bolts are made hollow so that they may automatically give notice of breakage by leaking. This artifice is helpful, but unfortunately it does not invariably work as it is intended to, and broken or badly corroded stay-bolts exist, not infrequently, without giving the alarm that they are supposed to give.

Externally Fired Boilers.— The commonest type of externally fired boiler, in the United States, is the horizontal tubular. The standard

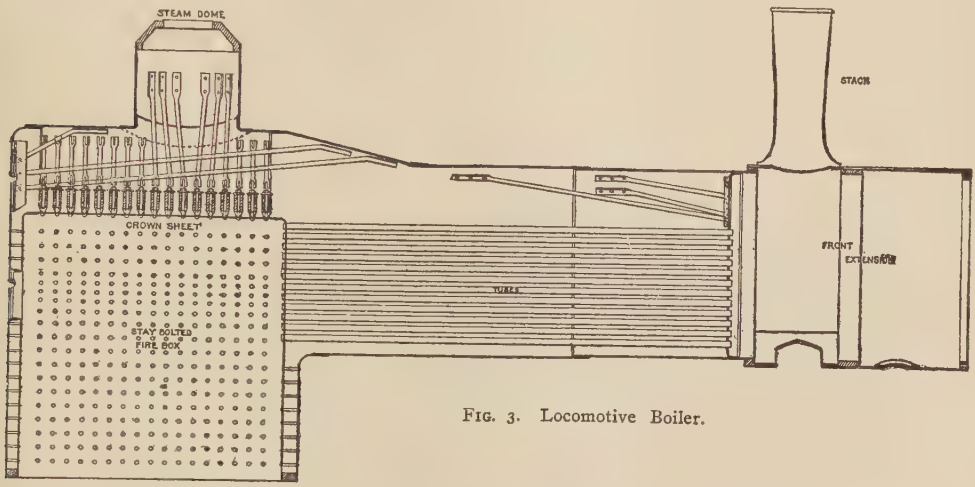


Fig. 3. Locomotive Boiler.

design of this boiler, according to the Hartford Steam Boiler Inspection and Insurance Company, is shown, with its brickwork (or "setting") partially torn away, in Fig. 4. It con-

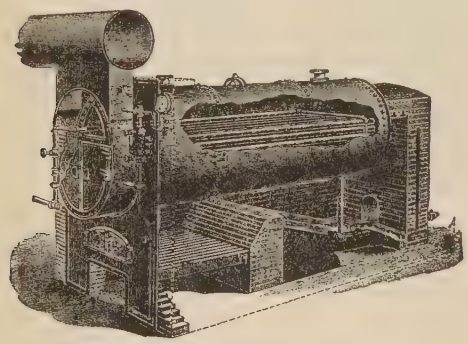


Fig. 4. Horizontal Tubular Boiler.

sists of a cylindrical shell, usually composed of three courses or "rings" of plates, riveted together. The circular joints in these boilers are almost invariably single-riveted; but the longitudinal joints are double-riveted, triple-riveted, or riveted in some even more substantial manner, according to the pressure that the boiler is to carry. The longitudinal joints, which are not shown in the engraving, should be high enough to be well out of the way of the hot gases from the furnace. A multitude of tubes extend through the boiler from end to end, and the furnace gases pass from the furnace back underneath the boiler shell to the "combustion chamber" at the rear, after which they rise and return to the front end through the tubes. They then enter the "smoke box" at the front end, and finally pass upward into the flue that leads to the chimney. The weight of the boiler is sustained by means of cast-iron (or steel) projections, or "lugs," that are not shown in the illustration, but which are riveted to the shell, and rest upon the side walls of the brick setting. Three pairs of lugs are often provided, but two pairs are sufficient except when the boiler is very long; and two pairs can be brought to a good bearing upon the side walls more readily than three. The boiler should be "anchored" by the front pair of lugs, and the rear pair should be provided with rollers so that the boiler may expand and contract freely, without producing strains in the setting or in itself. The course of the feed-pipe, through which water is introduced into the boiler, is indicated quite plainly in the engraving. If there are several boilers set together in one battery, the main feed-pipe runs along the fronts, just under the projecting ends of the boilers. From this main feed-pipe a branch pipe is taken off for each boiler. The branch pipe is taken off on the left-hand side of the boiler, and near the main pipe it is provided with a ground union, or with a flanged connection. Immediately above the union there is a check valve, and above this is the globe valve which controls the feed. The feed pipe enters the boiler just above the tubes, and passes down the boiler on the inside, nearly to the back head. It then crosses over to the right-hand side, and discharges downward between the tubes and the shell. It is found by experience that when feed water is introduced in this way it becomes heated almost to the temperature of the water in the boiler before it is discharged, so that the annoying and often dangerous effects that are produced when the shell is chilled by cooler feed-water are entirely avoided. On large boilers the feed-pipe should have a diameter of at least an inch and a half. The blow-off pipe (which is used for drawing off the contents of the boiler) should be located at the rear end, and

should enter the boiler at the bottom, and not through the back head. To strengthen the construction, the shell should be reinforced where the blow-off enters it, by a ring of boiler plate securely riveted in place, about the point of attachment of the blow-off. The neglect of this simple matter of reinforcement has led to many serious accidents, through the blow-off pipe pulling out and permitting the contents of the boiler to be discharged through the opening so made. As the blow-off is exposed to the action of the fire, it is also important that it should be encased in some sort of a protecting sleeve, as indicated by the dotted lines. A piece of larger pipe, slipped over the blow-off, is often used for this purpose, but it has the disadvantage of rendering the blow-off itself inaccessible for examination. A piece of asbestos rope coiled about the pipe is equally satisfactory, and permits of easy inspection of the pipe. The blow-off pipe of a boiler that is properly cared for is not likely to burn nor to become otherwise injured. Most of the accidents from the burning of such pipes have been primarily due to permitting the pipes to become choked up with mud or scale, so that water could not enter them freely from the boiler, to keep them properly cool. This may be almost certainly avoided by opening the blow-off (say) twice a day for a moment or two, until any sediment that may have fallen into it has been thoroughly swept out. The blow-off pipe is often so arranged that the elbow comes in the combustion chamber; but this is not good practice, and it is much better to carry the pipe down until it passes below the floor of this chamber. The pipe itself should be about two inches in diameter. It should be provided with a plug cock or with a gate valve, but a globe valve should never be used upon it, since valves of this type do not have a straight passage through them, and are therefore likely to catch and retain pieces of scale, which often prove to be very troublesome impediments. It should be mentioned that those parts of the heads of a horizontal tubular boiler that lie above the tubes are intrinsically weak, and must therefore be sustained in some manner. The necessary support is usually secured by running braces from the heads to the side of the boiler shell, though sometimes the braces are run through the entire length of the boiler, from one end to the other.

The horizontal tubular boiler has many excellent points, not the least of which is that it is accessible for examination and cleaning in practically every part. No boiler can be expected to work ideally when the feed water is bad, but the horizontal tubular type gives as good service, even under this trying condition, as can be had from any known type. Its weak points are (1) that it is not so well adapted to extremely high pressures as some of the water-tube types, of which one will be presently noticed; and (2) when it ruptures (as must happen occasionally with every type of boiler) the explosion is likely to be considerably more destructive than the explosion of a sectional boiler, because the large quantity of energy that it contains is liberated more suddenly.

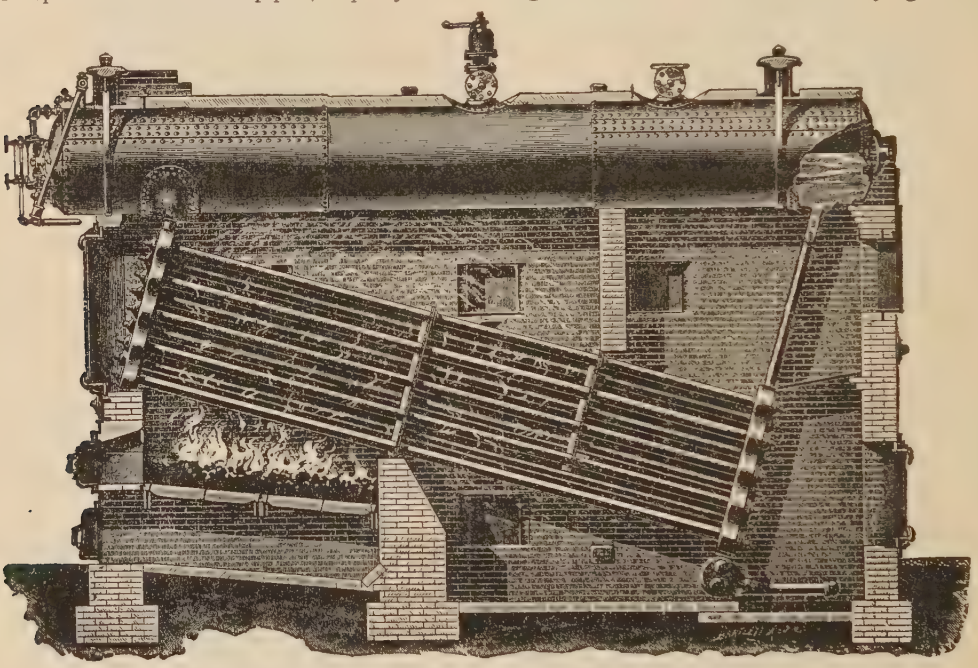
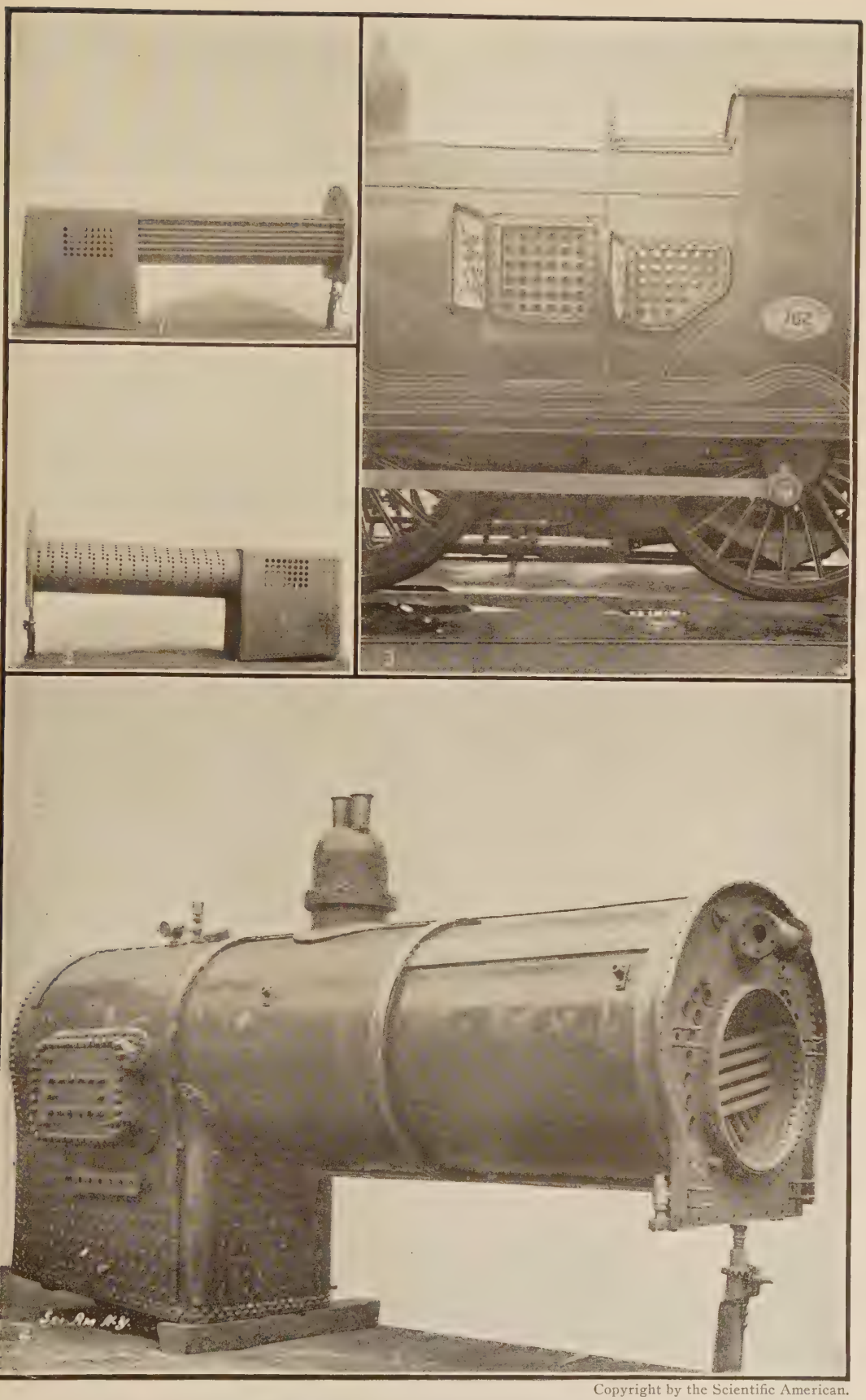


Fig. 5. The Babcock & Wilcox Water Tube Boiler.

Another class of externally fired boilers that is becoming more and more widely used, both in the United States and Europe, is the «water-tube» type, which is characterized by the fact that its tubular elements contain water, instead of serving for the transmission of the furnace gases, as in all the other forms that have been considered above. One of the best-known boilers of this class is the Babcock and Wilcox, which is shown in Fig. 5. This boiler is built up of lap-welded wrought-iron tubes, placed



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AN ENGLISH WATER-TUBE LOCOMOTIVE BOILER.

[1] View Showing Auxiliary Fire-Tubes for stiffening Front End of Fire-box. [2] The Fire-box and Water-Tube Flue.
[3] Side Doors Open, Showing Cross Water-Tubes in Fire-box. [4] Complete Boiler, Showing Side Door to Fire-box and Front End of Flue with Cross Water-Tubes.

in an inclined position, and attached, both at the front and at the rear, to an upper drum that is made of extra thick steel or iron plates, and double-riveted, or riveted with a butt-strapped joint. The tubes are not vertically over one another, but are «staggered,» so that each tube comes directly over a space in the row below it. The boiler is suspended from wrought-iron girders, which rest upon iron columns that are entirely independent of the brickwork; and hence the brickwork may be repaired, or may even be removed altogether, without disturbing the boiler itself. The fire is situated under the front or higher end of the inclined tubes, and the products of combustion are guided by division plates and bridges so that after rising from the fire grate they pass between the tubes to the combustion chamber under the drum, then downward among the tubes again, and finally upward and to the chimney. This devious course, as well as the staggering of the tubes, is intended to bring the hot gases into intimate contact with the tubes at every point. As the water in the boiler becomes heated, it rises toward the higher end of the tubes, becoming meanwhile partially converted into steam. The column of mixed water and steam ascends into the drum, where its constituents separate, the steam remaining in the drum, while the water flows to the rear, where it passes down through the long, upright tubes, and so completes the circulation.

Water-tube boilers are now used to some extent in marine work, and especially in the naval service. Attention has been particularly directed to this branch of the subject by the recent elaborate investigations of the Commission appointed by the British Admiralty, for the purpose of recommending a standard type of boiler for use in the British navy. (See 'Engineering News,' 4 Sept. 1902, page 176.) The Belleville boiler, which has heretofore been somewhat extensively used in that service, is represented, diagrammatically, on plate. It consists essentially of a series of water-tubes, slightly inclined to the horizontal, and opening at the bottom into malleable iron collector boxes, and at the top into a drum to which the main steam pipe is attached. The feed water is introduced at the middle of the upper drum, and is injected under a pressure in excess of that which is carried upon the boiler itself. To prevent the comparatively cool feed water from entering any of the tubes in which steam is generated, these tubes are caused to project at least eight inches into the drum. The feed passes down through return pipes at the sides of the boiler, and enters the tubes below, after its temperature has been raised by the heat of the furnace sufficiently to prevent injury from contraction strains. The proper regulation of the feed-water supply is one of the difficult practical points about the Belleville boiler; and to overcome it as far as possible an ingenious automatic feed device is provided. As will be understood from an inspection of the engraving, there is little or no true circulation in boilers of this type. The tube-groups discharge a mixture of steam and water into the drum, where the steam is supposed to be freed from the water by the aid of a system of baffle plates that are not shown. An economizer is placed in the stack above the boiler in the most approved modern installations, the construction of the economizer being similar to that of the boiler itself, except that the tubes composing the elements are smaller. The Commission already referred to reported somewhat unfavorably upon the Belleville boiler, but did not suggest any other special type of water-tube boiler for general use aboard ship. It inclined rather toward cylindrical boilers for ordinary purposes, with auxiliary water-tube boilers for emergencies.

All boilers are supposed to be provided with certain appliances intended to secure safety, and uniformity of working. Noteworthy among these are the safety valve, and the gauges that indicate the pressure of the steam and the position of the water level. These are described under separate headings.

The «horse-power» of a boiler is often spoken of; but the term is a loose one, without any definite significance, because the horse-power that can be realized from a boiler depends to a very great extent upon the engine that is used to develop the power, and upon how hard the boiler is forced. The Centennial Commission adopted, as the definition of a horse-power (when that expression is used in connection with a boiler), the «evaporation of 30 pounds of water per hour, when the temperature of the feed water is 100° F., and the pressure of the steam is 70 pounds per square inch, as read from the gauge.»

Steam boilers may explode from any one of a great variety of causes. Of these three are specially worthy of mention: (1) The boiler may be poorly made or poorly designed, so that even when it is new it is not capable of safely withstanding the load that is put upon it. All boilers, however well made, should have a «factor of safety» of five; that is, they should be able to sustain a pressure five times as great as the regular working pressure, before bursting. (2) A boiler, originally good, may be wasted away, either locally or generally, by corrosion or other form of deterioration, or it may develop defects in service, which detract from its original strength sufficiently to lead to explosive failure. Competent periodical inspection will materially lessen the liability to explosion from causes of this sort. (3) The water in the boiler may become low, through neglect or through the failure of the feed-apparatus, so that the metal becomes overheated or burned, and loses its strength. This is the cause almost invariably assigned, by the general public and even by minor «experts,» when the boiler explosion occurs, and the attendant is frequently censured for his carelessness when the explosion was really due to some totally different cause. When an explosion is attended by great manifestations of force and energy, it is safe to conclude that a plentiful supply of water was present; for a boiler full of heated water contains vastly more energy than one that is merely filled with steam at the same temperature. (See Thurston, 'Steam Boiler Explosions.') Pound for pound, steam contains more energy than water, when the two are at the same temperature; but cubic foot for cubic foot (and this is the way that the comparison should be made in reasoning about a boiler explosion), the water has an enormous advantage, owing to its greater density.

For further details concerning boilers, consult F. R. Hutton, 'The Mechanical Engineering of Power Plants'; J. G. A. Meyer, 'Modern

Locomotive Construction'; Peabody and Miller, 'Notes on Steam Boilers'; R. H. Thurston, 'A Manual of Steam Boilers,' and 'Steam Boiler Explosions'; William Kent, 'Steam Boiler Economy'; W. H. Shock, 'Steam Boilers'; Leslie S. Robertson, 'Water Tube Boilers'; and W. H. Ford, 'Boiler Making.' See also the 1899 'Code' for boiler trials, in Vol. 20 of the 'Transactions of the American Society of Mechanical Engineers.'

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Boiler Shop Terms. The following list of terms includes the principal terms and phrases commonly employed in connection with the work of the design, constructon, and use of steam boilers.

Specific information relative to boiler fittings such as valves and cocks may be found under the title Valves and Valve Terms.

Information relative to the design and construction of locomotive engine boilers, and concise descriptions of their various parts, fittings, and accessory appliances and devices such as pumps and injectors, and cocks, valves, and feed-water heaters, will be found carefully treated under the title Locomotive, Design and Construction of the Modern.

Special information relative to the general methods and operations of constructive work such as the boring, drilling, and punching of holes, and the joining of plates by riveting and welding, will be found under the title Work-Shop Terms; while the definitions of the various terms and their abbreviations such H.P.— Horse-power, and B. T. U.— British Thermal Units, etc., may be found under the title Engineering and Structural Terms in this encyclopedia.

Acidulated Water.— Water in which acids have been generated by the introduction of too much tallow into the boiler to prevent incrustation. Its use tends to produce boiler corrosion.

Air Casing.— The enclosed space which envelops the uptake of marine boilers and prevents the loss of heat therefrom by radiation.

Air Spaces.— The openings between the fire-bars of engine boilers.

Anti-fouling Compositions.— See Incrustation.

Ash Pit.— That part of the furnace of a stationary boiler which lies below the fire-bars and immediately in front of the fire-door. It is provided for the reception of the ashes which fall through the bars, and constitutes the main draught entrance of the furnace.

Baffle Plates or Bafflers.— The plates provided in the fire-boxes and flues of steam boilers for throwing the flames and hot gases against the best heating surfaces. Also to admit air above the fire, and to prevent the burning and buckling of the door of the furnace.

Ballooning.— The process which takes place within a steam boiler when a sediment of fine mud and scale is carried to the surface of the water by the ebullition of the bubbles of steam. Large boilers are provided with "scum-troughs" for collecting this sediment.

Banding or Bonding.— The securing of the lagging around steam cylinders and boilers with broad encircling bands of sheet-brass or hoop-iron.

Bar-stays.— Solid screwed stays as distinguished from tube-stays or stay-tubes.

Bearing Ring.— The ring which forms the support of the fire-bars in a vertical boiler.

Blast.— The volume of air forced artificially into the furnaces of marine boilers to quicken the combustion.

Bleeding.— The red streaks of rust which soak through the scale adhering to the inner surfaces of boilers and serve to indicate the presence of corrosion in the plates underneath.

Blisters.— Defects in boiler plates of poor quality, caused by the retention of cinders or sand therein during the rolling process.

Blow-off or Blow-off Cock.— The pipe and cock situated at the lower part of the boiler by which the boiler is blown-off or emptied of its contents to prevent incrustation. In horizontal boilers of the Lancashire and Cornish type, a pipe called the blow-off bend connects the cock with the blow-off seating through which the boiler is blown-off into the ash pit.

Bear or Boiler Bear.— See Punching Bear.

Bottle-tight.— The seams, rivets, fittings, and mountings of a steam boiler are said to be bottle-tight when the joints are so close and perfect that there is not the slightest leakage through them under the application of the water or the steam tests.

Bottling-up.— The temporary confinement of steam in the tubes of a sectional boiler caused by its being generated too rapidly.

Bowling Hoop.—A ring of arch-shaped section, and provided with flanges for the reception of rivets, employed for uniting the sections of furnace shells in horizontal boilers.

Breaking Joint.— The manner in which the longitudinal seams of the plates of the boiler are arranged so as to act as supports for each other.

Bridge.— The barrier of brickwork built upon a girder-like casting which stretches across the fire-box of an engine boiler at the farther end of the grate. It serves to throw the flames upwards to the heating surface, and also prevents a too rapid escape of the heated gases.

Brine Pump.— A pump employed for periodically drawing off a certain amount of water from a marine boiler to prevent saturation.

Bunker Plate.— A sheet-iron plate which encloses the bunker or space which holds the coal or coke used in the furnace of an engine boiler.

Bursting.— The destruction of a boiler by an excess of internal pressure, as distinguished from collapsing, or the failure of a boiler under the force of an external pressure.

Calorimeter.— The sectional area of a boiler flue, given in square inches.

Capacity.— See Heating Surface.

Carbonate of Lime.— The principal substance which causes the incrustation of steam boilers and water-pipes. It is held in solution in the water as a bi-carbonate by the excess of carbonic acid. When the boiler is heated the excess of acid is driven off, and the carbonate is precipitated in the form of a muddy deposit which hardens in the presence of heat into the form of an injurious scale.

Caulking.— The process of burring or driving up the edges of boiler plates along the riveted seams to make them steam and water tight. The caulking of the joints between boiler shells and the flanges of cast-iron man-holes, and safety and stop valve seatings, is accomplished by means of caulking-strips or strips of sheet metal interposed between the wrought-iron of the shells and the cast-iron of the pieces attached thereto. This is rendered necessary on account of the impossibility of caulking the cast-iron.

Chimney.— The tube or funnel through which the waste steam and smoke escapes from an engine or boiler into the open air. Its proportions bear a definite relation to the grate area, and vary in the different types of engines.

Circulating Tubes.— The cross tubes of vertical boilers, or the ordinary forms of tubes used in multi-tubular boilers or surface condensers.

Circulation.— The circulation in a steam boiler is caused by the bubbling up of the lighter boiling water from the heating surfaces through the heavier cooler water in the upper portions which descends and thus comes in contact with the heating surfaces. Efficient circulation is necessary to the rapid generation of steam, and for the prevention of incrustation. It is promoted by the use of properly arranged water tubes.

Clinkering.— The removal of the clinkers or other vitrified material from the fire in the boiler, periodically.

Clothing.— The felt and wood coverings placed around boilers to prevent loss of heat by radiation.

Coating.— Non-conducting compositions of felt, silicate cotton, asbestos, etc., which are smeared or placed around steam boilers while the substances are in a plastic state, and which become subsequently hardened by the heat, and prevent the loss of heat from the boiler by radiation.

Cold Water Test.— The hydraulic test, for pressures only, applied to steam boilers, as distinguished from the hot water test.

Collapse.— The destruction of the tubes and fire-boxes of steam boilers by external pressures which cause them to fail by bending or crumpling inwardly.

Collector.— A cylindrical vessel enclosed in a steam boiler for the purpose of collecting the sedimentary matter contained in the water, which if allowed to

remain in the water would produce injurious scale and incrustation. The material thus collected is removed by being blown-out at intervals.

COMBINED STEAM.— Dry and wet steam allowed to mingle together before being used. Its use, at a temperature not exceeding 310° Fahr., tends to diminish the evils of corrosion and priming.

COMBUSTION CHAMBER.— That portion of a boiler flue in which the gases liberated by the action of the fire are burned. It lies between the grate and the smoke-flue.

CORROSION.— The rusting or oxidation of metals by contact and chemical union with oxygen in the presence of water. Boiler corrosion is either internal or external. Internal corrosion is due to the presence of acidulated water, or to superheated steam in the steam-chamber. External corrosion results from leakage and from contact with damp foundations and seatings.

CORRUGATED FURNACE TUBES.— Furnace tubes which are ribbed in their longitudinal sections. They are extensively used both in land and marine boilers. The elastic character of the corrugations absorbs the linear expansion of the tubes under the influence of heat, and thus prevents the strains which tend to bulge the end-plates of the boiler.

CROSS-TUBES.— The heating tubes in a vertical or cross-tube boiler. They pass through the fire-box, and therefore, being surrounded by the fire, materially assist in maintaining a rapid circulation of the water. They are cleaned through a mud-door placed opposite the end of each tube.

CROWN.— The boiler crown proper, is the uppermost plate in the shell of the boiler. It is formed either in the shape of a hollow disc flanged around the edges, and by which it is riveted to the outer shell-plates, or it is made flat and secured in place by means of stays. That portion of the crown which lies over the top of the furnace or inner shell is usually designated as the fire-box crown.

DAMPER.— The plate, cover, or valve, employed for regulating the amount of draught in a boiler or furnace flue. The contrivance is usually balanced with a weight called the damper-weight which assists in its adjustment.

DEAD-PLATE.— The cast-iron plate which lies immediately within the furnace door of an engine boiler. It is provided for the reception, and for the partial coking of the coal before it is passed forwards onto the grate.

DEAD-WATER.— The water which lies below the heating surface of the boiler, and, therefore, is in comparatively slow circulation. In some forms of boilers the flues are brought forwards under the bottom so as to heat the dead water and thus induce a more rapid circulation therein.

DOLLY.— A riveting tool used by boilermakers for holding under the heads of rivets during the act of riveting.

DOUBLE-ENDED BOILER.— A marine boiler provided with furnaces and flue doors at each end, and is therefore fired from each end.

DRY STEAM or SATURATED STEAM.— Steam which has not been superheated, nor mixed with the water of priming. It is the most suitable form of steam for use in engine cylinders.

ECONOMIZER.— An arrangement of pipes by means of which the feed-water for steam boilers is heated up to, or higher than, the boiling point.

EVAPORATIVE VALUE.— The relative capacities of the various types of steam boilers to vaporize water, expressed in horse-powers, units of work, or in thermal units.

EXPANDING.— The tightening of boiler tubes in the tube plates by expanding or opening out their ends.

EXPANSION HOOP.— The metal ring which is used in the forming of an expansion joint provided in long boiler flues for the purpose of taking up the linear expansion due to heat.

FEEDER.— The agency by which the feed-water supply of a boiler is maintained. Usually, it is some form of force pump, or an injector.

FIRE-BARS.— The grate-bars of the furnaces of engine and other boilers.

FIRE-BOX.— A term which is specifically applied to the furnaces of locomotive and vertical boilers.

FIRING.— Boilers are fired both internally and externally. Internally fired boilers are those in which the fuel is consumed in a tube or arrangement of tubes within the boiler itself. The Cornish with one flue, the Lancashire with two flues, the locomotive boiler and other forms of boilers with many internal tubes, the vertical boilers with uptake and cross-tubes, and the marine boilers with return flues are of the internally fired class. Externally fired boilers are those which are not provided with internal fire-boxes or furnace flues. The egg-end, the balloon, the hay-stack, and the wagon boilers are of this class. They are practically obsolete.

FIRE TUBE BOILER.— A multitubular boiler, as distinguished from a sectional boiler or a water tube boiler.

FITTINGS.— The fittings of a boiler comprise the manhole and mudhole doors, the fire-bars and their rings and bearers, the furnace doors, the dampers and frames, etc.

FLAME PLATES.— The crown plates of a boiler flue or fire-box.

FLANGING.— The bending over of the edges of the boiler plates so as to form narrow flanges by which they are attached to each other either by riveting or by welding.

FLOAT.— A buoy employed to indicate the height of the water in the boiler. It is usually made of stone or of iron, and is rendered buoyant by means of a counterpoise the proportion of which relatively to the specific gravity of the float renders the float quite as susceptible to the variations in the water level as a float of wood. Its movements are observed by means of the float gauge attached to the boiler.

FLASH BOILER.— A steam boiler composed of a large number of small tubes which are kept red-hot, and unto which the water is fed in the form of a spray which is instantly converted into steam. They are principally used in connection with steam driven automobiles.

FLUES.— The flues of a boiler are the arrangements or parts which carry off the waste gases and smoke, and produce the draught.

FLUE PLATES.— The ends of horizontal boilers to which the flues are attached, or the fire-box crowns of vertical boilers.

FLUE SURFACE.— The area of the flues as distinguished from the grate-area.

FOLLOWING JOINTS.— The lap joints of the rings which compose a cylindrical boiler. As all of the joints lap in the same direction, they are called following joints.

FULLERING.— A mode of caulking boiler plates. It differs from caulking proper in that the entire edge of the plate is hammered over instead of only a portion of the edge.

GRATE.— The area which contains the burning fuel in the furnace of an engine boiler. The grate-area is the number of square feet covered by the grate-bars or fire-bars which compose the grate. It is equal to the area over which full combustion can take place, and is usually estimated in relation to the weight of coal burned.

GROOVING or FURROWING.— The cutting or corroding which takes place in the seams of improperly stayed boiler plates. It is partly due to the leverage to which those parts are subjected, and partly to the action of acids in the lines of strain.

GROSS SECTION.— The total number of inches contained in the circumference of a steam boiler.

GUSSET or GUSSET STAY.— A triangular piece of wrought-iron or steel employed to support the flat ends of boilers. Large boilers are provided with five gusset stays at each end, which are secured to the end-plates and the shell by angle-irons.

HOLES.— When the rivet holes in boiler plates are punched or drilled so inaccurately that they do not coincide within an amount equal to one-half their diameters when the plates are brought together, they are called half-lap or half-blind holes. When the holes do not correspond within the extent of a whole diameter they are called blind-holes. In riveting, such holes are either pulled together with a drift, or they are reamed out and larger rivets inserted.

HAND HOLES.— Holes provided in the shells of steam boilers in cases where a mudhole is impracticable, through which the hand may be introduced for purposes of cleaning and repair.

HARD WATER.— Water which contains a large percentage of carbonate and sulphate of lime. Its tendency to produce calcareous deposits makes it very objectionable for use in steam boilers.

HEATING SURFACE.— The entire surface of a steam boiler, comprising the surfaces exposed to the heat on one side and the surfaces in contact with the water on the other side.

HOGGING.— The distortion of the furnace tubes of boilers caused by the expansion of the plates under the influence of heat.

HONEYCOMBING.— A form of boiler corrosion consisting of numerous blank holes or pits. It is due to the action of acids, to galvanic action, or to a lack of uniformity in the quality of the plates.

HORIZONTAL BOILER.— One in which the longitudinal axis of the barrel is horizontal, such as the Cornish, Galloway, and Lancashire boilers, and various forms of marine boilers.

INCLINATION.— Some forms of horizontal boilers are inclined forwards about half an inch per ten feet of length so as to drain properly through the blow-off cock. Fire-bars are inclined backwards about one inch in ten inches to permit of the fuel being moved rapidly away from the dead-plate.

INCRUSTATION.— Coatings of carbonate and sulphate of lime and other solids formed on the internal portions of engine boilers by deposition from the feed water.

INJECTION.— The process of drawing water into a steam boiler by means of an injector.

KEELSONS.— The wrought-iron or steel saddles which support marine boilers.

LAMINATED PLATES.— Wrought-iron or rolled steel plates in which the several layers are imperfectly united. They are very apt to blister when used for boiler plates.

LEAKAGE.— The loss of feed water due to the alternate expansion and contraction of the plates under the influence of sudden heatings and coolings, which tend to start the rivets and open the seams.

LONGITUDINAL SEAMS.— The plates which run lengthways of the boiler. They are always arranged to break-joint, and are never placed in-line.

MANHOLE.— An opening provided in the shell of the boiler through which a man may gain access to the interior for purposes of examination, cleaning, and repair. It is oval in form and is usually stayed either with a wrought-iron ring, or with a casting.

MARINE BOILER.— A horizontal boiler of the return tubular type. They are of many different types, and vary in their arrangement to suit different conditions.

MUDHOLE.— An opening in the lower part of a boiler through which the sediment deposited by the water is removed. When the boiler is being used, the mud-hole is closed by a door called the mud-lid which is inserted within the hole and pulled up against its inner face by means of a bolt. This bolt is attached to the door and passes through a bridge which spans the hole and rests against its outer face. The bolt is tightened to the bridge by means of an ordinary nut.

MULTITUBULAR BOILER.— A boiler composed of numerous tubes of brass or of iron, through which the hot gases pass from the fire-box to the chimney, and thus heat the water which is in contact with the outer surfaces of the tubes. The locomotive, horizontal, and portable boilers are of this type.

OVERHEATING.— The overheating of boiler parts are due either to incrustation, or to an insufficient supply of water. It tends to soften the plates so that they bulge or fracture under the force of internal pressures.

OVERPRESSURE.— The pressure developed in a steam boiler exceeding that which it is designed to sustain.

PATCH.— A strengthening plate of wrought-iron or steel riveted or bolted to the boiler plates which have been injured by accident, or have become weakened by corrosion.

PITTING.— The corrosion of boiler plates in patches. See Honeycombing.

PLATE.— In the manufacture of steam boilers the use of wrought-iron plates has been completely abandoned for those of steel. The steel plates are rolled in larger sizes, thus reducing the number of riveted seams, and as they possess a much greater tensile strength, they permit of the development of the higher pressures required by modern engines.

PLATE FURNACE.— A reverberatory furnace used by boilermakers for heating plates preparatory to bending, flanging, and welding.

PRESSURE.— The working pressures in steam boilers vary with the type of the boiler, the material of the boiler plates, and the method of construction. They range from 45 to 60 pounds per square inch in those of the Cornish and Lancashire type; from 100 to 180 pounds in the marine boilers; and from 120 to 235 pounds in the portable and locomotive boilers.

PUNCHING BEAR or BOILER BEAR.— A portable punching machine. The punch is actuated either by a screw, or by hydraulic pressure.

RETURN FLUES.— The flues in horizontal boilers, which are brought from the back of the furnace to the front, and are then carried back again to the chimney.

RETURN TUBULAR BOILER.— A marine boiler in which the smoke tubes extend from the back of the boiler forwards to the smoke-box. By this arrangement, the products of combustion are carried first to the back of the boiler through the fire-box, and then to the front of the boiler through the tubes.

RIBBED TUBES.— Tubes which are rolled so as to form several deep radial ribs on their internal surfaces, and thus increase the area of the available heating surface. They were invented by M. Serve. The Purves tubes are ribbed or corrugated transversely. The use of these tubes gives from 15 to 20 per cent. better results relative to the economical consumption of fuel and the increase in steam pressure than may be obtained by the use of the ordinary tubes with smooth surfaces.

RINGS.— Metal rings used for uniting the shells and fire-boxes, for the jointing and caulking of seams, and other similar purposes. They are either cast or welded.

RING SEAMS.— The circumferential joints of a boiler shell.

SALINOMETER.— An instrument employed for ascertaining the amount of salt in the feed-water of a marine boiler. It is either a hydrometer graduated for degrees of saltness, and by which the specific gravity of the water is measured, or a thermometer by which the boiling point of the water is determined, and the percentage of salt in solution deduced therefrom.

SALTING.— The deposits of salt which accumulate on the plates of a marine boiler. It is not injurious to the plates unless excessive in quantity. The density of the feed-water should not exceed ten ounces of salt per gallon.

SATURATED STEAM.— Steam which remains in contact with the water from which it has been generated, and therefore retains a quantity of water in suspension. Also called Dry Steam.

SCALING.— The process of removing the scale or deposits of carbonate of lime, etc., from the interior of boiler plates. It is effected by a process of chipping with a keen-edged hammer called a scaling-hammer.

SECTIONAL BOILER.— A boiler composed of a number of small independent heating tubes. The advantages of sectional boilers are the high pressures that may be developed in them, the strength of the small tubes, the prevention of explosions, the rapid transmission of heat, and the facility with which local injuries may be repaired. Their disadvantages consist in the tendency to accumulate deposits in the flues, the tendency to overheating, and the difficulty experienced in clearing them out.

SCUM COCK.— A cock inserted in the side of a marine boiler for discharging the dirt and scum carried to the surface of the water, and which if allowed to remain in the water would deposit and form an injurious scale. See Ballooning.

SOOT DOOR.— A square iron door built into the front ends of the brickwork flues of horizontal boilers, through which the accumulations of soot are removed periodically.

STAYS.— Rods or tubes which connect and stay the flat ends of the boiler. They are made either of copper, wrought-iron, or steel. Bar stays and tube stays, also called screwed stays, are first screwed into the ends of the shells or fire-boxes, and then secured either with nuts or by riveting. Gusset stays are riveted.

STEAM ROOM.— The area included between the highest water level in the boiler and the boiler crown. It is the space occupied by the steam.

TESTING.— The strength of steam boilers or their capacity to withstand the stresses due to internal steam pressures are usually ascertained by the application of a pressure of water produced by means of a test pump. The pressure usually applied under test is about twice the working pressure.

THROUGH TUBES.— The flue tubes of horizontal boilers. They pass from one end of the boiler to the other, and are attached to the end plates.

TIE BOLTS.— Long screw bolts employed for the purpose of staying large, flat surfaces, which are inherently weak.

TRANSFER OF HEAT.— The transmission of heat from the furnace of a boiler to the water in the boiler. The rate of transmission or the number of heat units transferred per hour, varies according to the amount of heating surface, and is directly proportional to the thickness of the plates. Furnace area is more efficient than tube area.

TUBE PLATES.— The plates into which the tubes of multitubular boilers or surface condensers are inserted and secured.

TUBULAR BOILER.— Various forms of locomotive, marine, portable, horizontal, vertical, and sectional boilers.

UPTAKE.— In a vertical boiler, it is the internal flue which leads from the furnace to the chimney. In a marine boiler, it is the return flue.

VENT.— The value obtained by multiplying the calorimeter of a boiler by its length.

VERTICAL BOILER.— A steam boiler of circular horizontal section. Vertical boilers are chiefly used in connection with small steam engines, and are not

nearly as economical as those of the horizontal type, as the products of combustion pass from the fire-box directly into the chimney.

Water Bridge.— A form of bridge which is made of iron and is continuous with the boiler itself. It is hollow, and therefore assists the circulation of the water which passes through the interior of the boiler.

Water Tube Boiler.— Various forms of sectional boilers of the Yarrow, Thornycroft, Babcock and Wilcox, Belleville, and other classes.

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Boiling Point, the temperature at which a liquid boils, when exposed to a definite pressure, which is understood to be the ordinary atmospheric pressure, in the absence of any specific statement to the contrary. When a liquid is freely exposed to the air, evaporation goes on constantly from its surface, the heat required being absorbed from surrounding bodies. If the liquid is warmed, the evaporation goes on at an increased rate; but as its temperature is increased by the application of heat, there comes a time when mere superficial evaporation cannot take care of all the heat supplied. Bubbles of vapor then form within the body of the liquid, and the liquid is said to have attained its «boiling point.» If the supply of heat be now increased, it is found that the temperature of the liquid remains stationary; bubbles merely form more rapidly, so that the rate of loss of heat through evaporation is still maintained equal to the rate of supply. The temperature of boiling depends upon the pressure; for at an increased pressure the bubbles are formed in the interior of the liquid with greater difficulty, and therefore not until a higher temperature is attained. The variation from this cause is considerable. Thus the boiling point of water, under a pressure of one atmosphere, is 212° F., while under a pressure of two atmospheres it is about 250° F. At the reduced pressures prevailing on the tops of mountains, the boiling point of water is lower than 212° F., and advantage of this fact is taken for determining the heights of mountains by observations of the boiling point at their summits. (See Hypsometry.) When the liquid is not open freely to the air, but confined in a closed vessel, its temperature can be raised indefinitely by the application of heat, but the vapor in the space above it is denser, and has a greater pressure, at higher temperatures. The correspondence between pressure and temperature, under these circumstances, is very exact, although no simple law connecting the two is known. Rankine gave an empirical formula for the relation between them, of which computers of steam tables have made great use ('Miscellaneous Scientific Papers,' page 1); but the physical significance of this formula is unknown. The relation between the pressure and boiling point of a liquid is commonly exhibited by means of a table in which the temperatures of ebullition are set down opposite the corresponding pressures. (For a table of this sort for water, see Steam.) The phenomena described above in connection with the free evaporation from a liquid exposed to the air are in general true, but certain qualifications must be made, under certain special conditions. Thus, it is difficult to induce water to boil when it has been freed from dissolved air; and in the entire absence of such air De Luc found that water can be heated as high as 234° F., under ordinary atmospheric pressure, before boiling, if the experiment is performed with proper care. A liquid thus heated to a temperature in excess of the normal boiling point corresponding to the pressure to which it is subjected is said to be «superheated.» When boiling does finally occur in a superheated liquid, it takes place with almost explosive suddenness, and the loss of vapor is exceedingly rapid for a moment or two, until the temperature of the liquid has been reduced by this means to the normal temperature corresponding to the pressure prevailing at the time. The temperature at which ebullition takes place is also influenced to a certain extent by the nature of the vessel in which the liquid is heated. Thus Marcet found that in a glass vessel which had been carefully washed out with sulphuric acid, and then well rinsed, pure water does not boil until a temperature of 223° F. has been attained. All results of this kind are of an indefinite character, however, since they relate to the temperature at which boiling first begins, rather than to the state in which the liquid and its vapor are in a condition of permanent thermal and mechanical equilibrium. Superheated water is in an unstable state, and, according to some authorities, not a few boiler explosions have been due to the superheating of the water present, from some cause, and the subsequent explosive liberation of steam, as the water returned to its normal condition; but this notion concerning the cause of boiler explosions has never been substantiated by experiment or otherwise, and must be regarded as a mere speculation, without any foundation in fact. A liquid has a higher boiling point, when it contains some substance in solution, than it has when pure. The effect of dissolving salt or any other electrolyte is complicated by the occurrence of dissociation (q.v.); but for dilute solutions of non-electrolytes, like sugar, the following law, first given by Raoult, holds true: If a series of dilute solutions of such substances be prepared, each solution containing, per unit weight of the solvent, an amount of solid proportional to the molecular weight of the solid, then the solutions so prepared will all boil at the same temperature. (See Solutions.) For marking the «boiling point» upon thermometers, it is the universal practice to expose the thermometers to the steam rising from the boiling water, rather than to immerse them in the water itself; for the temperature of the steam is independent of the presence of traces of dissolved substances in the water, and also of the action of such accidental or irregular causes as the superheating of the water. See Thermometry.

Boilly, Louis Leopold, loo-ę lā-ō-pŏld bwä'ye, French painter: b. La Bassée, France; d. 1845. To his prolific brush are attributed about 5,000 paintings, chiefly historical. The period represented on his canvases ranges from the time of Louis XVI. to the end of the Restoration. Among his works are: 'Arrival of the Diligence' (1803); and 'Isabey's Atelier.'

Bois d'Arc, bwä-därk, the osage orange (q.v.).

Bois de Boulogne, bwä-dė boo-lō-ny, once a forest abounding with game near the gates of Paris, now a beautiful park belonging to the city; area, 2,250 acres. The greater part of the old trees were destroyed during the revolution. When Napoleon chose St. Cloud for a summer

residence, he ordered young trees to be planted, had the place enclosed with a wall, and stocked with game. In 1815 the British troops under the Duke of Wellington were stationed in it, and many of the trees were then cut down, but new ones were planted by Louis XVIII. In 1852 it came into the possession of the municipality, and is now one of the gayest holiday promenades. During the Franco-German war of 1870–1 a large number of the trees were cut down by the French in preparing for the defense of Paris. In the time of the disturbances of the Commune in 1871 several sanguinary encounters took place here. In the Bois are the noted Auteuil and Longchamp race courses, and also the Jardin d'Acclimatation.

Bois-le-Duc, bwä-lė-dük (Dutch HERTOGENBOSCH), the capital of the province of North Brabant, in Holland, 49 miles southeast of Amsterdam, at the confluence of the Dommel and the Aa, which form, by their junction, the Diest. It was a strong fortress up to 1876, but has ceased to be kept as such. It is intersected by canals, and among its buildings the chief is the cathedral, in late Gothic, built in 1458–98, with an old tower of the 11th century, and a chapel of the 13th, the whole recently restored. Other buildings are the town-hall, palace of justice or court-house, the episcopal palace, and the government buildings. Among educational institutions are a gymnasium, a Latin school, and a normal school for teachers. Bois-le-Duc has many industrial establishments and an active trade. Its chief manufactures are gold and silver wares, cigars, mirrors, boots, and shoes, etc. The city suffered much in the religious wars of the 16th century, and fell into the hands of the Dutch in 1629. On 14 Sept. 1794, the French defeated the English here, and on 9 October of the same year it surrendered to Pichegru. In January 1814, it was taken by the Prussians, but the citadel held out. Pop. (1900) 44,034.

Bois-Guilbert, bwä-gel-bār, **Sir Brian,** a character in Scott's 'Ivanhoe.' He is a Knight Templar whose passionate attachment to the beautiful Jewess Rebecca, severe struggle with his pride and tragical death in the lists, form one of the most dramatic features of the romance.

Bois de Vincennes, bwä dė văń-sėn, the ancient hunting park of Louis IX.; now a pleasure-ground of 2,250 acres on the west of Paris. A large portion of it is devoted to the purposes of the Champ de Manœuvres, drill-ground, and polygone d'artillerie.

Boise, James Robinson, American educator: b. Blandford, Mass., 27 Jan. 1815; d. Chicago, 9 Feb. 1895. He was graduated at Brown in 1840, and received an appointment there as tutor in ancient languages. In 1850 he went abroad to study; in 1852 became professor of the Greek language and literature in the University of Michigan; in 1868 took the same chair in the University of Chicago. Upon the establishment of the new University of Chicago, he was appointed professor emeritus of New Testament Greek. The numerous classical text-books edited by him were widely used. Besides these, he published: 'Notes on the Greek Text of Paul's Epistles to the Ephesians, Colossians, Philemon, and the Philippians' (1884); 'Notes on the Greek Text of Galatians and Romans' (1886).

Boise, Otis Bardwell, American composer and music teacher: b. Oberlin, Ohio, 13 Aug. 1844. After studying music in Leipsic he settled in New York as a teacher of composition and for a time was organist of the Fifth Avenue Presbyterian Church. During 1876–7 he was again in Europe studying and had the benefit of Franz Liszt's advice and criticism, after which he resumed teaching in New York. Since 1888 he has been engaged in professional work in Berlin. He has published: 'Harmony Made Practical' (1900); 'Music and Its Masters' (1901), and many articles in journals devoted to music.

Boise, Idaho, the capital of the State and county-seat of Ada County; on the Boise River and the Union P. R.R.; 45 miles southwest of Idaho City. It occupies the site of a former trading post of the Hudson Bay Company; is in an agricultural and a rich mining region; and is supplied with pure hot water from a flowing boiling well. The city is said to be the only one in the world having a natural supply of hot water. It contains the State capitol, erected in 1885–7, penitentiary, United States assay office, State library, high and graded schools, and two national banks. Its mayor is elected biennially. Pop. (1900) 5,957.

Boisgobey, Fortuné Abraham du, fôr-tünā äb-rä-ham dü bwä-gō-bā, French novelist: b. Granville, 11 Sept. 1821; d. February 1891. In 1844–8 he was paymaster in the army at Algiers, and began to write in 1868, somewhat on the lines of Emile Gaboriau. His novels were popular, and include: 'The Scoundrels' (Paris 1873); 'Chevalier Casse-Con' (1873); 'The Mysteries of Modern Paris' (1876); 'The Demi-Monde Under the Terror' (1877); 'The Old Age of M. Lecoq' (1878); 'The Cat's Eye' (1888); and 'The Cold Hand' (1879).

Boisserée (bwä-srā) **Collection,** a number of pictures exhibited in Munich, which were collected by the brothers Sulpice (1783–1854) and Melchior Boisserée (1786–1851), and John Bertram, men who, animated by love of the arts, began, at the time of the destruction of the monasteries, during and after the French revolution, to purchase old pictures, and afterward completed their collection by the addition of many valuable paintings of the old German school. By this collection the brothers Boisserée and Bertram happily realized the idea of a historical series of old German paintings. It is to their endeavors that we owe the discovery that Germany possessed, as early as the 13th century, a school of painters of much merit, which, like the Italian, proceeded from the old Byzantine school, but became, in the sequel, distinguished by excellences of its own. We owe to these collectors, also, the restoration to favor of the forgotten Low German masters, and a just estimation of John van Eyck, as the creator of the genuine German style of painting. The most distinguished connoisseurs and artists, including Goethe, Canova, Dannecker, and Thorwaldsen, have strongly expressed their admiration of this collection. It was first brought together and exhibited at Heidelberg, and afterward removed to Stuttgart, where the king of Würtemberg assigned it a suitable building. The collection remained there till 1828, when King Louis of Bavaria, having purchased it in the previous year for 120,000 thalers, removed

it to Schleissheim, and in 1836 most of the paintings were sent to Munich. A lithographic work on this collection was published in 40 parts between 1821 and 1840. See 'Sulpiz Boisserée,' a biography (1862).

Boissier, Marie Louis Gaston, mä-rę loo-e gäs-tôṅ bwä-syā, French archæologist and historian: b. Nîmes, 15 Aug. 1823. After studying at the Ecole Normale he was an instructor in rhetoric in his native city 1847–57; professor of Latin eloquence and literature at the Collège de France from 1861, was elected to the French Academy in 1876 and to the Academy of Inscriptions and Belles-lettres 1886. His literary style has been much praised for its clearness and beauty. His works comprise 'Le poète Attius' (1857); 'Etude sur la ire et les ouvrages de Terentius Varron' (1861); 'La religion romaine d'Auguste aux Antonins' (1883); 'La fin du paganisme' (1894); 'Cicéron et ses amis' (1892); and 'Promenades archéologiques Rome et Pompéi' (1892); the two last named being marvelously accurate and vivid reconstructions of the antique spirit and atmosphere. Other works are: 'Roman Africa,' and 'The Country of Horace and Vergil.'

Boissieu, Jean Jacques de, zhŏṅ zhäk bwäsyė, French painter and engraver: b. Lyons, 1738; d. there in 1810. He was intended by his parents for the magistracy, but manifested such a decided inclination for drawing that he was allowed to follow it. After remaining for some time at Lyons, and painting some excellent imitations of the Flemish school, he visited Paris, where his intimacy with the most celebrated artists of the time enabled him greatly to improve his style. On his return to Lyons he devoted his attention chiefly to engraving. He afterward accompanied the Duc de Rochefoucauld to Italy, and having studied the works of the great masters with the greatest assiduity, resumed painting; but as the use of oil injured his health, he, shortly after his return to France, abandoned it finally for engraving, in which his reputation soon became European, and his works were eagerly purchased by the most wealthy and distinguished amateurs. His engravings amount to 140 plates, among which that of 'Le Charlatan,' after a picture by Karel Dujardin, is considered his masterpiece.

Boissonade, Jean François, zhŏṅ fräṅ-swą bwä-sō-nąd, French classical scholar: b. Paris, 12 Aug. 1774; d. Passy, 8 Sept. 1857. He was educated at the Collège d'Harcourt, and at the age of 18 was attached to the ministry of foreign affairs. He subsequently became a contributor to periodical literature in the 'Magasin Encyclopédique' of Millin and the 'Journal de l'Empire,' the precursor of the 'Journal des Débats.' Ancient and modern literature, both French and foreign, grammatical criticism, bibliography, and natural sciences occupied his pen. In 1813 he was admitted a member of the Academy of Inscriptions and Belles-Lettres. He afterward wrote about 150 articles for the 'Biographie Universelle.' He became, in 1809, assistant of Larcher, as Greek professor of the faculty of letters in Paris, and four years afterward he succeeded him both in the faculty and in the institute. Finally, in 1828, he was called to the chair of Greek literature in the College of France. From this time he devoted himself entirely to his duties as a professor, and his labors as a classical editor. He has produced no complete work in French, but is said to have written Latin with natural grace and elegance, and his editions of the classics are highly esteemed. His editorial labors were also extended to a few French works, and he translated a heroi-comic poem, the «Genpillen,» from the Portuguese.

Boissy d'Anglas, François Antoine, fränswä än-twän bwä-sę dän-glas (Comte de), French statesman of the revolutionary period: b. Saint Jean-la-Chambre, near Annonay, 1756; d. Paris, 20 Oct. 1826. He studied at Annonay, and was admitted as an advocate to the parliament of Paris. In 1789 he was elected to the States-General where he was a moderate advocate of revolutionary principles, in support of which he wrote at this time various brochures. In 1792 he was returned as a deputy to the convention. He voted against the death of Louis XVI., and after the fall of Robespierre he was appointed secretary of the convention, and a member of the Committee of Public Safety. He was created a peer by Louis XVIII. in 1814, but supported Napoleon during the Hundred Days, and was consequently expelled from the peerage by a royal ordinance, but shortly afterward reinstated. He was from 1803 a member of the consistory of the Reformed Church, a member of the Institute from its commencement, and on its reconstruction in 1816 he became a member of the Academy of Inscriptions. He wrote an essay on the life and writings of Malesherbes (1819–21); 'Etudes Littéraires et Poétiques d'un Vieillard' (1825).

The fame of Boissy d'Anglas rests chiefly on a scene in the convention in 1795, when the hall was invaded by an angry mob demanding bread and the Constitution of 1793. Called temporarily to take the chair, in the absence of the president, Boissy had presented to him the head of a deputy, Féraud, which had been cut off by the insurgents and placed on the end of a pike. He saluted it, and continued calmly facing the mob, and to his courage and firmness the safety of the convention at this crisis is attributed. Such is the popular version of a story of which the most various and contradictory accounts are given. It has been said that Boissy d'Anglas exhibited no such courage as has been attributed to him, and that he was merely kept in his place by the pressure of the mob. His enemies, who accused him of reactionary tendencies, even said the insurrection was started by the reactionary party to discredit the revolution, and that Boissy was in understanding with the leaders of the mob. For this last accusation there appears to be no foundation, but it is quite likely the scene may have been represented in a more dramatic form than as it actually occurred.

Boito, Arrigo, ä-rē'gō bō-ē'tō, Italian composer: b. Padua, 24 Feb. 1842. His great work, the opera 'Mefistofele,' occupied him for nearly 20 years. The garden scene was written while he was a student in the Milan Conservatory in 1856, and the score was finished for the stage in 1868, the composer having done much literary work in the interim and lived variously in France, Germany, and Poland. On 5 March 1868, 'Mefistofele' was sung at La Scala, Milan, the performance lasting six hours, much interrupted by hissing and applause, and its failure was evident. Boito then remodeled the opera,

and in 1875 it was produced at Bologna with great success. It was sung in other cities with equal success, but it has never been a popular opera in the full sense of the word. In 1883 it was produced at the New York Metropolitan Opera House with Campanini and Nilsson in the cast and was revived in 1896 and again in 1901. The opera is considered one of the most important of modern Italian operas, marking, as it does, the precise point where the modern school of Italian composition, illustrated by the later works of Verdi, Mascagni, Puccini, etc., diverges from the work of the Bellini and Donizetti school. Boito's other operas, 'Ero e Leandro'; 'Nerone'; and 'Orestiade' have never been sung.

Boivin, Marie Anne Victoire, mä-rę ăn vĭc-twär bwä-văñ (GILLAIN), French midwife, upon whom a diploma of M.D. was conferred by the University of Marburg, noted for her writings on obstetrics: b. Montreuil, 9 April 1773; d. 16 May 1841. She was educated in a nunnery, where by her talents she attracted the attention of the sister of Louis XVI., Madame Elisabeth. When the nunnery where she was placed was destroyed in the course of the revolution, she spent three years in the study of anatomy and midwifery. In 1797 she married an employee at Versailles, of the name of Boivin, but on being left after a short time a widow with a child and without fortune, undertook the office of midwife at the Hospital of the Maternity, and, in 1801, was appointed chief superintendent of the institution, to which, in accordance with her suggestion, a special school of accouchement was added by Chaptal. Her 'Mémorial de l'art des accouchements,' published in 1824, passed through several editions. The empress of Russia invited her to St. Petersburg, but she declined.

Bojaca, bō-zhä'ka, **Battle of,** so called from having been fought near the bridge of the small town of Bojaca, not far from the city of Tunja, between the Spaniards under Barreyro, and the united forces of Venezuela and New Granada, commanded by Bolivar. It occurred 7 Aug. 1819, and was decisive of the independence of New Granada. Among the Republicans, Gens. Anzuategui, Paez, and Santander distinguished themselves; and the Spaniards sustained a total defeat, their general, most of their officers and men who survived the battle, together with all their arms, ammunition, and equipments, falling into the hands of Bolivar. So complete was the destruction of the Spanish army, that the viceroy instantly fled from Santa Fé, leaving even the public treasure a prey to the conquerors.

Bojador, bō-zha-dôr', Cape, a promontory on the west coast of Africa; lat. 26° 7′ 10″ N.; lon. 14° 29′ W. It is one of the projecting points of the great desert of Sahara, and forms the west extremity of a rocky ridge called the Jebel-khal or Black Mountain. The coast north of this cape is extremely dangerous, being shallow to a great distance out, and constantly enveloped in a haze. It has been, in consequence, the scene of many a melancholy disaster. Cape Bojador was long the limit of navigation toward the south and was first passed by the Portuguese in 1433.

Bojol', Philippines, an island north of Mindanao, about 40 miles long by 30 miles wide. It is woody and mountainous. Rice and gold are its chief productions. Pop. 187,000.

Bok, Edward William, American editor: b. Helder, Holland, 9 Oct. 1863. He came to the United States in infancy, and was educated in the public schools of Brooklyn. He has edited the 'Ladies' Home Journal,' and written 'The Young Man in Business,' and 'Successward.'

Boker, George Henry, American poet and dramatist: b. Philadelphia, Pa., 6 Oct. 1823; d. there, 2 Jan. 1890. He graduated from Princeton in 1842; studied law; and was United States minister to Turkey in 1871–5, and to Russia in 1875–9. His plays include: 'Calaynos' (1848); 'Anne Boleyn' (1850); 'Francesca da Rimini'; 'The Betrothed'; and 'All the World's a Mask.' He published also 'Poems of the War' (1864); 'Königsmark and other Poems' (1869); 'The Book of the Dead' (1882); and Sonnets' (1886); 'Francesca' is his best play and has been several times put upon the stage by Barrett and other actors.

Bokelmann, Christian Ludwig, krĭst-yăn lood-vĭg bō'kĕl-man, German painter: b. Saint Jürgen, 1844; d. 1894. He was a pupil of Wilhelm Sohn at Düsseldorf and became distinguished as a genre and portrait painter. Among his works are: 'House of Sorrow'; 'Pawnbroker's Shop'; 'Opening of the Will'; 'Portrait of Klaus Groths.'

Bokhara, bŏ-kä'ra, a khanate of Central Asia, practically vassal to Russia, bounded on the north by Russian Turkestan, west by Khiva and the Russian Trans-Caspian territory, south by Afghanistan, and east by Russian Turkestan. It formerly occupied considerably more territory than now, having been reduced by the conquests and encroachments of Russia, which have been only partially compensated by some additions. The present area of the khanate is estimated at about 92,000 square miles. The country is to a great extent occupied by deserts and low and naked ranges of mountains, and the cultivated portions of it are confined to the valley of the rivers, especially the Oxus or Amoo Daria, which forms the southern boundary for a considerable distance, and then flows from southeast to northwest parallel to and not far from the frontier of the country. Bokhara lies between lat. 37° and 41° N., and in greater part is no more than 1,100 or 1,200 feet above the level of the sea, but in the extreme east is mountainous. The climate is subject to great extremes, being warm in summer and very cold in winter. There is very little rain, on which account it is necessary to resort to artificial irrigation. Besides cereals, cotton, tobacco, and vegetables are cultivated, and there is abundance of fruit. The total population amounts to about 2,250,000, and consists of the Uzbecks, who are the ruling race, and to whom the emir belongs; the Tajiks, who form the majority in the capital; the Kirghizes, less numerous than the Tajiks; about 60,000 Arabians, descendants of the soldiers who were brought into the country by the third caliph of Bagdad on the occasion of the conquest of Turkestan; Persians who have chiefly been brought as slaves to Bokhara; Turcomans, Hindus, and about 10,000 Jews who live in the towns beyond the protection of the law, and accordingly oppressed by the other inhabitants. Since the

separation of Samarcand there are now only two towns of importance in Bokhara, namely, the chief town Bokhara, with a population of about 60,000; and Karshi, with about 25,000. Besides these there are a few small towns and some hundred villages in the country. The capital, according to Vámbéry, the centre of Tartar civilization, is ill built and has a gloomy aspect, and in luxury of dress and mode of life is far behind the towns of western Asia. Among the people there reigns the utmost moral corruption along with a rigorous adherence to outward forms. The country is distinguished from the other countries of Central Asia by its numerous schools, and in the same proportion by the amount of culture diffused among the people generally; but the women are even more degraded than in other Mohammedan countries. The rule of the emir is absolute, though he is to some extent under the influence of the clergy. The manufactures are unimportant, but there is a very considerable caravan trade, cotton, rice, silk, and indigo being exported, and woven goods, sugar, iron, etc., being imported. There is also now a trade by railway, since the making of the line from the Caspian to Samarcand. Bokhara is remarkable for its religious fanaticism, and various European travelers have been exposed to danger. After Alexander Burnes had visited Bokhara on a commission from the government of India in 1832, the British ambassador in Teheran sent Col. Stoddart in 1838 to obtain from the Emir Nasrulla the deliverance of the Russian prisoners that he had taken on his predatory incursions into Russian territory. Nasrulla, however, irritated at the neglect to answer his letter to the queen of England, ordered Col. Stoddart to be thrown into prison, and after treating him with great cruelty, compelled him to acknowledge the Mohammedan creed. Capt. Conolly, who had been with a similar object in Khiva and Khokand, came in 1841 to Bokhara, and after having to submit to the same treatment as Col. Stoddart, was executed along with him in 1842. Information of their fate was brought to Europe by the missionary Wolff, who had been sent to Bokhara in 1843 for this purpose.

In 1850 the Russians established themselves at the mouth of the Sir (Jaxartes), where it flows into the Sea of Aral, and in 1864 they found it necessary to proceed farther up the river. They made themselves masters of the two towns Turkestan and Aulie-ata, and after bringing them into communication with one another, invested Chemkend, Niazbek, and Chinab. The land thus occupied, which up to that time had formed the northern half of the khanate of Khokand, was, along with some other districts that had previously been annexed to Russia, erected into the Russian government of Turkestan, and incorporated with the general government of Orenburg, by the ukase of 14 Feb. (26) 1865. By a subsequent ukase, dated 11 July (23) 1867, this territory was constituted a general government. Soon after the khan of Khokand invaded the Russian territory, in consequence of which the Russians advanced still farther south and attacked Tashkend, which they took on 28 June 1865. They did not, however, incorporate Tashkend with the Russian territory, but declared it an independent khanate under the protection of Russia. This arrangement was opposed by Muzaffer-Eddin, Emir of Bokhara, whereupon the Russian general Romanovski again assumed the offensive, and marching into Bokhara took Khojend by storm on 5 June 1866. In this way Russia came into the possession of the whole basin of the Sir. Not long after Tashkend was incorporated with the Russian territory by the desire of the inhabitants. Meanwhile the war with Bokhara still went on, and peace was not concluded till the beginning of 1867. This peace, however, did not last long. The war was renewed in the spring of the following year, and it was only in July 1868 that the terms of peace between Russia and Bokhara were finally agreed upon. Bokhara was to give up Samarcand and Katti Kurghan, along with the surrounding districts (constituting the tract of land watered by the Zerafshan), and at the same time promised to pay an indemnity to Russia and to protect her trade. Since then the peace has not been broken, but the Emir of Bokhara has sunk more and more into a position of entire dependency on Russia. During the autumn the Russians intervened against the emir's son, who had risen in revolt against him, and on 12 October in the following year the emir sent an embassy with presents (tribute) to the czar at St. Petersburg. In the meantime Muzaffer-Eddin had fallen into a dispute with Afghanistan. Shere Ali Khan, of Kabul, had given a favorable reception to the rebellious son of the emir, and Muzaffer-Eddin, probably in consequence of encouragement from Russia, now thought himself able to make good his former claim to Badakshan, and the territory lying about the sources of the Oxus, especially since the Khan of Kabul seemed to have but a slight hold of these parts. He had accordingly already sent out an army with the view of conquering those parts, when, toward the end of 1869, pressure being put upon him by Russia, he concluded a treaty with Kabul by which the Oxus was fixed as the boundary of the conterminous states, and this boundary was afterward recognized by Russia and England. After the Russian expedition to Khiva in 1873 an agreement was made between Russia and Bokhara on 28 September of that year, according to which Bokhara received a portion of the territory that had been ceded by Khiva to Russia, while the Russians received various privileges in return. Muzaffer-Eddin died in 1885, and was succeeded by his son Abd-ul-Ahad. Bokhara will probably be ultimately completely placed under Russian administration, for what little power it had lapsed in 1884 by the practical absorption of the country, resulting from the annexation of Merv. Since 1885 the troops, which were formerly ill trained and badly armed, have been drilled by Russian instructors and armed with rifles. See Le Messuner, 'From London to Bokhara' (1899); O'Donovan, 'The Merv Oasis' (1880); Curzon, 'Russia in Central Asia' (1889).

Bokhara, the capital of the khanate of the same name, in lat. 39° 48′ N.; lon. 64° 26′ E. It is eight or nine miles in circuit, and is surrounded by a mud-wall. It is poorly built, consisting of extremely narrow streets and paltry houses. The principal edifices are the palace of the khan, crowning a height near the centre of the town and surrounded by a brick wall 70 feet high; and numerous mosques, the largest of which is enameled

with tiles of azure blue, and has a tower 210 feet high. The trade was formerly large with India, but has now been almost completely absorbed by Russia. There are several manufacturing establishments producing blades, various metal articles, silks, and cloth. The pop. (estimated) 60,000.

Bol, bŏl, **Ferdinand,** Dutch painter: b. Dordrecht, 1610; d. Amsterdam, 1681. He was the pupil of Rembrandt, and is best known by his admirable portraits, in the style of that master, though he likewise executed several historical paintings of merit. Many of his works are still to be seen at Amsterdam. He also practised etching with success. His best known portrait is that of Saskia, the wife of Rembrandt, now in the Brussels Museum.

Bolan (bō-län′) **Pass,** a celebrated defile in the Hala Mountains, leading from Sind into Beluchistan. It is about 60 miles long, hemmed in on all sides by lofty precipices, and in parts so narrow that a regiment could defend it against an army. It is traversed by the Bolan River. The crest of the pass is 5,800 feet high. The English government has recently built a railway through the pass to connect Sind with Kandahar.

Bolas (that is, "balls"), a form of missile used by the Paraguay Indians, the Patagonians, and especially by the Gauchos of Argentine. It consists of a rope or line having at either end a stone, ball of metal, or lump of hardened clay. When used it is swung round the head by one end, and then hurled at an animal so as to entangle it.

Bolbec, bŏl-bĕk, a town in France, department of Seine-Inferieure, 17 miles east-northeast of Havre; agreeably situated on the side of a hill, washed by the Bolbec, which supplies waterpower for its mills, and at the junction of four valleys. It is a thriving and industrious place, and well situated for commerce. Its printed cottons and handkerchiefs have long been held in high estimation. Besides these it produces linen and woolen stuffs, lace, cotton, velvet, and thread, and has several dyeworks and tanneries, with a considerable trade in grain, horses, and cattle. Pop. (1896) 12,239.

Boldini (bōl-de′nę) **Giovanni,** Italian artist: b. Ferrara, 1845. He studied for some time in London, and many of his paintings are found in American collections. His portraits have been especially commended. Among his works are 'Gossips'; 'The Connoisseur'; 'Kitchen Garden'; and 'Portrait of Menzel.'

Boldrewood, Rolf. See Browne, Thomas Alexander.

Bole, a term applied to various clay-like substances. They are chiefly hydrous silicates of aluminum and iron. It is of a dull yellow, brownish, or red color, feels greasy to the touch, and yields to the nail. It has a conchoidal fracture; its streak is shining, and it is opaque or slightly translucent. Bole is found in various localities, such as Armenia, Saxony, Tuscany, and the isle of Skye in Scotland. In ancient times, under the name of Lemnian bole or earth, it had a place in the materia medica, but is no longer used. At present the only bole of commerce is a coarse pigment sold under the name of Berlin and English red.

Bolero, bō-lā′rō, the name given by the Spaniards to a number of their national dances of the ballet class, which in Spain are regularly performed in theatres between the different pieces. They are danced both by men and women, the male dancers who take part in these performances being also called boleros, while the females are called boleras. The dances of this class which are best known and most in vogue are known by such names as the Cachuca, Iota aragonesa, Madrileña, Ole, Ialeo de Jerez, etc. They are danced by one or more couples, or, as in the case of the indecent Ole, by a single female dancer. The dancers wear the Andalusian costume, partly because of all the national dresses of Spain this is the richest and most elegant, and partly because the greater number of the boleros are of Andalusian origin. The music for these dances is always played by the orchestra, and is generally marked by rapid changes of time. The melodies are often very beautiful, and are always based upon some of the national airs. The dancers mostly beat time to the music with the castanets (castañuelas). These dances, when the performers are well trained and handsome, have a very powerful effect on the spectators, consisting as they do of graceful attitudes and movements of the body, and being strictly speaking not dances, but pantomimes. The dancers endeavor to express by their gestures all the different phases of the passion of love, and this often in a manner which passes far beyond the bounds of modesty. The dances of the common people, on which the boleros are founded, are essentially distinguished from the latter by the fact that the former are accompanied by singing,—partly that of the performers, partly that of the spectators,—while the music is mostly supplied by the guitar, or in some cases by the tambourine. They are very simple, but at the same time very graceful. The dancers beat time with the castanets, as in the boleros properly so called.

Boleslas, the name of six kings of Poland and three of Bohemia. The most celebrated of them, Boleslas, surnamed the Great, and the first Polish sovereign who had the title of king, was son of Duke Mietchislaf, and succeeded him in 999. He completed the work of introducing Christianity which his father had begun, contributed greatly to the progress of civilization, and brought the army under regular discipline. The Emperor Otho III. resolved to ascertain his real character by visiting him in person, and was so much pleased with the deference with which he was received, that he crowned him with his own hands in 1001, and exempted him from all homage and tribute. Boleslas assumed all the splendor of his new dignity, and became a powerful sovereign. He not only repelled an aggression on his territories by the Duke of Bohemia, but became in his turn the aggressor, and conquered Moravia. Success awakened a desire for new conquests, and the Russians, who hitherto had always been the aggressors, were attacked in their turn, and were obliged to purchase peace by the cession of large tracts of territory. He afterward turned his arms to the north of Germany, and compelled the greater part of the northern sovereigns to

become his tributaries. In 1012 a formidable league was formed against him by the emperor of Germany and the dukes of Bohemia and Austria; but the allies were glad to conclude a peace with him in 1018. His last campaign was against the Russians, whom he signally defeated in a great battle on the banks of the Bug. After 20 years of continued warfare he was permitted to enjoy peace, and effected numerous internal improvements, promulgating excellent laws, and even putting a check upon his own power by the appointment of a council of 12 to act as mediators between the sovereign and the people. This body was the germ of the Polish senate. Boleslas died in 1025, after a reign of 26 years, which is one of the most glorious in the annals of Poland, and has handed down his name as one of the greatest sovereigns of his time.

Bole'tus, a genus of fungi of the order *Hymenomycetes* (fungi provided with a cap and a fructiferous membrane or hymenium which covers the sporules contained in the tubes). The greater number of the species are globulous, from which the Italians called them ovoli. The characters of the genus are, broad, hemispherical cap, the lower surface formed of open tubes, cylindrical in form, and adhering to one another. The tubes can be separated from the cap, and contain little cylindrical capsules, which are the organs of reproduction. They differ from the *Polyporei* by the absence of the membrane which encloses the tubes. *Boletus edulis* has the pedicle thick, especially at the base, and marked with red and pale white. The cap is also thick, smooth, and fawn-colored. The tubes are very small, rounded, and pass from white to a greenish yellow. It grows on the ground abundantly in woods during summer. The flesh is firm, and has an agreeable nutty flavor. It is a considerable article of commerce in France, particularly around Bordeaux. It is also found in England, but more rarely. The other species of Boletus are numerous.

Boleyn, bůl'ĕn, **Anne,** queen of England, one of the wives of Henry VIII.: b. probably in 1500; d. 26 May 1536. The name is also spelled Bullen and Bouleyne. Her father, Sir Thomas Boleyn, had been several times sent by Henry as ambassador to France, and her mother was a daughter of the Duke of Norfolk. At the age of 15 years Anne accompanied to France as maid of honor the Princess Mary of England, betrothed to Louis XII.; but when that princess three years later returned to England a widow, Anne did not follow her, but remained at the French court, the freedom and gaiety of which suited her natural disposition, and where she was admired for her beauty and wit. She was attached to the household of Claudia, wife of Francis I., after whose death she was for a time in the service of the Duchess of Alençon, sister of Francis I. Young, beautiful, gay, and witty, she was an object of great attraction in the gallant court of Francis I. She returned to England about 1522, and became lady of honor to Queen Catharine, whom she soon supplanted. The king, passionately enamored of her, found an unexpected opposition to his wishes, and Anne firmly declared that she could be had on no terms but those of marriage. She knew that the king already meditated a divorce from his wife, Catharine of Aragon; but she also knew what difficulties the Catholic religion opposed to the execution of this plan. Cranmer offered his services to bring about the accomplishment of the king's wishes, and thus gave the first occasion to the separation of England from the Roman Church. But the impetuous Henry did not wait for the ministers of his new religion to confirm his divorce; on the contrary, he married Anne in January 1533, having previously created her Marchioness of Pembroke. When her pregnancy revealed the secret, Cranmer declared the first marriage void, and the second valid, and Anne was crowned queen at Westminster with unparalleled splendor. In 1533 she became the mother of the famous Elizabeth. She could not, however, retain the affections of the king, as inconstant as he was tyrannical; and as she had supplanted her queen while lady of honor to Catharine, she was now supplanted herself by Jane Seymour, her own lady of honor. Suspicions of infidelity were alleged, which appear to have had no foundation in truth, but were doubtless eagerly laid hold of by Henry as a color for his violent proceedings. In 1535 she was accused, and brought before a jury of peers. Smeaton, a musician, who was arrested with others, asserted that he had enjoyed the queen's favors, and 17 May 1536 she was condemned to death by 26 judges. Anne in vain affirmed that she had long before been contracted to the Duke of Northumberland, and therefore had never been the lawful wife of Henry. Cranmer in vain declared the marriage void. The sentence of death was executed by the command of the inflexible Henry, who esteemed it a great exercise of clemency to substitute the scaffold for the stake. The last day of the life of this unhappy woman, 19 May 1536, presents many interesting moments. She sent for the wife of the lieutenant of the Tower, threw herself upon her knees before her and said, "Go to the Princess Mary (daughter of Catharine) in my name, and in this position beg her forgiveness for all the sufferings I have drawn upon her and her mother." "She sent her last message to the king," says Hume, "and acknowledged the obligations which she owed him in uniformly continuing his endeavors for her advancement." "From a private gentlewoman you have made me first a marchioness, then a queen, and as you can raise me no higher in this world, you are now sending me to be a saint in heaven."

See Strickland, 'Queens of England' (Vol. II., 1875–80); Dixon, 'Two Queens' (1873–4); Friedmann, 'Anne Boleyn' (1885).

Bolgrad, Russia, a town on the river Yalpookh, in the Lower Budjak, colonial district of Bessarabia, 162 miles from Odessa and 30 miles from Ismail. It is celebrated for the frequent mention made of it in the discussions relative to the territorial difficulties of Russia with Turkey in the Treaty of Paris of 1856. Pop. about 13,000.

Bolingbroke, Henry St. John (Viscount), English statesman, b. Battersea in Surrey, 1678 (baptised 10 Oct.); d. Battersea, 12 Dec. 1751. He was the son of Sir Henry St. John, afterwards Viscount St. John, of Battersea, and Mary, daughter of Robert Rich, Earl of Warwick, thus being (in Goldsmith's words) of a family "of the first rank, equally conspicuous for its antiquity, dignity, and large possessions."

As a child he was brought up in the house of his grandmother, a rigid Presbyterian, where his early and enforced studies of Dr. Manton's famous commentaries are supposed to have "prepared him to become a High Churchman." However, he went early to Eton, where he completed his education, although it was long asserted that he went to Oxford (Christ Church). About 1698–9 he travelled abroad, and lived generally for a time, with all the avidity of youth and of high spirits, what is called a life of pleasure. He dabbled a little in literature; but his chief ambition seems to have been distinction in dissipation. In 1700 he married Frances Winchescombe, daughter and coheiress of Sir Henry Winchescombe; and entered Parliament for the family borough of Wootton Bassett in Wiltshire. His brilliant oratorical abilities speedily attracted attention; and he eventually cast in his lot with the then dominant Tories, of whom Harley (the Speaker) was the leader. In 1702 he received an honorary doctor's degree at Oxford. Two years later, when Harley became Secretary of State, he was made Secretary of War, a post which he retained until February, 1708, when upon the accession of the rival Whig party under Marlborough and Godolphin, he and Harley went out together.

For the next two years he led a retired life. But in August, 1710, the political whirligig restored the Tories to power with Harley again at their head; and Bolingbroke sitting in the new Parliament as member for Berkshire, became Secretary of State for Foreign Affairs. In 1712, he was created Viscount Bolingbroke and Baron St. John of Lydiard Tregoze, and he bore a chief part in the "vile Utrecht Treaty," as Prior calls it, of March, 1713. By this time his friendship for his temporising, sluggish coadjutor had greatly declined; and the last years of their political alliance were years of wrangling hostility, which Swift (the friend of both) strove vainly to mitigate. Then when, at last, Bolingbroke had compassed the downfall of Harley; and was intriguing for a Jacobite succession, Queen Anne died suddenly in August, 1714, and changed the aspect of affairs.

With the accession of George I., Bolingbroke's power passed away. The new King dismissed him, and after a short time he found it expedient to fly to France. His impeachment and attainder speedily followed. In France, where he remained seven years, he became Secretary of State to the Pretender, by whom also he was eventually dismissed for alleged neglect of duty. In October, 1718, his first wife, with whom he had never got on very well, died; and in 1722 he was married to Marie-ClaireDeschamps de Marcilly, widow of the Marquis de Villette, by whose exertions, and interest with King George's mistress, the Duchess of Kendal, he was ultimately allowed to return to England. In 1725 his property was restored, but he could not recover his rights as a peer, and was thus excluded from the House of Lords. At this date he resided at Dawley, near Uxbridge, where he occupied himself in the preparation of philosophical treatises, and of political articles in the 'Craftsman,' 1727–34, in opposition to Walpole. In 1735, finding it hopeless to re-enter political life, he retired again to France, where he lived at Chantelou in Touraine until his father's death in the spring of 1742. This brought him again to his paternal home at Battersea. Here for nine years longer he for the most part resided until 12 December, 1751, when he died of a cancer in the face,—the long torture of which he bore with exemplary fortitude. His second wife, to whom he was tenderly attached, had died in the previous year. Both were buried at Battersea, where there is a monument to them in the parish church, with medallions by Roubillac.

Bolingbroke's biographers have dwelt effectively upon his personal advantages, his handsome presence, his mingled dignity and sweetness, his vivacity, his wit, his marvellous memory, and his quickness of apprehension. "His mind," said Swift, who loved him, "was adorned with the choicest gifts that God has yet thought fit to bestow upon the children of men," and he refers especially to his "clear judgment," "his most agreeable elocution," and his "invincible eloquence." Of his eloquence, whether in speech or script, there is no doubt, and writer after writer has spoken to its seductive charm. His patriotism, upon which he himself insisted, has also found sturdy advocates. But in the main, he is now regarded rather as a brilliant and meteoric intriguer than a really great statesman with honest convictions; while his boasted philosophy and his learning are held to be equally unsound and superficial. Pope, his pupil in the 'Essay on Man,' is the accredited mouthpiece of his religious opinions; and it is a current criticism of Pope's cleverly executed thesis that it is an exposition of undeveloped doctrine by a disciple to whom it was unintelligible.

Apart from Bolingbroke's political tracts, and contributions to the 'Craftsman,' the bulk of his writings were published posthumously. The Letters on the 'Spirit of Patriotism,' and the 'Idea of a Patriot King' appeared in 1752 and 1749; the 'Letters on the Study of History' in 1752; and the 'Letter to Sir William Windham; a vindication of his conduct up to 1716, generally regarded as his best work, in 1753. In 1754 his dependant, David Mallet, published his 'Philosophical Writings' in 5 vols. It was this publication which gave rise to the celebrated utterance ascribed to Dr. Johnson about the "beggarly Scotchman," who was paid to let off Bolingbroke's blunderbuss against religion and morality after his death. But Johnson told Boswell that he had "never read Bolingbroke's impiety."

Bibliography.— Bolingbroke's 'Life' has been written by Mallet (see above); Macknight (1863); Harrop (1884); Hassall (1889); and latterly (exhaustively and appreciatively) by Walter Sichel (1901–2). Consult also 'Bolingbroke, a Historical Study,' by Churton Collins (1886).

Austin Dobson,
Author of 'Life of Goldsmith'; 'Life of Richardson,' etc.

Bolivar, Simon, sē-mōn' bō-lē'vär, South American liberator: b. Caracas, 24 July 1783; d. San Pedro Alejandrino, 10 Dec. 1830. He was educated in Spain, and, when but 18 years old, married in Madrid. His wife died

soon afterward. The sources of the inspiration of his life's work were: (1) The spectacle of the French Revolution; (2) the example of the United States, which country he visited in 1809; (3) the personality of Gen. Miranda, the leader of the revolutionary movement in Venezuela, who had openly and vigorously attacked Spain's colonial government. Bolívar offered his services to the revolutionary junta a year before Venezuela declared its independence, which was on 5 July 1811.

The revolutionists being at first overwhelmed by the Spanish forces, Bolívar fled to Curaçao. In September 1812 he was at Cartagena; next, we see him scoring against the Spaniards in New Granada; then marching back into Venezuela with only 500 men, but winning so many recruits among the inhabitants that he could meet and defeat Gen. Monteverde at Lastoguanes. He entered Caracas in triumph, 4 Aug. 1813, but suffered defeat in July 1814, and Caracas was again a Spanish town. He then went back to New Granada, succeeding at Bogotá; failing at Santa Marta; resigning his commission, and sailing for Kingston, Jamaica, in May 1814. Next, from Aux Cayes, Haiti, he set out with a little force that President Petion equipped; but this expedition, landing in Venezuela in May 1816 was a failure. Again reinforced at Aux Cayes, he landed (December 1816) in Margarita, and (16 Feb. 1817) at Barcelona, for a three days' battle with Gen. Morillo. The latter was defeated. Bolívar was made commander-in-chief, with headquarters at Angostura. Offering to resign his command to a migratory Congress (15 Feb. 1819), he was urged to continue the war; reorganized the army; crossed the Cordilleras; joined forces with Santander, republican leader in New Granada; caught the Spaniards unawares; entered Tunja July 1819, and on 7 August won the battle of Boyacá. On 17 Dec. 1819 Venezuela and New Granada were merged in the new Republic of Colombia, which included both and absorbed Ecuador after the victory in Bomboná — the union continuing until the close of 1830. Spain made another effort, sending Gen. Torre to take command of her forces; but Torre was defeated on the field of Carabobo, in the central part of Venezuela, 25 June 1821. The constitution of Colombia was adopted, 30 Aug. 1821, and its government inaugurated with Bolívar as president and Gen. Francisco de Paula Santander as vice-president.

But in that great region lying south of Colombia and north of Chile and Argentina Spain was still strong. At the request of the Congress of Peru, Bolívar sent reinforcements under the command of Gen. Antonio José de Sucre, and went in person to the scene of action. Quito was occupied in June 1822; next, the Liberator assumed the presidency at Lima; on 6 Aug. 1824 he triumphed at Junin. Before the end of that year Sucre gave the *coup de grace* to Spain's colonial system on the mainland (though at widely separated points hopeless resistance was offered a little longer), by capturing Viceroy Laserna, General-in-Chief Aymeric, and other Spanish commanders and officers (see Ayacucho). In June 1825 Bolivar visited Upper Peru, a region of vast extent, which, in his honor, received the name Bolivia (q.v.) when it was organized as a separate republic. In December 1826, returning to Venezuela (where Gen. José Antonio Paez and Admiral José Padilla had destroyed the remnants of Spanish power on the northern coast), he was re-elected to the presidency, though manifesting great reluctance to retain an office the powers of which were wholly inadequate to the task of holding together in a permanent union three states such as Venezuela, New Granada, and Ecuador. Then two important steps were taken: (1) Leaders of the people assured him that he alone could avert disaster and disruption; (2) he himself assumed and attempted to exercise such powers as, in his opinion, were necessary to control the situation. At the height of his fame and strength (for he was in his 47th year), on the eve, however, of a great failure,— for the tendency to disunion in the country freed and consolidated by him had grown beyond control,— Bolívar resigned his command and died.

Marrion Wilcox,
Authority on Latin-America.

Bolivar, Colombia, a northern department of that republic, bordering the Caribbean Sea; area 21,345 square miles. The surface of the country is low and heavily wooded, agriculture having made but little progress. The most important rivers are the Magdalena, the Cauca (a tributary of the former), and the Sinu. Capital, Cartagena. Pop. about 300,000.

Bolivia, bō-lēv′yä, an inland republic of South America, bounded on the north and east by Brazil, northwest by Peru, southwest by Chile, south by Argentina and Paraguay. It extends from north to south between lat. 10° 20′ S. (see Acre River) and 22° 50′ S. and from east to west between lon. 57° 47′ 40″ W. (Compare treaty with Brazil 17 Nov. 1903) and about 72° W. Area, exclusive of Acré and Chaco claims, estimated at 560,000 square miles.

The principal centres of population are now, and apparently have always been, located in the mountainous region of the western half of the country, called the Sierra. The eastern districts, stretching away from the slopes of the Cordillera far into the torrid interior of the continent, where are the sources of the Amazon's great tributary, the Madeira River, as well as of the Paraguay, a part of the system of the Rio de la Plata, are covered with tropical forests, are but sparsely settled. Running southeast through the departments of La Paz, Cochabamba, and Potosi is the principal range of the Andes Mountains, called the Cordillera Real. Here are the rich mineral districts of Bolivia: the Cerro Rico de Potosi alone has produced up to the present time about $2,000,000,000 worth of silver. Here are some of the highest mountains of America and one of the greatest continuous snow-ranges in the world, having an average altitude of 20,000 feet, with the superb peaks of Illimani, Huaina-Potosi, and Illampu lifted 5,000 or 6,000 feet still higher above their gigantic associates. The western range of the Andes continues in a line parallel with the Pacific coast, rejoining the Cordillera Real near Bolivia's southern boundary. Between these two ranges are the high plains, 12,000 to 13,000 feet, and Lake Titicaca, 12,488 feet, above the sea-level. This great sheet of water, 120 miles long, and from 30 to 50 miles wide, has an average depth of 100 fathoms. Lying southeast

of Lake Titicaca are the two most famous cities of the republic, La Paz and Sucre. A railway from Mollendo on the Peruvian coast climbs up to the plateau, but where it passes over the western range of the Andes the track is 14,765 feet above the sea. On the Pacific side, then, the problem of transportation is very difficult; moreover, as is shown below, the republic has been deprived of the little strip of seacoast that was formerly in its possession.

Turning now toward the east, we find some of the best farming lands in the world, but here also the means of transportation are inadequate, and the products must be carried a great distance before reaching the Atlantic Ocean. The agricultural methods are incredibly primitive. Indian communities or wealthy townspeople own the farms; the Indians plow the land in a fashion that has been thus described:

> Oxen are yoked by lashing a light crosspiece of wood immediately behind the horns. To this rude yoke is fastened the long beam of the wooden plow, which is almost exactly like those used by the people of Egypt thousands of years ago. It has but a single handle, and a flat piece of iron is fastened with rawhide at the point of the crooked stick. This cuts the soil to a depth of about six inches. Clods are broken by hand, and the ground is further prepared by dragging a heavy tree over it until the soil becomes smooth.

The roads are but narrow trails winding along the mountain sides, and are for the use of pack animals exclusively. Mules and llamas, driven by Indians, carry loads of coffee, cacao, cinchona bark, wool, and the precious metals.

Natural Wealth and Commerce.— The natural wealth of Bolivia may be shown by an enumeration of the products of its chief geographical divisions, called departments. The department of Potosí is exceedingly rich in silver, tin, and bismuth. Gold also is found in Chilco de Chichas; nitrate in San Cristobal de Lipez, and red and white copper, topazes, emeralds, opals, jasper, and marble in Lipez. The department of Tarija has an abundance of copper, silver, gold, asphalt, marble, etc. Sucre contains silver, tin, coal, lead, copper, gold, and mineral asphaltum. Cochabamba has gold mines that were famous during the time of the Spanish dominion; also silver and marble. Santa Cruz contains rich gold mines that are worked by the natives only; also large deposits of iron ore. La Paz contains famous mines, such as Tipuani and Yani (gold), and Chuquioguillo (silver). Copper, bismuth, tin, marble, antimony, and coal are also found. Oruro contains silver, tin, gold, copper, iron, lead, bismuth, antimony, sulphur, feldspar, borax, topaz, and amethysts.

Though ranking high in the production of silver, Bolivia is essentially an agricultural and grazing country. The province of Lipez has great herds of alpacas, vicuñas, sheep, and llamas. Alfalfa and barley grow in Chichas; sugarcane, coffee, wool, potatoes, cereals, flour, and fruits are produced in Charcas (Potosí). In the valley of the Paraguay River, department of Tarija, cacao, wines, maize, barley, and vegetables are the chief products. Cattle and horses abound upon the pasture-lands of the province of Azero. Rice, dairy products, and all varieties of fruits, European as well as tropical, are mentioned among the possibilities or actual achievements in the comparatively small portion of these eastern districts as yet brought under cultivation. Immense areas are covered with rubber-trees, and valuable cabinet- and dyewoods, cedar, mahogany, etc., are among the unexploited treasures of the forests. The exports of rubber from the territory of Acré were 4,471,374 pounds in 1901. Geographically, a large part of northeastern Bolivia belongs to the Amazon River system, the natural outlet for its products being the waterways of Brazil; and until this opening to the commerce of the world is secured it will remain buried alive. See Acre River and South America.

The exports of the entire nation in 1901 amounted to $13,621,237.56. The value of imports in the same year was $6,120,113; of which amount Germany supplied merchandise of the value of $1,170,755; England, $827,358; France, $690,331; United States, $602,906; Chile, $600,670; Peru, $557,107; Belgium, $471,451; Italy, $245,252; Argentine Republic, $218,334; Spain, $131,570.

Government Receipts and Expenditures.— The budget for 1903 is even more surprising, when we consider the size and natural resources of Bolivia. The estimated receipts of the government to 1903 amount to only $2,904,807.17; the expenditures for the same period, $3,385,395.64; the deficit in the budget being $480,588.47.

Population.— The population is classified as, (1) whites, (2) Quichuas, (3) Aymaras, (4) Chunchos. The first class is composed chiefly of descendants of the Spaniards. The second class is numerically the strongest in the republic, the Quichua Indians being commonly employed either as domestic servants or as laborers in the mines. In the third class are Indians of a distinct tribe, who are found in the department of La Paz and the high plains of the western portion of Bolivia, especially in the neighborhood of Lake Titicaca, where they are employed in pastoral and agricultural pursuits. As for the members of the fourth class, they are aborigines whose scattered tribes,— now inhabiting the eastern departments of Chuquisaca, Beni, and Santa Cruz, with a few representatives also in La Paz and the central department of Cochabamba,— have not even the bond of a common language. There are not sufficient data on which to base an opinion as to their tribal relationships, nor has it ever been possible to make a close estimate of their numbers. It is probable, however, that they are fragments of the original population of this land, displaced by successive waves of invasion, the Aymaras having been the next tribe to gain possession of the great upland plateau. The Quichuas came in at a much later date, when the empire of the Incas was extended from Cuzco, Peru, through this region. While Spanish is the language of the ruling element, both Quichua and Aymara are also in common use, even among the whites. Estimate of total pop. 1,800,000.

The professions, and the best positions in the army, the public service, and mercantile business, are monopolized by persons of European descent. Below them are the Mestizos (persons of blended Indian and European blood), more commonly known as «Cholos»— the tradesmen, soldiers, small shopkeepers, etc., constituting a middle class. Lowest in the social scale are the Indian farmers, day laborers, miners, and servants. The lines between

CARIBBEAN SEA
ATLANTIC OCEAN
PACIFIC OCEAN
CENTRAL AMERICA
COLOMBIA
VENEZUELA
ECUADOR
BRAZIL
BRITISH GUIANA
DUTCH GUIANA
FRENCH GUIANA
BOGOTA
Panama
Quito
Guayaquil
Cartagena
Medellin
Maracaibo
Barcelona
Trinidad
Tobago I.
Barbados I.
St. Vincent
Grenada
Kingstown
Bridgetown
Port of Spain
Georgetown
Paramaribo
Cayenne
Manaos
Iquitos
Pará
Belem
EQUATOR
80°
75°
70°
65°
60°
55°
10°
5°
0°
5°
Old Providence I. (Colombia)
St. Andrews I. (Colombia)
Monkey Pt.
Greytown San Juan del Norte
Bahia Honda
Pt. Gallinas
Bahia Portete
C. de la Vela
Aruba
Curaçao
Willemstad
Buen Ayre
Is. de Aves
Gulf of Venezuela
Pto. de Maracaibo
Gulf of Darien
Gulf of Panama
Gulf of Guayaquil
Pt. Burica
Pt. Mala
Pt. Manglares
Pt. Galera
Pt. Parina
Pt. Pariñas
Pt. Aguja
Pt. Icacos
Pt. Galera
Pt. Barima
Pt. Playa
Isla Barima
Boca Grande
Boca Araguapiche
Delta del Orinoco
Serpents Mouth
Boca Marisua
Boca de Navios
Los Roques
Los Hermanos
La Orchilla
Blanquilla
Margarita
Coche
Cubagua
Cumana
Carupano
Araya
Paria
Gulf of Paria
Pt. Galera
Scarborough
Tobago I.
Goyaves
St. George
Bequia I.
Cannouan I.
Carriacou I.
Moustique I.
Union I.
Barbados I. (Br.)
Pt. Reventazon
Dos Mallos
Limon
Carrera Pt.
Almirante
Chiriqui
Chiriqui Gulf
Bocas del Toro
Chiriqui Lagoon
Pt. Burica
Pt. Mala
Pt. Purcos
Pt. Mariato
Coiba I.
Hicaron I.
Tabaco I.
Pedro Gonzalez I.
Taboga I.
Perico I.
Flamenco I.
Naos I.
Culebra I.
Farallon de Pajaros
Farallon de Monas
Gallo I.
Gorgona I.
Malpelo I.
Pta. Ancon
Pta. Piedra
Pta. Salinas
Pta. Santa Elena
Pta. Parina
Pta. Pariñas
Pta. Aguja
Pta. Icacos
Pta. Galera
Pta. Barima
Pta. Playa
Pta. Sal
Pta. Malpelo
Pta. Piedra

COLOMBIA, VENEZUELA,
BRITISH & DUTCH GUIANA,
ECUADOR, PERU, CHILE,
BOLIVIA, PARAGUAY,
ARGENTINE REPUBLIC
AND PART OF
BRAZIL.
SCALE OF MILES ON EQUATOR.
0 50 100 200 300 400 500
Population of places is indicated by
different lettering, thus;
100,000 and over. LIMA
50,000 to 100,000 Quito
10,000 to 50,000 Chiclay
5,000 to 10,000 Trinidad
Smaller Places. Cobija
Railroads
Copyright, 1903, by The Americana Company
LIMA
and Vicinity
SCALE OF MILES
0 1 2 3 4 5
PACIFIC OCEAN
PERU
BOLIVIA
ARGENTINA
PARAGUAY
MATTO GROSSO
PACIFIC OCEAN
ATLANTIC OCEAN
Greenwich
West from Greenwich
10°
15°
20°
25°
30°
35°
80°
75°
70°
65°
60°
55°
95°

these classes being uncertain and disputable as the national boundaries, the structure of Bolivian society forbids the full acceptance of free political institutions.

History.— The country was formed in 1825 from the province of Upper Peru, and named in honor of the South American Liberator, Simon Bolívar. Partly within Peruvian and partly within Bolivian territory are the waters of Lake Titicaca, on the shores of which we find monuments of a civilization antedating the Inca conquest by about 600 years. From the earliest times, therefore, Peru and Bolivia must have been united. The Incas of Cuzco overran this district in the 14th century, and 200 years afterward Hernando Pizarro added it to the conquest his brother had made at the heart of the Inca empire. Under the Spaniards, then, it was known as the district or territory of the high court of Charcas, and remained subject to the viceroy of Peru until 1776, when it became a province of the new viceroyalty of Buenos Ayres. Before the coming of Pizarro the Sierra supplied a large part of the gold used for the decoration of the temples and palaces of the Incas; after the Spanish conquest the natives were driven to work, to continue or increase the output of precious metals for the benefit of masters whose ruthless severity was conspicuous even in that age. There is no entirely trustworthy record of the numbers of those who perished in the mines, but we know that a large Indian population was reduced to its present proportions in the course of two centuries. Taxation was oppressive; provincial governors became monopolists, from whom the natives were obliged to purchase their supplies; here, as elsewhere in America, colonists were forbidden to raise any crops or manufacture any articles which could interfere with the industries of the mother country. Commerce was so strictly limited to Spain that even neighboring colonies were forbidden to have commercial dealings with one another. Toward the end of the 18th century the resentment of the Indians was expressed in several insurrections (1780–82); early in the 19th the provinces of Rio de la Plata and Peru aided the Bolivians in their struggle for independence (July 1809 to August 1825). Gen. Santa Cruz was in command of the expeditions from Lima which failed to drive out the Spanish troops in 1823. But in the following year Gen. Sucre, marching from the same country at the head of an army encouraged by the victory of Ayacucho, was favored by a rising of patriots in all the principal towns. By February 1825 La Paz was in the power of the revolutionists, and in March the Spaniards lost their only remaining stronghold, the province of Potosí.

Deputies from the various provinces assembled at the capital to decide whether the relation of dependence upon Argentina should continue or not. In August they reached the conclusion that they would undertake their own government, and before the dissolution of this Assembly (6 Oct. 1825) independence was declared. The Constitution adopted then (subsequently modified in important respects) was prepared by Gen. Bolivar, and in accordance with the views entertained by the great Liberator at this period in his career, when he was master of Colombia and Peru as well, it vested the supreme authority in a president chosen for life. The first incumbent was Gen. Sucre, who accepted the presidency for the space of two years only, and took the further precaution to retain 2,000 Colombian soldiers for his protection. In 1827 he and his Colombians were actually expelled from the country.

Since 1827 Bolivia has had seventeen presidents or dictators, the average duration of their terms being about four years. In 1828 Santa Cruz came into power and was confronted with a revolution the following year. In 1835, interposing in a quarrel of political factions in Peru, he defeated Gamarra, and named himself Protector of that country. Chile refusing to consent to the proposed union of her neighbors, three years of fighting ensued. Santa Cruz was defeated and exiled in 1839, but his party in Bolivia kept up the agitation and finally conferred the presidency upon Gen. Ballivian. Meanwhile Gamarra, who had become President of Peru, tried to annex the department of La Paz. He lost his life in this attempt, and then the Bolivians in their turn would have invaded Peru if Chile had not again intervened. Ballivian surrendered his thankless task in 1848. The next President, Belzu, was borne into office on the crest of a wave of revolution; by a revolutionary storm his successor, Cordova, was driven from office and from the land. Linares made himself Dictator in 1858, and was deposed in 1861. President Acha, his successor, fell from power when his forces were defeated in battle by his political antagonist, Melgarejo (February 1865). The latter may be characterized as a revolutionist until 1865; President from that time until 1869; Dictator from 1869 to 1871. Morales, elected in the year last mentioned, was succeeded in 1873 by Ballivian, who died before a twelvemonth had passed. Frias, next to take office, was deposed two years later by the troops, who proclaimed Gen. Daza President.

In 1878 Bolivia and Peru were at war with Chile, and the defeat of the allies after 18 months of hopeless struggling against a well-prepared enemy stripped from the weakest of the contestants her only possessions on the Pacific. Bolivia became a landlocked country. The national anger vented itself first upon the President whom the army had lifted up, and who now fled to escape assassination. But Campero, whom Congress chose to carry on the war, and who personally led the Bolivian troops in the field, was wholly unable to oppose Chile's demands alone, and Peru was an ally without power to aid. Bolivia saw herself obliged to acquiesce in an arrangement which some of her leaders have not yet ceased to regard as provisional and temporary. Her bit of coast line and most of the coveted nitrate of soda deposits in the districts of Cobija and Tarapacá,— territory aggregating 70,181 square miles, with about 6,000 inhabitants,— passed into Chile's keeping. (For an account of the war on the Pacific, see CHILE; PERU.)

Coincidentally, the failure in 1879–80, after years of effort, to secure the opening of a commercial outlet for Bolivian products to the Atlantic through the Amazon River and its great tributary, the Madeira, was a severe blow. The American contractors for the Madeira and Mamoré Railway of Bolivia and Brazil were deprived of the funds necessary to the prosecution of the enterprise by the withdrawal of the loan that had been placed in England in 1872 for the

purpose of constructing this much-needed road. The decision to abandon the undertaking was reached after years of litigation, the final appeal being heard in the British House of Lords.

The Constitution of 28 Oct. 1880 vested the legislative power in a Senate and House of Representatives, and the executive power in a president elected for four years by direct universal suffrage. But little or no improvement in the political situation was observed. President Campero was succeeded by Gregorio Pacheco, and then came Aniceto Arce (1 Aug. 1888). It was necessary to declare a state of siege in all parts of the republic in the summer of 1890. Attempts were made to overthrow the government, and a number of political leaders were arrested. The election of a successor to President Arce took place 3 May 1892. Violent collisions between the rival factions again compelled the authorities to proclaim a state of siege — which was continued even after the inauguration of the new president, Baptista, on 6 August. Indian revolts also occurred in this year, originating in both the north and the south, and spreading rapidly through the entire country. The barbarous practices of the Indians were, as is usual in this most repulsive species of warfare, matched by the repressive measures of the Bolivian troops.

Chile furnished arms and money to uphold the Baptista government; and the dependence of the country without sea coast upon the country all sea coast was recognized in the treaty of 1903. Bolivia had been placed in a position such that any one of her three powerful neighbors,— Chile, Argentina, or Brazil,— could win her allegiance by conferring substantial favors, or even by a display of international courtesy. Following Chile's diplomatic overtures, Argentina undertook to open up a way to the sea by a new railroad connecting the Sierra with her river system. Brazil's attitude remained in doubt, until the treaty of 17 Nov. 1903 showed that Acré, competing with Brazil in the production of rubber, was demanded as the price of any concession of a right of way. Some of the neighboring states have, in times not long past, actually discussed the disposition to be made of Bolivia, as though this interesting country were a South American Poland.

It can hardly be said that Bolivia has given evidence of greater political stability in recent years. When Fernandez Alonzo was elected to the presidency in 1896 his opponents protested that the government had tampered with the returns in such a way as to change the expression of the people's will under the constitutional guaranty of universal suffrage, and an uprising was successful in April 1899. The revolutionists, under Col. José Manuel Pando, defeated the government forces in a pitched battle; President Alonzo fled over the Andes into Chile, and the government which has maintained itself until 1903 was organized, with Señor Pando at its head.

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MARRION WILCOX,
Authority on Latin-America.

Bolkhov, bōl-kōf′ Russia, capital of a district of the same name in the government of Orel, on the Nugra. It is a very ancient place, and is chiefly built of wood. It has manufactures of leather, glue, soap, etc., and a considerable trade in hemp, hemp-oil, and tallow, amounting to more than $800,000 annually. Pop. (1903) 26,265.

Boll (from the Saxon *bolla,* a bowl), an old Scotch measure for corn, varying in different districts and for different articles. A boll of wheat or beans was equal to four bushels, a boll of oats to six bushels. The boll is still used in some parts of Scotland, but is no longer legally recognized.

Bol′lan, William, lawyer: b. England; d. Massachusetts, 1776. In 1740 he settled in Boston, Mass., married a daughter of Governor Shirley in 1743, and became advocate-general. In 1745 he was sent to London as the colony's agent, a post of great responsibility and requiring considerable ability in the holder. After three years of negotiating he secured from the English government the repayment of £183,649 advanced by Massachusetts for the Cape Breton expedition. In 1769 he secured and sent over to Massachusetts 33 letters of Gov. Bernard and Gen. Gage, denouncing and calumniating the colonists. He wrote a number of political tracts and pamphlets favoring conciliation with the colonists. Among them were: 'The Mutual Interests of Great Britain and the American Colonies Considered'; 'Continued Corruption of Standing Armies'; 'The Free Briton's Memorial, in Defense of the Right of Election'; 'Importance of the Colonies of North America and the Interests of Great Britain with Regard to Them Considered'; 'Petition to the King in Council, 26 Jan. 1774, with Illustra-

tions Intended to Promote the Harmony of Great Britain and Her Colonies'; 'The Importance of Cape Breton Illustrated'; etc.

Bol'landists, a society of Jesuits which published, under the title 'Acta Sanctorum,' the well-known collection of the lives of the saints of the Roman Catholic Church. They received this name from John Bolland (died 1665), who edited the first five volumes from materials already accumulated by Heribert Rosweyd, a Flemish Jesuit, whose collections were entrusted to Bolland at his death in 1629. On the abolition of the society of Jesuits in 1773, it was removed to the monastery of Candenberg, in Brussels. The abolition of the monasteries by Joseph II. brought about its dissolution. A new association was formed in 1837 under the patronage of the Belgian government, and by it the publication of the great work was continued.

Bolles, Albert Sidney, writer on finance: b. Montville, Conn., 8 March 1846. He practised law for a time; then became editor of the Norwich (Conn.) *Bulletin,* and later of the *Banker's Bulletin.* For more than four years he was professor of mercantile law and banking in the University of Pennsylvania, and for eight years chief of the Pennsylvania Bureau of Industrial Statistics. Publications: 'Chapters on Political Economy'; 'Conflict Between Labor and Capital'; 'Industrial History of the United States'; 'Financial History of the United States, 1774–1885,' his most important work; 'Practical Banking'; 'The National Bank Act and its Judicial Meaning'; 'Pennsylvania, Province and State, 1609–1790.'

Bolles, Frank, author: b. Winchester, Mass., 31 Oct. 1856; d. Cambridge, Mass., 10 Jan. 1894. He graduated at Harvard Law School in 1882, and while there founded and became first president of what is now the Harvard Co-operative Association. He was an associate editor of the Boston *Advertiser* until chosen secretary of Harvard University in 1886. That office he made thoroughly human to the great gain of both students and faculty. He was in the truest sense the students' friend, and he endeared himself to hundreds, especially the diffident ones and those of limited means, by many acts of helpfulness. In a series of judicious and clear pamphlets he set forth the actual working of Harvard, its methods of instruction, the scope of its departments, etc., and did much to correct the impression that it was a rich man's college. He wrote three works of exceptional literary merit: 'Land of the Lingering Snow,' sketches written on an abandoned farm in the heart of the White Mountains; 'At the North of Bearcamp Water'; and 'From Blomidon to Smoky, and Other Papers.' In his descriptions of nature and scenery he is absolutely impersonal, and impartial as a scientist; he never moralizes or indulges in sentiment.

Bollman, Eric, adventurer: b. Hoya, Hanover, 1769; d. Jamaica, W. I., 9 Dec. 1821. He was a physician at Paris during the Revolution, accompanied the refugee, Count Narbonne to London in 1792, then established practice in Vienna to discover Lafayette's place of imprisonment. Finding it to be Olmütz, he joined an American named Francis K. Huger in rescuing him, though he was recaptured. Bollman was imprisoned nearly a year in Austria, then released on condition of leaving the country. He came to America, was in Philadelphia for years, then joined Burr's conspiracy in 1806 and was his agent in New Orleans; was apprehended and committed for treason in 1807, but discharged for lack of evidence (see below). In 1814 he returned to Europe, finally settling in London.

Bollman's Case, in United States law. Eric Bollman (above) was committed on probable suspicion of treason, 27 Jan. 1807, by the circuit court of the District of Columbia; the supreme court was moved for a writ of *habeas corpus ad subjiciendum* (the great writ against illegal confinement) to the marshal to bring him before the court. The questions were whether the court had the initial power to grant such writs, and if so, whether it could grant them against committals by the circuit court. John Marshall decided that it had such right both by common law, as the right of any superior court of record to guard the liberty of the citizen, and by express grant from Congress; and that the allegation of treason was immaterial, as the writ would be useless without the power to go behind the lower court's action and decide on the merits. William Johnson dissented. On the marshal's return it was moved that Bollman be discharged, because no place of commission of the treasonable act was cited, and because the evidence was insufficient and the crime even if proved did not amount to treason. It was decided that there must be an actual levying of war, not merely intent to do so to constitute treason, that the evidence at best did not even prove that, but only a culpable attempt against a power with which the United States was at peace.

Boll Weevil. See Cotton Insects.

Bollworm, a southern name for a caterpillar which bores into cotton balls. In the north it is called "corn worm." See Cotton Insects.

Bo'lo, the national weapon of the Filipinos. The blade is about 18 inches in length by nearly 3 inches in breadth at its broadest dimension. It tapers from the middle toward the haft as well as toward the point, making it strongly resemble the ancient short sword. It is not double edged, however, but tapers from a thick back to an extremely keen edge. The scabbard of the bolo is made of a native wood with rough outlined designs carved upon it. The whole weapon is much more beautiful in outline and more formidable than the Cuban machete.

Bologna, Giovanni di, jō-vän'ne de bō-lō'nya, sculptor and architect: b. Douai, in Flanders, about 1524; d. Florence, 1608. At an early age he went to Rome, where he passed two years in studying the masterpieces of art. Going to Florence, he was attracted by the works of Michael Angelo, and determined to pass the rest of his life there. He rapidly rose to the foremost rank among sculptors, and few artists were charged with the execution of so many and such important works. His surname of Bologna seems to have been derived from the celebrated fountain in that city, designed by himself, of which the crowning colossal figure of Neptune is one of the wonders of the modern city. His fine statue of Duke Ferdinand is said to have inspired Browning's poem, 'The Statue and the Bust.'

Bologna, bō-lō'nya, Italy (anciently Bononia), capital of the province of the same name. It lies at the foot of the Apennines, between the rivers Reno and Savena, 190 miles north-northwest of Rome. Bologna is five or six miles in circumference, and is surrounded by an unfortified wall of brick. It is an archbishopric, and has a tribunal of appeal in the first instance, and of commerce. It has extensive manufactures of silk goods, velvet, artificial flowers, etc. The town consists of four quarters, the older poorly, and the modern handsomely built. There are colonnades along the sides of the streets affording shade and shelter to the foot-passengers. Bologna was long renowned for its university, founded, according to tradition, by Theodosius the younger in 425, but more probably not till 1088, which, in the centuries of barbarism, spread the light of knowledge over all Europe. It once had 10,000 students, but the number is now about 1,500 only. Here the famous Irnerius taught the civil law in the 11th century, and students were attracted from every quarter. Several learned ladies have at different times been professors here, such as Laura Bassi, professor of mathematics and natural philosophy, and Matilda Tambroni, professor of Greek, and the predecessor of the famous Cardinal Mezzofanti. The university formerly possessed so much influence, that even the coins of the city bore its motto — *Bononia docet* ("Bologna teaches"). The law school enjoyed the greatest fame. Its teachers had the reputation of inculcating principles favorable to despotism, and were consequently rewarded by the favor of the emperors, and of the Italian sovereigns. Every new discovery in science and the arts found a welcome, and here Galvani discovered galvanism (1789). The medical school is celebrated for having introduced the public dissection of human bodies, and the scientific journals prove that the love of investigation is still awake in Bologna. The university, indeed, still enjoys an excellent reputation, and is well provided with scientific collections, the anatomical collection being especially extensive. It possesses in all five faculties. The university library numbers about 170,000 volumes, with 6,000 manuscripts. Since 1803 the university buildings have consisted of what was formerly the Palazzo Cellesi. The original university building now accommodates the public library, of some 200,000 volumes. The city has a picture-gallery (in the Accademia delle Belle Arte) and a museum of archæological and other objects. In the 16th century the famous painters and sculptors, Carracci, Guido Reni, Domenichino, and Albani, founded a school, to which their works have given great reputation. There were, even as early as the 12th and 13th centuries, great painters in Bologna. Francesco Francia was famous in the 15th and early part of the 16th century. The city picture-gallery is rich in the works of these and other artists, the gem of the whole being Raphael's St. Cecilia.

The chief square of the city, Piazza Vittorio Emanuele, formerly the Piazza Maggiore, with the Piazza del Nettuno at right angles, is adorned by several venerable buildings; among them are the Palazzo Comunale (or Del Governo), which contains some magnificent halls, adorned with statues and paintings; Palazzo del Podestà (dating from 1201), now the town hall, chiefly remarkable as having been the prison of Enzius, king of Sardinia, and son of the Emperor Frederick II., who was captured and kept here by the Bolognese for more than 20 years, till his death; and the church or basilica of St. Petronio, with its unfinished front and the meridian of Cassini drawn upon a copper plate in the floor. Among the hundred other churches, the following are distinguished: St. Pietro (the cathedral), St. Salvatore, St. Domenico (containing the tomb of the saint), St. Giovanni in Monte, St. Giacomo Maggiore, all possessed of rich treasures of art, and St. Stephano, consisting of seven different churches, and partly dating from the 10th century. The palaces are numerous, and were formerly enriched with numerous and valuable works of art. Many of these have now disappeared, though frescoes and other internal decorations still remain. The admired fountain of the Piazza del Nettuno is adorned with a Neptune in bronze, by John of Bologna; in the Piazza Vittorio Emanuele is an equestrian statue of Victor Emanuel II. The leaning towers, Degli Asinelli, and Garisenda, dating from the 12th century, are among the most remarkable objects in Bologna. The former is square and of massive brickwork, built in three portions, and diminishing in diameter to the top. Its height is 321 feet, and its inclination from the perpendicular 4 feet. The Garisenda is 163 feet high, and inclines about 10 feet. Bologna is famous for macaroni, sausage, liqueurs, and preserved fruits. The pilgrimage to the Madonna di S. Luca, whose church is situated at the foot of the Apennines, three miles distant from Bologna, and to which an arcade of 640 arches leads, annually attracts a great number of people from all parts of Italy. This and other places in the environs may be reached by steam tramway.

Bologna was founded by the Etruscans under the name of Felsina, before the foundation of Rome. In 189 B.C. it was made a Roman colony, and called Bononia. On the fall of the Roman empire, it was taken by the Longobards, then it passed into the hands of the Franks, and was made a free city by Charlemagne. In the 12th and 13th centuries it was one of the most flourishing of the Italian republics; but the feuds between the different parties of the nobles disturbed the stable government of the city, and led to its submission to the papal see, and incorporation in the states of the Church, in 1506. Several attempts were made to throw off the papal authority, one of which, in 1831, was for a time successful. In 1849 the Austrians obtained possession of Bologna, and made it the headquarters of their 2d Italian Corps. In 1860 Bologna was by popular vote annexed to the dominions of King Victor Emanuel. Pop. (1899) 158,975.

Bologna Phial, a small flask of unannealed glass, which flies into pieces when its surface is scratched by a hard body or a sharpened body dropped into it. It is prepared by the glass-maker as a test of the condition of a pot of metal before he fashions it into bottles or glasses.

Bolo'gna Stone, or **Bologna Phosphorus.** See Barium and Barite.

Bolom'eter ("ray-measurer"), an instrument invented by Prof. S. P. Langley, secretary of the Smithsonian Institution, for detect-

ing and measuring small quantities of radiant heat. It consists essentially of a balanced Wheatstone's bridge (see RESISTANCE, ELECTRICAL), one of whose arms is formed by a thin strip of platinum foil, blackened to facilitate the absorption of heat. The bridge being in equilibrium, with no current passing through the galvanometer, a ray of radiant heat falling upon the platinum strip warms it slightly, thereby increasing its electric resistance, destroying the balance of the bridge, and causing an electric current to flow through the galvanometer. By comparing the current so produced with that produced by a source of heat, the intensity of the radiation of which is known, an estimate may be formed of the quantity of heat received from the body under investigation. The instrument is so delicate that it can detect a change of temperature, in the platinum strip, amounting to the hundred-thousandth part of a degree, Fahrenheit. Prof. Langley considers that it is also capable of measuring small quantities of radiant heat with an error of not more than one per cent. The bolometer was first devised for the purpose of studying the distribution of heat in the solar spectrum, and it has yielded much valuable information on this subject, especially in the infrared regions, where Fraunhofer lines exist, although they are invisible to the eye and can only be photographed with difficulty. For more extended descriptions of the instrument, see 'Proceedings of the American Academy of Arts and Sciences' (1881, Vol. XVI. p. 342); also 'Annals of the Astrophysical Observatory of the Smithsonian Institution' (1900, Vol. I.).

Bolor Tagh, bō-lôr′ täg, also **Bilaur,** or **Belut Tagh,** a mountain range formerly imagined to exist in central Asia between eastern and western Turkestan, as the axis of the continent. At that point, however, there is really a lofty tableland called the Pamir.

Bolsas, a river of Mexico, which, after flowing west, enters the Pacific Ocean, 225 miles southwest of Mexico City.

Bolsec, Jérôme Hermès, zhā-rōm hèr-māz bōl-sĕc, French writer: b. early in the 16th century; d. 1585. He became first, it is said, a monk, but subsequently embraced the doctrines of the Reformation and became a medical practitioner. After retiring to Italy, and remaining for some time at Ferrara, he repaired to Geneva, and insinuated himself into the good graces of Calvin. A quarrel afterward took place, occasioned, it is said, by the opposition of Bolsec to the doctrine of absolute election. It issued in his imprisonment and ultimate banishment from Geneva. He was driven later on also from Lausanne through the influence of Beza. He latterly returned to France, and having formally abjured Protestantism, settled as a physician in Lyons. He acquired considerable notoriety by the violence of his philippics against Calvin and Beza, in which, under the name of their Lives, he has raked together and published all sorts of scandal. This at least is the common view of Protestant writers.

Bolsena, bōl-sā′na, Italy, a town on the lake of the same name; 56 miles north-northwest of Rome. In the immediate vicinity stood the ancient Volsinium, one of the most powerful of the Etruscan cities. Some remains of its temples, including several granite columns, are still in existence. The lake of Bolsena, which is supposed to fill an ancient crater, exhales a deadly malaria during the summer season. It is about 9 miles long, 7 miles broad, and 285 feet deep. The shores are formed by finely wooded hills, presenting much beautiful scenery; it has two small islands, called Martana and Bisentina, believed once to have been floating, and it discharges its surplus waters into the Mediterranean by the Marta River.

Bolsward, bōl′svärt, Holland, a town in the province of Friesland, 15 miles southwest of Leeuwarden, at the junction of several canals, and intersected by canals crossed by numerous bridges. The parish church is said to be the largest and finest in Friesland. The trade of Bolsward consists chiefly in cattle, cheese, and butter. Pop. (1902) 6,500.

Bolswert, bōl′svĕrt, **Boetius Adam,** called Bolswert after his native place in Friesland, Dutch engraver: b. about 1580; d. 1634. He was the author of many valuable engravings after designs of Bloemaert and Rubens. His younger brother, SCHELTIUS ADAM, rose to higher fame in the same art, especially distinguishing himself by his prints after some of the best works of Rubens and Vandyke. Both brothers practised their art at Antwerp.

Bolt Court, a residential court in London, off Fleet Street, near Saint Bride's Church, in which Cobbett and Dr. Samuel Johnson lived for some years.

Bolt-ropes, ropes used to strengthen the sails of a ship, the edges of the sails being sewn to them. Those on the sides are called leech-ropes, the others head and foot ropes.

Bolti, or **Bultëe,** an edible chichlid fish of the Nile.

Bolting-cloth, a closely woven fabric, generally of silk, used for sifting flour. See FLOUR.

Bolton, Charles Edward, American lecturer and writer: b. South Hadley Falls, Mass., 16 May 1841; d. East Cleveland, Ohio, 1901. He inaugurated the Cleveland Educational Bureau; lectured extensively in the United States and Canada; and was mayor of East Cleveland in his latest years. He published: 'A Few Civic Problems'; 'A Model Village' (1901).

Bolton, Charles Knowles, American poet and miscellaneous writer, son of Mrs. Sarah Knowles Bolton: b. Cleveland, Ohio, 14 Nov. 1867. He has been librarian of the Boston Athenæum Library from 1898. He has written: 'Gossiping Guide to Harvard'; 'Saskia, the Wife of Rembrandt'; 'The Wooing of Martha Pitkin'; 'Love Story of Ursula Wolcott'; 'The Private Soldier Under Washington' (1903).

Bolton, Henry Carrington, American scientific writer: b. New York, 1843; d. Washington, D. C., 17 Nov. 1903. He graduated at Columbia University and studied abroad; became professor of chemistry and natural science at Trinity College, Hartford, Conn. In 1900 he was elected president of the Chemical Society of Washington, D. C. He wrote: 'The Counting-Out Rhymes of Children, a Study in Folk-Lore' (1888); 'Literature of Manganese'; 'Students' Guide in Quantitative Analysis'; 'The Evolution of the Thermometer, 1592–1743' (1900).

Bolton, Sarah Knowles, American author: b. Farmington, Conn., 15 Sept. 1841. She married Charles E. Bolton (q.v.), lecturer and

philanthropist, and resides in Cleveland, Ohio. She is the author of a number of books, including: 'Girls Who Became Famous' (1886); 'Famous American Authors' (1887); 'Famous American Statesmen' (1888); 'Famous Types of Womanhood' (1892); 'The Inevitable and Other Poems' (1895); 'Our Devoted Friend, the Dog' (1901); etc.

Bolton, Sarah Tittle, American poet: b. Newport, Ky., 18 Dec. 1815; d. Indianapolis, 4 Aug. 1893. She is known for her patriotic and war poems, including 'Paddle Your Own Canoe'; 'Left on the Battlefield'; etc. Her collected 'Poems' appeared in 1865 and 1886.

Bolton, or **Bolton-le-Moors,** a manufacturing town of Lancashire, England, 10 miles northwest from Manchester. It consists mainly of two divisions, Great Bolton and Little Bolton, separated from each other by the river Croal. The older portion of the two contains many narrow and irregular streets, but by far the larger portion of the town is modern. About $2,500,000 has been recently expended in street improvements. The finest of the public edifices is the town-hall, in the Grecian style, with a tower 220 feet high, fronting a spacious square, and erected at an expense of about $1,000,000. Among other public buildings are one of the finest market-halls in England, costing, with its approaches, nearly $500,000; a church institute; a temperance-hall; commodious baths; savings-bank; two theatres; two technical schools; a post-office, gas offices, county court, infirmary and children's hospital; orphanages; Chadwick and Mere Hall museums; board schools; poor-law offices, etc. The religious edifices are numerous, and some of them of fine architectural appearance. Foremost among these is St. Peter's parish church, a modern cruciform building in the Decorated style, with a tower at the western end 150 feet high. The schools are numerous and well attended, and, under the school board, education is rapidly improving. There is a free grammar-school, founded in 1641. The Bolton Free Public libraries (six in number) contain over 93,000 volumes. There are now four parks and three recreation grounds belonging to the town. In manufacturing industry Bolton is surpassed by few places in the kingdom, the cotton manufacture being its staple. It contains some of the largest and finest cotton mills in the world. In the town itself there are some 370 factories, of which nearly 140 are cotton mills and establishments for the weaving of cotton fabrics. The yarns spun in Bolton are generally fine, and a great variety of fancy goods are produced, besides plain calicoes. Bleaching is also carried on to a great extent, there being over 20 bleaching grounds, some of them very large. There are also several large engineering works, employing a great many hands. Besides these there are collieries, paper mills, foundries, chemical works, and various other works. Bolton is of considerable antiquity, having been raised to the dignity of a market-town in 1256. It returns two members to Parliament. Pop. (1901) 168,205.

Bolton Abbey, a famous English Abbey in Yorkshire; in a highly picturesque district on the river Wharfe, six miles east of Skipton, and 21 miles northwest of Leeds. Founded for Augustinian canons about 1150, it has been celebrated by Wordsworth in 'The White Doe of Rylstone' and 'The Force of Prayer.' The eastern end is a ruin, but the nave is utilized for the purposes of a parish church.

Bolyai, Farkas, Hungarian mathematician: b. Bolyai 1775; d. 1856. He obtained his early education in Enged, Klausenburg, and Jena, and for three years (1796–9) studied at Göttingen. He later became professor of mathematics in the Reformed College of Maros-Vósárhely, a position which he very efficiently held for 47 years. He made several attempts to prove Euclid's postulate of parallelism, but it remained to his son to finally declare the *science absolute of space,* assigning the Euclidean geometry to a particular kind of space. His chief work, however, was known as 'Teutamen,' which later contained an appendix of 26 pages to Vol. I., called 'Scientiam Spatii Absolute Veram Exhibens,' written by his son János, and which has since become famous.

Bolzano, Bernhard, Bohemian Roman Catholic theologian and philosopher: b. Prague, 5 Oct. 1781; d. 18 Dec. 1848. From 1805 to 1820 he was professor and chaplain at the University of Prague, but was accused of insidiously instilling into the minds of the students the heresies of Schelling and Hegel, and was dismissed from his office. He left many writings, of which his 'Wissenschaftslehre' (1842) is the most important. Consult 'Autobiography' (1875).

Bomarsund, a narrow channel between the islands of Aland and Vardö, at the entrance of the Gulf of Bothnia. The Russian fortifications to the harbor of Bomarsund were destroyed by the British and French fleets during the war of 1854. The channels leading up to Bomarsund were blockaded at the end of July by four British ships and a few small steamers. Shortly afterward strong detachments of the allied fleets arrived, with the admirals Napier and Parseval-Deschênes, followed, 7 August, by the line-of-battle ships with Gen. Baraguay d'Hilliers and 12,000 troops, mostly French. The Russian commander, Gen. Bodisco, was compelled to surrender on 16 August, the allies continuing to occupy the island until the end of the month, when the whole of the fortification was blown up. The trophies of the victors were 112 mounted guns, 79 not mounted, 3 mortars, 7 field guns, and 2,235 prisoners. The principal military interest offered by this siege is its setting at rest the question of the employment of uncovered masonry in fortifications with land-fronts.

Bomb, a hollow, cast-iron ball or shell, filled with gunpowder, or other combustible, and exploded by means of a time-fuse, being commonly thrown from a mortar. Instead of spherical bombs, elongated shells fired from rifled guns are now in general use. See also Ammunition; Projectiles.

Bomb Lance, a harpoon used in whale fishing which carries a charge of explosive material in its head. In one form of the weapon the arrangement is that when the harpoon strikes the fish, the bar, which is pivoted obliquely in the head of the instrument, shall serve to release a spring acting on the hammer, which then explodes the cap and bursts the charge chamber.

Bombard. See Bombardment.

Bombardier, originally an artillery soldier whose special duties are connected with the loading and firing of shells, grenades, etc., from

bombards, mortars, or howitzers. Bombardier is now the special title of a non-commissioned officer in the British artillery ranking with a corporal.

Bombardier-beetle, or **Artillery-beetle,** an insect of the genus *Brachinus,* and family *Carabidæ.* The head is narrow, the prothorax heart-shaped. While certain other beetles have at the end of the body two glands which secrete a malodorous fluid which they eject as a means of defense against their enemies, in the bombardier-beetle this fluid or spray appears to be charged with a gas, which, on coming in contact with the air, looks like smoke, and is ejected with an explosion like that of a miniature pop-gun. This gas-like vapor and detonation baffles and discomfits the pursuer (most often some other predatory beetle) as if blinding it. When being captured they will fire off this discharge several times. Several of the species (*B. fumans* and allies) are yellowish-red, with bluish and greenish elytra.

Bombardment, the act of throwing bombs or shells into a town or fortress for incendiary purposes. A bombardment is either desultory, when ships, field batteries, or a proportionately small number of siege batteries, throw shells into a place in order to intimidate the inhabitants and garrison into a hasty surrender, or for some other purpose; or it is regular, and then forms one of the methods of conducting the attack of a fortified place. The attack by regular bombardment was first introduced by the Prussians in their sieges in 1815, after Waterloo, of the fortresses in the north of France. The army and the Bonapartist party being then much dispirited, and the remainder of the inhabitants anxiously wishing for peace, it was thought that the formalities of the old methodical attack in this case might be dispensed with, and a short and heavy bombardment substituted, which would create fires and explosions of magazines, prevent every soul in the place from getting a night's rest, and thus in a short time compel a surrender, either by the moral pressure of the inhabitants on the commander, or by the actual amount of devastation caused, and by outfatiguing the garrison. The regular attack by direct fire against the defenses, though proceeded with, became secondary to vertical fire and shelling from heavy howitzers. In some cases a desultory bombardment was sufficient, in others a regular bombardment had to be resorted to; but in every instance the plan was successful; and it is now a maxim in the theory of sieges, that to destroy the resources, and to render unsafe the interior of a fortress by vertical fire, is as important (if not more so) as the destruction of its outer defenses by direct and ricochet firing. A bombardment will be most effective against a fortress of middling size, with numerous non-military inhabitants, the moral effect upon them being one of the means applied to force the commander into surrender. Before bombarding a town, it is customary to give 24 hours' notice thereof, to allow women, children, and non-combatants to leave it. Modern bombardments have not usually been particularly destructive. During the siege of Paris, 1870-71, some 500 shells were thrown into the city by the Germans, but relatively little mischief was accomplished by them. A similar result was shown at the bombardment of Santiago de Cuba by the American forces in 1898, and also in the long sieges of Ladysmith and Kimberley in 1899–1900. See also Siege.

Bombardon, a large brass musical instrument of the sax-horn kind, and the lowest of these instruments. It is made in more than one size, and the largest is generally of circular form and big enough to go round the body of the performer. It is not capable of very rapid execution.

Bombastes Furioso, a burlesque opera by William Barnes Rhodes, produced in 1790 and intended as a parody of 'Orlando Furioso.' Its name is that of the principal personage, a braggard who kills his king, Artaxominous, for a pair of jack-boots.

Bombax (Silk Cotton Tree), a genus of 10 or 12 tropical trees of the natural order *Malvaceæ* with digitate leaves and large scarlet or white axillary flowers. *B. ceiba,* the five-leaved silk cotton tree, attains a great height in tropical America, where it is native and where its immense trunks are scooped out for canoes. This species, *B. munguba,* another South American species, and *B. malabaricum,* the red silk cotton tree, so named from the color of its "cotton," bear pods which furnish a fibre useful for stuffing cushions; hence the common name. All the species yield useful bast employed in rope making, and have been suggested as possibly valuable for paper making.

Bombay, a presidency of British India, stretching along the west side of the peninsula, and bounded on the land side by Baluchistan, the Punjab, Rajputana, native states of the Central India Agency, the Central Provinces, Berar, Haidarabad, Madras, and Mysore; and on the west by the Arabian Sea. The divisions are: Sind, the least populous, Gujerat, the most populous, Deccan, Konkan, and Karnatik. The presidency also includes many feudatory states. The chief towns are Bombay, Poona, Ahmedadad, Surat, and Karachi. The chief spoken languages are Marathi, used by nearly half the population; Gujrathi, used by the commercial classes; Kanarese, and Sindhi. About three fourths of the population profess Hinduism, fully one sixth are Mohammedans, the rest being Jains, Christians, Sikhs, Parsees, aboriginals, etc.

The chief openings in the coast of Bombay are the gulfs of Cambay and Cutch, separated by the peninsula of Kathiawar. The chief harbors are those of Bombay and Karachi. The river Nerbudda which enters the Gulf of Cambay, divides the province into two physically distinct parts. North of it are Gujerat and Sind, with the peninsulas of Cutch and Kathiawar, mostly a fertile alluvial plain. Much of Sind, however, is a desert, crossed by low sand-hills. South of the Nerbudda, the province presents a narrow flat strip of coast, rising inland toward the upland country of the Western Ghats and the Deccan. The chief mountain ranges are the Hala Mountains, west of the Indus, the Western Ghats, running north and south, and the Satpura range, separating the basins of the Nerbudda

and the Taptee. The most important rivers are the Indus, Nerbudda, and Taptee, all of which flow into the Arabian Sea; the Godavari and Kistna rise on the eastern slopes of the Ghats. Many short torrential rivers traverse the Konkan coastal strip. The forests of Sind consist chiefly of sisu, babul (a kind of acacia), bhan (a species of poplar), and tamarisk; while from the forests of the western slopes of the Ghats are obtained teak, blackwood, ebony, ironwood, babul, sandalwood, and other valuable timbers. The cocoanut and date palms, mango, jack, betel-nut, and myrobalans are other important indigenous vegetable products. Among the wild animals are the maneless lion of Gujerat, the wild ass, leopard, tiger, black bear, bison, antelopes, and venomous snakes. The climate varies greatly from one district to another, two extremes being represented by Upper Sind, with great heat and little rain, and the Konkan, with excessive rainfall, especially from June to October. The chief agricultural productions are cotton, rice, millet, wheat, barley, dates, the cocoa-palm, oil-seeds, sugar, and indigo. The area of the presidency under British administration is 124,122 square miles. Pop. of British portion of the presidency (1901) 18,584,496, and of the native states, 6,891,691. See Drew, 'Bombay and Its Feudatories' (1892); Douglas, 'Glimpses of Old Bombay and Western India' (1900). The growth of cotton in Bombay received a great impetus during the American Civil War; and although the great demand did not prove lasting, cotton continues to be a highly important crop, part of the produce being exported, and a considerable portion of it worked up in the cotton-mills of Bombay. The total number of pupils receiving education at primary and other schools amounts to about 750,000, of whom only about one eighth consist of females. The annual revenue largely exceeds the expenditure, and latterly has amounted to about $75,000,000.

Bombay, a city and seaport on the west coast of India, capital of the presidency of the same name, situated at the southern extremity of the island of Bombay, and connected with the mainland and the interior by extensions of the Bombay and Baroda, and the Great Indian and Peninsula Railways, the terminus of the latter being a splendid edifice which cost $15,000,000. Extensive waterworks have been constructed on the mainland, including a dam two miles in length, and were opened in 1892. The town comprises two main portions, one known as the Fort, and formerly surrounded with fortifications, on a narrow point of land with the harbor on the east side and Back Bay on the west; the other known as the City, a little to the northwest. The European population live partly in the Fort quarter, but mostly in villas surrounded with extensive areas, called compounds, in various parts of the island. Bombay has many handsome buildings, both public and private, and a number of fine streets, the latter being in many cases traversed by street railways. The castle, the government offices, and almost all the merchants' warehouses and offices are in the Fort. On the esplanade facing southwest is a fine range of public buildings, including the secretariat, the new high court, the offices of the public works department, the post and telegraph offices, etc. There are a cathedral and several other churches in Bombay, which is the see of an Anglican bishop. There are also some fine hotels. In 1859 a university was opened. Various industries, such as dyeing, tanning, and metal working, are actively carried on, and there are now nearly 100 cotton-mills. The commerce of the port is very extensive, by far the greater portion of the exports and imports of the presidency passing through Bombay. The chief article of export is raw cotton, the chief import cotton piece goods, the commerce being chiefly with Great Britain. The harbor is one of the largest and safest in India; while its scenery and that of the neighboring continent presents a rare combination of grandeur and beauty. It is situated between the islands of Colabah, Bombay, and Salsette on the one hand, and the mainland and islands of Caranjah and Elephanta on the other. There are large and commodious docks, the ships and basins being calculated for vessels of any size. There is a large traffic with steam vessels between Bombay and Great Britain, and regular steam communication with China, Australia, Singapore, Mauritius, etc. A railway between Bombay and Tannah, on the island of Salsette, 20 miles distant, opened in 1853, was the first Indian railway constructed. Pop. (1901) 770,800. The island of Bombay is about 11 miles long from north to south, and about three miles broad, formed by two ranges of rock running parallel to each other on opposite sides of the island. The interior was formerly liable to be overflowed by the sea, to prevent which substantial walls and embankments were constructed.

Bombay was obtained by the Portuguese in 1530 from an Indian chief at Salsette; by them it was ceded to Great Britain in 1661, and in 1668 it was transferred to the East India Company. Next to Madras it is the oldest of the British possessions in the East, and from the commencement of the last century has gradually increased in importance.

Bombay Duck. See BUMMALOTI.

Bombazine, derived from *bombyx*, the Greek term for silk and silkworm, is a mixed tissue of silk and worsted, and was long woven both plain and colored. The latter, however, has gone into disuse, and the only color now used is black, for which there is an extensive demand in Spain and South America, where some of the religious orders use it, and it generally forms the material of the almost universally worn Spanish *mantilla*. The manufacture was originally introduced into England by a colony of Dutch or Flemings, who settled in Norfolk, and long continued to have its principal seat at Norwich, the capital of that county, though it is now chiefly confined to Halifax and Kidderminster.

Bombon, Philippines, a large, fresh water lake in the island of Luzon, about 50 miles south of Manila. It is 105 square miles in area. There is a small island in the centre, from which rises the volcano Taal, whose height is only 850 feet. The waters of the lake find an outlet to the sea through the Pansipit River.

VICTORIA RAILWAY STATION.

Bombproof, a structure intended to resist or repel artillery shot and shell. When designed for permanency they are either of masonry or cut from solid rock, but temporary bombproofs are constructed of earth and timber, or other available material. See also BLINDAGE.

Bombycidæ, a group of genera comprising some of the largest and most regal of moths. Their thick, heavy bodies and small sunken heads, the mouth parts often obsolete, the tongue either wholly or partly atrophied; the broadly pectinated antennæ; the broad, often falcate, wings; and their sluggish habits, afford good characters for distinguishing them. The larvæ are silk-worms, or «spinners.» They are often thick, usually more hairy or spiny than those of other groups of moths, or as in the Chinese silk-worm, smooth; while in the large *Attacus ablas, Telea polyphemus, Samia cecropia* and *Tropæa luna,* the worms are short, fat, fleshy, and sluggish. They spin a more or less dense cocoon of silk to protect the enclosed pupa from sudden changes in the weather. Although the name *Bombycidæ* is confined to the small group represented by the silk-worm (*Bombyx mori*), all the typical spinners are referred to as bombycine moths. The most typical families are the *Notodontidæ, Sphingicampidæ, Saturniidæ,* and *Remileucidæ.* Of these the *Sphingicampidæ,* however, like the *Sphingidæ,* to which they may have given origin, spin no cocoon and transform in the earth, the pupa being subterranean (see also SILKWORM). Consult: Packard, 'Monograph of the Bombycine Moths' ('Memoirs of the National Academy of Sciences,' Vol. VII., Washington, 1895).

Bomford, George, American soldier: b. New York, 1780; d. Boston, Mass., 25 March 1848. He graduated at West Point in 1805 and was assigned to the Engineer corps. Between 1805 and 1812 he worked on the fortifications of New York harbor, the defenses of Chesapeake Bay, and was superintending engineer of the works on Governor's Island. During the War of 1812 he was brevetted lieutenant-colonel for distinguished service in the ordnance department. He introduced bomb cannons, made on a pattern of his own invention, which were called Columbiads, a kind of heavy gun combining the qualities of gun, howitzer, and mortar. On 30 May 1832 he was appointed chief of ordnance, and on 1 Feb. 1842 became inspector of arsenals, ordnance, arms, and munitions of war, in which duty he continued until his death. See Cullum, 'Officers and Graduates of the United States Military Academy' (Vol. I. 1868).

Bon Marché, bôn mär-shā, one of the large department stores of Paris, situated on the Rue de Bac and Rue de Sèvres. It was founded in 1853 by Aristide Boucicault as a small store in the Rue de Bac and grew little by little to be the great establishment it now is. The present building was begun in 1869, was first used in 1872, and has been enlarged at various times since then. The management is co-operative. Pensions from $120 to $300 a year are given to men after the age of 50, and women after 45, and there is a regular system of promotion. It is thought that this organization has contributed largely to the success of the store.

Bona, Giovanni, Italian cardinal: b. Mondovi, Piedmont, 10 Oct. 1609; d. Rome, 27 Oct. 1674. He was renowned for his piety and learning, a collaborator in the 'Acta Sanctorum,' the author of 'Rerum Liturgicarum,' which is an authority on the service of mass, and of 'De principiis vitæ Christianæ,' — a book which has frequently been compared to the 'Imitation of Christ,' and of which a French translation has appeared (1854–5).

Bona Dea, the good goddess, a mysterious divinity of the Roman mythology, the wife or the daughter of Faunus. Her worship was secret, performed only by women; men were even required to ignore her name. Her sanctuary was in a cavern in the Aventine Hill, but her festival, which occurred 1 May, was celebrated in a separate room in the dwelling of the consul who then had the fasces. No man was allowed to be present, and all male statues in the house were covered. The wine used at this festival was called milk, and the vessel in which it was kept, *mellarium.* After the sacrifices, bacchanalian dances were performed. According to Juvenal, licentious abominations marked these festivals. The snake was the symbol of the goddess, and this would point to her being considered as possessing a curative, medical power, and in her sanctuary various herbs were offered for sale. By the Greeks the Bona Dea was identified with Hecate, Semele, or other divinities.

Bona Fide, a technical legal expression, to which the law of Great Britain and this country has annexed a certain idea. It is a term used in statutes in England and in acts of the legislature of all the United States, and signifies a thing done really, with a good faith, without fraud or deceit, or collusion or trust. The words *bona fide* are restrictive, for a debt may be for a valuable consideration and yet not *bona fide.* A debt must be *bona fide* at the time of its commencement or it can never become so afterward. If a contract be made with good faith, subsequent fraudulent acts will not vitiate it, although such acts may raise a presumption of antecedent fraud and thus become a means of proving the want of good faith in making the contract.

Bonacci-Brunamonti, Maria Alinda, mä-ē'ä ä-lēn'dä bō-nä'chē-broo-nä-mŏn'tē, Italian poet: b. Perugia, 1842. She was only 14 years old when her first 'Collection of Poems' appeared and attracted much attention. Her 'National Songs' (1859–78) were inspired by Italy's struggle for freedom.

Bonald, Louis Gabriel Ambroise, loo-ē gä-brē-ĕl aṅ-brwäz bō-näl (VICOMTE DE, vē-kôṅt dĕ), French philosopher: b. 1754; d. 1840. During the Revolution he joined the Royalist army under the Bourbon princes. He returned to France under Napoleon; became co-editor of the *Mercure* with Chateaubriand and Fiévée, and in 1808 was appointed minister of public instruction. After the Restoration,— as the deputy for his department,— he voted with the Ultramontane or Theocratic party in the Chambre Introuvable, and in his political career, as in his philosophical works, was the ardent advocate of absolutism, of the infallibility of the Pope, and of the Jesuits. In 1830 he refused to take the oath of allegiance to the new dynasty.

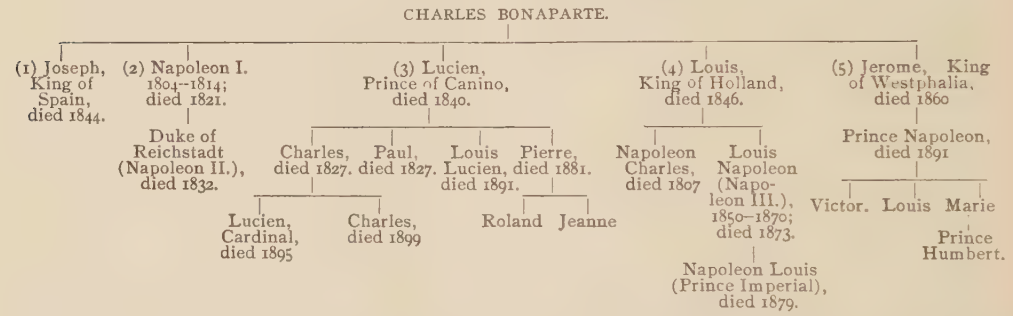
Bonanno, bō-nän'nō, Italian architect and sculptor. In 1174 he commenced, with Wilhelm of Innsbruck, the famous Leaning Tower of Pisa. He was also the designer of the celebrated bronze doors of the cathedral of that city.

Bonanza, a rich body of ore. See COMSTOCK LODE.

Bonaparte, or **Buonaparte,** the name of a Corsican family — a name now as well known as any in history. It was spelt Buonaparte by the Emperor Napoleon and his father till 1796, though the more usual, modern form also occurs in old Italian documents. Several families are mentioned as early as the 12th century who bore the name of Bonaparte, and who took a position of some prominence in the history of Italy. In 1122, for instance, a Bonaparte was banished from Florence as a Ghibelline. Corrado Bonaparte is mentioned in 1170 and Jacopo Bonaparte in 1210 as knights of the Order of the Golden Spur. The office of *podestà* was held by Nordio Bonaparte in Parma in 1272, by Pietro Bonaparte in Padua 1285, and by Giovanni Bonaparte in Florence 1333. In 1250 a Bonaparte was syndic of Ascoli, and in 1440 Cesare Bonaparte was chosen as head of naval affairs at Sarzana. A Giovanni Bonaparte is said to have married a niece of Pope Nicholas V. in 1404, but this seems doubtful for chronological reasons. It is however certain that about 1454 Niccolo Bonaparte was ambassador of this Pope to several courts, and vicar of the Holy See in Ascoli. Another Niccolo Bonaparte, professor at San Miniato in the 16th century, is stated to have been the author of the comedy 'La Vedova' (Florence 1568); and a work on the Sack of Rome in 1527 is attributed to the Tuscan Giacomo or Jacopo Bonaparte, who was an eyewitness of the event. The connection between these different Bonapartes is by no means well established; yet in 1771 the relationship of the Corsican Bonapartes with the Florentine Bonapartes was judicially recognized. In Corsica itself a Messire Bonaparte appears as witness to an act executed by Berengar II. of Italy as early as 947, and it is therefore not improbable that the family originally emigrated from this island to the mainland, and that a branch of the Genoese line returned to their old home in the 16th century. From the time of Gabriel Bonaparte, who settled at Ajaccio in 1567, and took part in the naval expeditions against the Moors, the Bonapartes ranked as a patrician family of that town. In 1576 Girolamo Bonaparte was elected deputy of Ajaccio in the senate of Genoa, and in 1614 Francesco was chosen captain of his native town. In 1757 Joseph, the grandfather of Napoleon I., received a formal patent of nobility from the Grand Duke of Tuscany. About the middle of the 18th century there remained three male representatives of the family of Bonaparte at Ajaccio, the archdeacon Lucien Bonaparte, his brother Napoleon, and their nephew Charles, who became father of the Emperor Napoleon I. and of a numerous family of princes.

Bonaparte, Charles, father of the Emperor Napoleon I. b. Ajaccio, Corsica, 29 March 1746; d. Montpellier, 24 Feb. 1785. He was carefully educated, studied law at Pisa, and soon after his return married without the consent of his relatives Letitia Ramolino, a beautiful patrician. He fought under Paoli for the independence of Corsica, but resistance to the French proving useless he went over to their side. In 1771, when Louis XV. caused 400 Corsican families to be selected who alone were to be considered noble, the Bonaparte family,— and consequently Charles,— was among the number. By the influence of the French governor, Marbœuf, who was very friendly toward the family, he was (1773) named royal councilor and assessor for the town and province of Ajaccio. As a member of the deputation of Corsican nobles sent to the court of France in 1777 he resided several years at Paris, and was fortunate enough to secure a free admission for his eldest son, Joseph, to the seminary at Autun, another for his second son, Napoleon, to the military school of Brienne, and a third for his daughter, Maria Anna, to the educational institution at St. Cyr. He returned to Corsica in 1779, and afterward went to Montpellier for the benefit of his health, but did not recover. By his marriage with Letitia Ramolino he left eight children; Joseph (see BONAPARTE, JOSEPH), king of Spain; Napoleon I., emperor of the French (see NAPOLEON I.); Lucien (see BONAPARTE, LUCIEN), prince of Canino; Maria Anna, afterward called Elise, princess of Lucca and Piombino, and wife of Prince Bacciocchi (see BACCIOCCHI, FELICE PASQUALE); Louis (see BONAPARTE, LOUIS), king of Holland; Carlotta, afterward named Marie Pauline, Princess Borghese (q.v.); Annunciata, afterward called Caroline, wife of Murat (see MURAT), king of Naples; and Jerome (see BONAPARTE, JEROME), king of Westphalia. See also BONAPARTE, LETITIA RAMOLINO; NAPOLEON III.

THE BONAPARTE FAMILY (*Male Issue*).


CHARLES BONAPARTE.
(1) Joseph, King of Spain, died 1844.
(2) Napoleon I. 1804–1814; died 1821.
Duke of Reichstadt (Napoleon II.), died 1832.
(3) Lucien, Prince of Canino, died 1840.
Charles, died 1827.
Paul, died 1827.
Louis Lucien, died 1891.
Pierre, died 1881.
Lucien, Cardinal, died 1895
Charles, died 1899
Roland
Jeanne
(4) Louis, King of Holland, died 1846.
Napoleon Charles, died 1807
Louis Napoleon (Napoleon III.), 1850–1870; died 1873.
Napoleon Louis (Prince Imperial), died 1879.
(5) Jerome, King of Westphalia, died 1860
Prince Napoleon, died 1891
Victor.
Louis
Marie
Prince Humbert.

Bonaparte, Jerome, youngest brother of Napoleon: b. Ajaccio, Corsica, 15 Nov. 1784; d. near Paris, 24 June 1860. At an early age he entered the French navy as a midshipman. In 1801 he was sent out on an expedition to the West Indies, but the vessel being chased by English cruisers, was obliged to put in to New York. During his sojourn in America, Jerome Bonaparte became acquainted with Miss Elizabeth Patterson, the daughter of the president of the Bank of Baltimore, and a descendant, as is asserted, of «Old Mortality,» immortalized by Sir Walter Scott. His addresses to this young lady having been accepted, they were married 24 Dec. 1803, according to the Roman Catholic ritual, in the cathedral of Baltimore, and in 1805 embarked for Europe. This marriage of his brother did not meet the approval of the Emperor Napoleon, whose ambitious views it thwarted, and he accordingly, after an ineffectual application to Pope Pius VII. to have it dissolved, issued a decree declaring it to be null and void. On 12 Aug. 1807, Jerome was married to Catherine Sophia, Princess of Würtemberg, and a few months afterward was created king of Westphalia, and crowned with great pomp at Cassel, 1 Jan. 1808. His government was not marked by much judiciousness or prudence; little regard was paid to national feelings, and the finances of the state, both from mismanagement and the frequency of hostile incursions, became ere long involved in hopeless embarrassment. The battle of Leipsic put an end to Jerome's reign, and he was obliged to take flight to Paris. On the conclusion of the Treaty of Paris he left France, and proceeded first to Switzerland, thence to Grätz, and in the beginning of 1815 to Trieste. On his brother's return from Elba he again proceeded to Paris, and was nominated a peer of France. At the battles of Ligny and Waterloo he was actively engaged, and displayed considerable bravery, besides receiving a wound in the arm. On Napoleon's overthrow he retired first to Switzerland, then to Würtemberg, and from this period up to the fall of Louis Philippe, in 1848, resided in different parts of Europe under the title of the Comte de Montfort, and latterly chiefly in Florence. On the outbreak of the revolution of February 1848 he returned to Paris, and was appointed (23 December) governor-general of the hospital of the Invalids, and in 1850 a marshal of France. In 1852 he was made president of the Senate. Reference has already been made to the two successive marriages contracted by Jerome Bonaparte. From his union with Miss Patterson only one son proceeded, Jerome (see BONAPARTES OF BALTIMORE). By his second wife Jerome Bonaparte had three children. The elder son, JEROME BONAPARTE, b. 1814, d. 1847. MATHILDE BONAPARTE, Princess of Montfort (b. Trieste, 27 May 1820), married the Russian Count Anatol Demidoff, and lived at the court of Louis Napoleon during his presidency. The younger son, NAPOLEON JOSEPH CHARLES PAUL BONAPARTE, commonly known as PRINCE NAPOLEON (b. Trieste, 9 Sept. 1822; d. 18 March 1891), passed his youth in Italy; entered the military service of Würtemberg in 1837; afterward traveled in several countries of Europe; and was banished from France (1845) on account of his intercourse with the Republican party. After February 1848 he was elected to the National Assembly. He commanded an infantry division at the battles of Alma and Inkermann. In 1859 he married the Princess Clotilde, daughter of Victor Emmanuel, by whom he had two sons (see BONAPARTE PRETENDERS), and a daughter. After the fall of the empire he took up his residence in England, but returned to France in 1872. On the death of the Prince Imperial, son of the Emperor Louis Napoleon, in Zululand in 1879, the eldest son of Prince Napoleon became the heir of the Bonapartist hopes. When, in 1886, the chiefs of the Bourbon family were, by a vote of both chambers, expelled from France, Prince Napoleon and his eldest son were exiled also as pretenders to the throne.

Bonaparte, Joseph, eldest brother of Napoleon I.: b. Corte, Corsica; d. Florence, Italy, 28 July 1844. He was educated in France at the college of Autun, returned to Corsica in 1785 on his father's death, studied law, and in 1792 became a member of the new administration of Corsica under Paoli. In 1793, after Paoli had called in English aid, he emigrated to Marseilles, and became brother-in-law to Bernadotte, afterward king of Sweden, by marrying one of the daughters of a wealthy banker named Clari. In 1796 he accompanied the army of Italy as commissary, in 1797 was elected a Corsican deputy to the Council of Five Hundred, and shortly after was sent by the Directory ambassador to the Pope. He returned abruptly, and had not long resumed his seat in the Council of Five Hundred, when his brother having become First Consul he was made councilor of state, and employed to negotiate a treaty with the United States. Shortly after, in 1801, he negotiated the peace of Luneville with the emperor of Germany, and in 1802 that of Amiens with Great Britain. Napoleon having now begun to deal out kingdoms among his family, Joseph was made king of Naples and Sicily in 1806, but had reigned only two years when his brother recalled him, and sent him to Madrid to be king of Spain and the Indies. His seat at Naples had not been comfortable, and he now found himself on a bed of thorns. His kingship lasted nominally for five years, but he was chased once and again from his capital, and the third time, in 1813, fled not to return. In these appointments Joseph was merely a tool in his brother's hands. In 1814, after the fatal expedition to Russia, Napoleon on setting out for the army made him lieutenant-general of the empire, and head of the council of regency. This was his last office of any consequence. After the battle of Waterloo he sailed for the United States and lived for some years at Bordentown, N. J., where he employed himself in agriculture, and was highly esteemed by his neighbors. During his exile he assumed the title of Count de Survilliers. In 1832 he went to England and after residing there for some time repaired to Italy, and spent his closing days in Florence. His wife appears to have been prevented by ill health from accompanying him to the United States. She survived her husband but a few months. There were two daughters. The eldest became the wife of the eldest son of Lucien Bonaparte, and the second was married to the second son of Louis Bonaparte.

Bonaparte, Letitia Ramolino, mother of Napoleon, and hence known by the name of MADAME MÈRE: b. Ajaccio, Corsica, 24 Aug.

1750; d. Rome, 2 Feb. 1836. She was married in 1767 to Charles Bonaparte (see BONAPARTE, CHARLES). Left a widow in 1785, she continued to reside in Corsica till 1793, when she removed to Marseilles. In this city she lived in straitened circumstances. After her son became First Consul, she fixed her residence at Paris, had a separate establishment assigned to her, and lived in considerable state, though somewhat retired. All things considered, she conducted herself with great discretion, performing her part becomingly in the station to which she had been so unexpectedly elevated, and yet never allowing herself to forget that in the necessary course of events the sudden rise of her family might one day be terminated by an equally sudden fall. When the fall came she retired to Rome, and collecting most of the surviving members of her family around her, lived to the very advanced age of 86.

Bonaparte, Louis (COUNT OF ST. LEU), second younger brother of the Emperor Napoleon I., and father of Napoleon III.: b. Ajaccio, Corsica, 2 Sept. 1778; d. Leghorn, Italy, 25 July 1846. He was educated in the artillery school at Chalons, accompanied Napoleon to Italy, and afterward to Egypt, but without distinguishing himself in any special manner. He subsequently rose to the rank of a brigadier-general, and in 1802 married Hortense Eugénie Beauharnais, Napoleon's step-daughter (see BEAUHARNAIS, HORTENSE EUGENIE). In 1806, on Schimmelpenninck, grand pensionary of Holland, demitting his office, Louis Bonaparte was compelled by his brother, notwithstanding his protestations, to accept the Dutch crown. The difficult situation in which he was placed rendered it impossible for him to be anything else than a mere viceroy of Napoleon; but to his credit it must be recorded that he exerted himself to the utmost in promoting the welfare of his new subjects, and resisted as far as in him lay the tyrannical interference and arbitrary procedure of France. With all his efforts, however, he found himself unable to restore the finances of the country to a healthy condition: a quarrel took place between him and his brother relative to the continental system maintained by the latter, which had proved most injurious to Dutch commerce, and he ultimately, on 1 June 1810, abdicated the sovereignty, and retired to Grätz under the title of the Count of St. Leu. Holland was thereupon annexed to France. In 1814 Louis paid a visit to Paris, and strongly counseled his brother to make peace with the allies. After the Restoration he took up his abode at Rome, and separated himself from his wife, Hortense, a disunion which continued throughout his life. In 1826 he removed from Rome to Florence, and from thence, a short time after his son's escape from the fortress of Ham, to Leghorn, where his literary abilities were considerable, and he was the author of a novel entitled 'Marie, les Peines de l'Amour ou les Hollandaises'; and 'Documents historiques et Réflexions sur le Gouvernement de la Hollande'; etc.

Bonaparte, Lucien (PRINCE OF CANINO), next younger brother of Napoleon I.: b. Ajaccio, Corsica, 21 March 1775; d. Viterbo, Italy, 29 June 1840. He emigrated to Marseilles in 1793, and made himself conspicuous as a hot-headed Republican by addressing clubs, and publishing bombastic pamphlets. Shortly after, having been appointed to a situation in the commissariat at the small town of St. Maximin in Provence, he married the innkeeper's daughter. He made a narrow escape during the Reign of Terror, and in 1796 was appointed commissary at war, and on his election as a member of the Council of Five Hundred, took up his residence in Paris. He joined the opposition in the council, and seconded Sieyès and his party, who wished to frame a new constitution. He is said to have written to his brother in Egypt complaining of the incapacity of the executive Directory, and urging his return; and in 1799, when the council wished to outlaw Napoleon, Lucien, who was president, after manfully resisting the motion, slipped quietly out of the chair in the confusion, and sent in the soldiers, who cleared the hall. The revolution thus mainly accomplished by his decisive procedure led to the establishment of the consular government, and Lucien was a member of the commission which framed its constitution. Afterward appointed minister of the interior, he was active in the encouragement of education, art, and science, and organized the prefectures. As ambassador to Madrid (1800) he contrived to gain the confidence of King Charles IV. and his favorite, Godoy, and to undermine the British influence, which had until then been exercised at the court of Spain. On his return to Paris in 1802 he was member of the tribunate, and then a senator, and having lost his first wife, married a stockbroker's widow. This marriage, and other concurring causes, appear to have given deep offense to Napoleon, and in the enactment fixing the succession to the crown, while Joseph and Louis were named eventual heirs, Lucien and Jerome were not mentioned. The crowns of Italy and Spain were offered Lucien on condition of his divorcing his wife, but he refused them and chose a retired life, devoting himself to art and science. He fixed his residence at Rome, where he appears to have gained the good graces of Pius VII., who created him, in 1814, Prince of Canino. During Napoleon's haughty treatment of the Pope, Lucien had freely expressed his displeasure, and apparently despairing of a reconciliation with his brother, or perhaps not caring to ask it, he embarked for the United States in 1810, but had not proceeded far when he was captured by a British cruiser and carried to Malta. Ultimately he was brought to England, and allowed to reside on parole at a place in the vicinity of Ludlow Castle. Here he employed much of his time in writing a poem entitled 'Charlemagne ou l'Église Sauvée,' which he afterward published with a dedication to Pius VII. After the battle of Waterloo his brother appointed him his extraordinary commissioner to the chamber of deputies. He showed no lack of zeal in endeavoring to arouse a feeling of sympathy, but found the attempt vain, and left matters to take their course. He afterward returned to Italy. Besides the poem 'Charlemagne,' which has been translated into English, and published in 2 volumes 4to, he wrote another, called 'La Cyrnéïde ou la Corse Sauvée,' and an autobiography, which, under the title of 'Mémoires,' was published during his lifetime.

By his first wife, Lucien had two daughters; by his second, nine children. His eldest son, CHARLES LUCIEN JULES LAURENT BONAPARTE, Prince of Canino and Musignano: b. Paris, 24

May 1803; d. 29 July 1857, achieved a considerable reputation as a naturalist, chiefly in ornithology. He published a continuation of Wilson's 'Ornithology of America' (1825–33); the 'Iconografia della Fauna Italica' (1832–41); his *chef d'œuvre;* 'Catalogo Metodico degli Uccelli Europei' (1842); 'Catalogo Metodico dei Pesci Europei' (1845); 'Ornithologie Fossile' (1858); and a number of other valuable works on zoology, and was a member of the leading natural history societies in Europe and America. During the later years of his life he took a prominent part in Italian affairs as a supporter of the Liberal party. PAUL MARIE BONAPARTE, the second son, b. 1808, took a part in the Greek war of liberation, and died by the accidental discharge of a pistol in 1827. The third son, LOUIS LUCIEN BONAPARTE (b. Thorngrove, England, 1813; d. 1891), early devoted himself with equal ardor to chemistry, mineralogy, and the study of languages, and became an authority of the first rank in Basque, Celtic, and comparative philology generally. His election for Corsica in 1848 was annulled, but he was sent to the Constituent Assembly for the Seine department next year, and was made senator in 1852, with the title of highness in addition to that of prince, which he already possessed from his birth. The total number of separate books written either by himself or at his instigation and encouragement, amounted to no less than 222. Among these are a translation of St. Matthew's version of the parable of the sower into 72 languages and dialects of Europe (1857); a linguistic map of the seven Basque provinces, showing the delimitation of the "Euscara," and its division into dialects, sub-dialects, and varieties (1863); a Basque version of the Bible in the Labourdin dialect (1865); a treatise on the Basque verb (1869); besides many papers of profound learning in the philological journals. A great work produced under his patronage from 1858 to 1860, was a version of the Song of Solomon in 22 different English dialects, besides four in Lowland Scotch, and one in Saxon. He lived long in England, where a Civil List pension of $1,250 was granted to him in 1883. The fourth son, PIERRE NAPOLEON BONAPARTE (1815–83), passed through many changes of fortune in America, Italy, and Belgium, and returned to France in 1848. In 1870 he shot a journalist, Victor Noir, a deed which created great excitement in Paris; and, being tried, was acquitted of the charge of murder, but condemned to pay $5,000 to Victor Noir's relatives. He died in 1881. The youngest son, ANTOINE BONAPARTE (b. 1816), fled to the United States after an affair with the papal troops in 1836, and returned to France in 1848, where he was elected to the National Assembly in 1849.

Bonaparte Pretenders. Of the Emperor Napoleon I. and his brothers, Joseph and Louis, male issue is now extinct. The emperor's brothers, Lucien and Jerome, are represented by the following living descendants, and they constitute the present imperialist house of France:

PRINCE VICTOR NAPOLEON (of the house of Jerome): b. 18 July 1862, is the son of the late Prince Napoleon and the Princess Clotilde, sister of King Humbert of Italy. The Prince has been recognized by his party as the undisputed head of the Bonaparte family. He lives in Brussels and is unmarried. His only brother, Prince Louis Napoleon, born in 1864, is an officer in the Russian army. His sister, born in 1866, is the widow of Prince Amadeus of Italy, by whom she had a son, Prince Humbert, born in 1889.

PRINCE CHARLES NAPOLEON, brother of the late Cardinal Bonaparte, who died 12 Feb. 1899, was the last representative of the eldest son of Napoleon's brother, Lucien, in the male line. He was born in 1839; was married and had two daughters — Marie, wife of Lieut. Giotti, of the Italian army, and Eugénie, unmarried. He had three sisters, married, respectively, to the Marquis of Roccagivoine, Count Primoli, and Prince Gabrelli.

PRINCE ROLAND BONAPARTE is the only living male cousin of Prince Charles Napoleon. He is a son of the late Prince Pierre Napoleon Bonaparte (1815–81); was born in 1858; married in 1880, the daughter of Blanc, the proprietor of the Monte Carlo gambling establishment. His wife died in 1882, leaving him a daughter and a fortune. He has one sister, Jeanne, born in 1861, and married to the Marquis de Villeneuve.

Bonapartes of Baltimore, the branch of the family residing in Baltimore, Md., and derived from the marriage of Jerome Bonaparte, brother of the Emperor Napoleon I., with Elizabeth Patterson, daughter of William Patterson, an eminent merchant in the city of Baltimore. Elizabeth was born 6 Feb. 1785, and was scarce 18 years of age, when Jerome Bonaparte in command of a French frigate landed in New York in 1803. She, at that time, was distinguished by uncommon personal beauty, and is said, moreover, to have strikingly resembled the Bonaparte family. The fame of Napoleon insured for his brother Jerome a distinguished reception in America, and wherever he went he was most hospitably entertained. On visiting Baltimore he saw Miss Patterson, and soon became much attached to her, a partiality which she readily returned, and being ambitious in her views of life, she at once accepted his offer of marriage, and was united to him 24 Dec. 1803. The marriage ceremony was performed by the bishop of Baltimore, John Carroll, brother of Charles Carroll of Carrollton, the signer of the Declaration of Independence, and in accordance with the ritual of the Roman Catholic Church. The marriage contract, considered of importance, was drawn up by Alexander J. Dallas, subsequently secretary of the treasury, and witnessed by several official personages, including the mayor of Baltimore. Jerome Bonaparte remained in America for a full year, visiting, with his wife, various parts of the country. They embarked for Europe in the spring of 1805, in the American ship Erin, and arrived safely at Lisbon. The news of the marriage proved very distasteful to the dictator of France, partly because Jerome had dared to marry without his consent, and partly on account of his own wish to unite all his brothers to European princesses. Before the newly wedded pair could reach Europe, an order went forth to every port under French authority, forbidding them to land. The hopes of the fair American were now forever blighted, as Napoleon sternly refused to recognize her marriage. Jerome left her at Lisbon, and hastened to Paris, hoping by a personal interview to soften the emperor, directing the vessel to proceed to Amsterdam, as the state of his wife's health would

not admit of her undergoing a long land journey, even if a passport could be obtained for her, which was very doubtful. On the Erin's arrival at Texel roads, Madame Bonaparte found that an order had been awaiting her coming, which prohibited her from landing. She was obliged to sail at once for England, where she established her abode, and at Camberwell, near London, gave birth to a son. She never saw her husband again, except in a casual meeting many years after their separation. Jerome, who was originally much attached to his wife, in vain petitioned the emperor to recognize her, and was finally obliged to marry the Princess of Würtemberg. After the downfall of Napoleon, Madame Patterson (as she was styled for a long period) visited Europe, and is said to have encountered Jerome Bonaparte with his wife in the gallery of the Pitti palace in Florence. On meeting, Jerome started aside, and was overheard to say to the princess: «That lady is my former wife.» He instantly left the gallery, and next morning departed from Florence. Napoleon I. never succeeded in inducing Pope Pius VII. to declare Jerome's first marriage null and void. Madame Bonaparte, after the birth of her son, generally resided in Baltimore, in the possession of abundant wealth. Notwithstanding her treatment by Napoleon, she always expressed the highest admiration for him, and prophesied that her grandson would eventually succeed him as emperor of the French. Jerome Napoleon, son of the preceding: b. Camberwell, England, 7 July 1805; d. Baltimore, 17 June 1870. His mother returned to the United States during his boyhood, and he was raised in Baltimore. He entered Harvard College, and graduated from that institution in 1826. He studied for the bar, but never practised law. He was married to Miss Susan Mary Williams, daughter of Benjamin Williams, originally of Roxbury, Mass. Miss Williams was a lady of very large fortune, which, united with Bonaparte's own property, made him one of the wealthiest citizens of Baltimore. After his marriage he devoted his time to the management of a large estate, and partly to agricultural pursuits. For many years, Bonaparte received a handsome allowance from his father, with whom he was on terms of intimacy in his several visits to Europe. During the reign of Louis Philippe, Bonaparte was permitted to sojourn in Paris, but for a short period only, and under his mother's name of Patterson. Although traveling *incognito*, he attracted much attention from his singular likeness to the great emperor. He was thought to resemble him more than any of the monarch's own brothers did. He was on good terms with Napoleon III., and visited the French court with his son, by the invitation of the emperor. Bonaparte tested his legal standing in the French courts by lodging a claim to share with the offspring of the second marriage, in the property of his father; but judgment was given against him. Jerome Napoleon, grandson of Jerome Bonaparte: b. Baltimore, 5 Nov. 1832; d. Pride's Crossing, Mass., 4 Sept. 1893. He was educated at Harvard College and West Point Military Academy, but resigned his commission in the United States army to enter the French service in 1854. He served with distinction in the Crimean war and in the Italian campaign. Charles Joseph, grandson of Jerome Bonaparte: b. Baltimore, 9 June 1851. He was graduated from Harvard University in 1871 and the Harvard law school in 1874. In 1904 he was appointed a member of the Board of Indian Commissioners. In 1905 he was appointed Secretary of the Navy by President Roosevelt and on 17 Dec. 1906 became Attorney-General.

Bonar, Horatius, Scotch hymnist: b. Edinburgh, 19 Dec. 1808; d. 31 July 1889. He wrote 'Hymns of Faith and Hope,' many of which have been taken into the hymnals of most of the Protestant churches. He also wrote more than 20 volumes on theological and religious subjects.

Bonasone, Giulio, jool'ē-ō bō-nä-sō'nā, Italian painter: b. Bologna, 1510; d. 1574. He studied under Marcantonio Raimondi, but did not equal his master in execution. Although best known by his engravings, which reproduce the works of Raphael, Michael Angelo, and Guilio Romano, specimens of his paintings are to be found in the churches of his native city.

Bonasus, a species of wild ox, the aurochs (q.v.).

Bonaven'ture, Saint (properly John of Fidanza), Italian philosopher: b. Tuscany, 1221; d. 1274. In 1243 (or 1248) he became a Franciscan monk; in 1253 teacher of theology at Paris, where he had studied; in 1256, general of his order, which he ruled with a prudent mixture of gentleness and firmness. At the time of his death he was a cardinal and papal legate at the Council of Lyons. His death was hastened by his ascetic severities. On account of his blameless conduct from his earliest youth, and of some miracles ascribed to him, he enjoyed during his life the greatest veneration, and was canonized by Pope Sixtus IV. The elevation of thought in his writings procured him the name of «The Seraphic Doctor.» The Franciscans oppose him as their hero to the Dominican scholastic Thomas Aquinas. He wrote for the honor and improvement of his order, for the promotion of the worship of the Virgin, on celibacy, transubstantiation, and other doctrines. He is, on the whole, distinguished from other scholastics by perspicuity, avoidance of useless subtleties, and greater warmth of religious feeling. Among his writings are 'Itinerarium Mentis in Deum'; 'Reductio Artium in Theologiam'; 'Centiloquium'; and 'Breviloquium.' His whole works were published 1588–96, at Rome, in 7 folio volumes, and there are several modern editions. Many pieces attributed to him are not genuine.

Bonavis'ta, Newfoundland, the name of a bay, cape, district, and town on the east coast of the island. The greatest width of the bay is 39 miles. Its navigation is rendered dangerous by the rocky islands with which it is studded. There is a lighthouse at the entrance of the harbor. The town stands near the cape, about 70 miles north by west of St. John's, and is a port of entry and fishing station. Pop. 3,551.

Bon'bright, Daniel, American educator: b. Youngstown, Pa., 1831. He graduated at Yale (1850), and was tutor there (1854–6). Between 1856 and 1858 he studied at the universities of Berlin, Bonn, and Göttingen, and upon his return to America became professor of the Latin language and literature in Northwestern University, Evanston, Ill. From 1899–92 he was dean of the faculty of liberal arts. During 1900–2 he was acting president of the university.

Bonchamp, Charles Melchoir Artus, shärl měl-kē-or är-tü bŏn-shän (Marquis de, märkē dē), Vendean leader: b. Anjou, 10 May 1760; d. 17 Oct. 1793. He served as a volunteer in the American Revolutionary War, and was a captain in the French army at the outbreak of the French Revolution. A strong Royalist, he naturally disliked the Revolution, and consequently lived in retirement until chosen leader of the Anjou insurgents. In conjunction with La Rochejacquelein and Cathelineau he fought with great bravery and frequent success, but his superior knowledge of military tactics was not sufficiently made use of by the insurgent army. In the encounter at Cholet, 17 Oct. 1793, Bonchamp received a fatal shot in the breast, and when his followers vowed to revenge his death on 5,000 Republican prisoners, the dying hero exclaimed: "Spare your prisoners. I command it!" This last command was obeyed.

Bond, (Sir) Edward Augustus, English scholar: b. Hanwell, 1815. In 1867 he was placed over one of the departments of the British Museum, and in 1878 became head librarian, retaining the post for 10 years. He was one of the founders and for many years the president of the Palæological Society, editing in this connection 'Facsimiles of Ancient Manuscripts.' Among other works edited by him are 'Statutes of the Colleges of Oxford,' and 'Travels of Jerome Horsey.'

Bond, George Phillips, American astronomer (son of William Cranch Bond (q.v.): b. Dorchester, Mass., 20 May 1825; d. 17 Feb. 1865. He assisted his father in the Harvard College Observatory, and at the time of the latter's death was appointed director. He discovered independently 11 new comets, and was the author of an elaborate memoir on the appearance of Donati's comet in 1858, and of important investigations on the subject of perturbations of cometary orbits, as well as an investigation into the theory of the constitution of Saturn's rings. His drawing of the nebula in Orion, of which a fine steel-plate engraving was made, was also remarkable work, and astronomical photography received its first impulse at his hands.

Bond, William Cranch, American astronomer: b. Portland, Me., 9 Sept. 1789; d. 29 Jan. 1859. He began life as a watchmaker, and constructed the first ship's chronometer made in the United States. He established a private observatory at Dorchester, Mass., which was at the time the finest in the country. Invited to move his observatory to Cambridge, he accepted the invitation of the Harvard College authorities, and in 1840 was appointed astronomical observer to the college, and later to the directorship of the observatory erected there in 1843–4. He was the inventor of the method of registering the beats of a clock by galvanic circuit, together with the observed transits of stars over the wires of a transit instrument, upon a chronograph, and he invented the spring governor, in which part of a train of clockwork is regulated by a pendulum with a dead-beat escapement, and the other, receiving its motion through an elastic axis, is made to run uniformly by a balance- or fly-wheel, and thus time is visibly measured to a small fraction of a second. The plan of recording observations by electro-magnetism, known in Europe as the American method was first brought into practical working by Sears C. Walker, through Bond's assistance.

Bond. See Building; Masonry.

Bond, a written acknowledgment or binding of a debt under seal. The person who gives the bond is called the obligor, and he to whom it is given the obligee. A bond may be single, as where the obligor obliges himself, his heirs, executors, and administrators, to pay a certain sum of money to another at a day named, or it may be conditional (which is the kind more generally used) that if the obligor does some particular act, the obligation shall be void, or else shall remain in full force, as payment of rent, performance of covenants in a deed, or repayment of a principal sum of money borrowed of the obligee with interest, which principal sum is usually half of the penal sum specified in the bond. There must be proper parties, and no person can take the benefit of a bond, except the parties named therein, except, perhaps, in some cases of bonds given for the performance of their duties by certain classes of public officers. A man cannot be bound to himself even in connection with others. The bond must be in writing and sealed, but a sealing sufficient where the bond is made is held sufficient though it might be an insufficient sealing if it had been made where it is sued on. It must be delivered by the party whose bond it is to the other. But the delivery and acceptance may be by attorney. The date is not considered of the substance of a bond, and therefore a bond which has either no date or an impossible date is still valid, provided the real day of its being dated or given can be proven. The condition is a vital part of a conditional bond, and usually limits and determines the amount to be paid in case of a breach, but interest and costs may be added (12 Johns. 350). The recovery against a surety in a bond for the payment of money is not limited to the penalty, but may exceed so far as necessary to include interest from the time of the breach. So far as interest is payable by the terms of the contract, and until default made, it is limited by the penalty, but after breach it is recoverable, not on the ground of contract, but as damages, which the law gives for its violation. On the forfeiture of the bond, or its becoming single, the whole penalty was formerly recoverable at law, but here the courts of equity interfered, and would not permit a man to take more than in conscience he ought, that is, his principal, interest and expenses in case the forfeiture accrued by non-payment of money borrowed, the damages sustained upon non-performance of covenants, etc. And the similar practice having gained some footing in the courts of law, the statute of 4 and 5 Anne, C. 16, at length enacted, in the same spirit of equity, that in case of a bond conditioned for the payment of money, the payment or tender of the principal sum due with interest and costs, even though the bond were forfeited and a suit commenced thereon, should be a full satisfaction and discharge. (2 Bl. Com. 340.) If in a bond the obligor binds himself without adding his heirs, executors, and administrators, the executors and administrators are bound, but not the heir (Sheppard's Touchstone, 369) for the law will not imply the obligation upon the heir. (Coke,

Litt. 209*a*.) If a bond lie dormant for 20 years it cannot afterward be recovered; for the law raises a presumption of its having been paid, and the defendant may plead *solvit ad diem* to an action upon it. (1 Burr. 434; 4 Burr. 1963.)

Bondage. See VILLENAGE.

Bonded Warehouse, a place where taxable imports of manufactures may be left in government custody, under bond for payment of the duty, till the importer or manufacturer is prepared to make full payment of duty. The system was designed to promote commerce and certain manufactures by lessening the pressure on the importer or manufacturer by means of instalment payments of duty.

Bonders, a class of independent landholders in Norway and Sweden. They are at once peasants and aristocrats, being descended from the old leaders, and sometimes from the princes, of the nation, yet being also cultivators of the soil, and more rude than the farmers of America or the yeomen of England. They number seven ninths of the whole population, and are the principal electors of representatives to the National Assembly, in which their power predominates over that of the nobles and clergy.

Bondi, bŏn'dē, **Clement,** Italian poet: b. Mizzano, Parma, 27 June 1742; d. Vienna, 20 June 1821. Joining the Jesuits shortly before the suppression of the order in Italy, he was appointed professor of eloquence in the University of Parma. He afterward provoked the hostility of the order by publishing an ode in praise of their suppression, and was obliged to seek an asylum in the Tyrol, where the Archduke Ferdinand took him under his protection, appointed him his librarian at Brünn, and entrusted him with the education of his sons, one of whom afterward succeeded to the duchy of Modena. In 1816 Bondi was appointed professor of history and literature at Vienna, and died there. He was an easy and elegant versifier, and cultivated with success almost all the varieties of poetry — lyric, didactic, satirical, and elegiac. Among the most important are 'La Giornata Villereccia,' 'La Conversazione,' and 'La Felicità.' He also executed a metrical version of the Æneid, which some consider his best work.

Bondman, The, one of Hall Caine's best-known romances, abounding in action and variety. The action turns upon the blind attempts of a young man at doing new wrongs to revenge old ones, which are overruled by Providence for good; and at the last, no longer against his will but by the development of his own nature, he fulfills his destiny of blessing those he has sworn to undo.

Bondu, bŏn-doo, a country of West Africa, belonging to the French territory of Senegal, on the west of the Falémé, a tributary of that river. Its length is about 115 miles, its breadth about 100. Its surface is but little diversified, and the land as a whole is not very fertile, nor is the climate good. The ordinary African animals occur, but the lion is becoming scarce. The ass is the chief domestic animal. The population, which consists of Fulahs and other tribes, is rather sparse, having been reduced by frequent wars, but under French rule is beginning to increase. Agriculture, manufactures, and commerce are alike unimportant.

Bone, or **Bona** (the APHRODISIUM of Ptolemy), a seaport of Algeria, province of and 86 miles north-northeast of Constantine. Pop. (1896) 34,498, among whom there are about 12,000 French and 10,000 Italians. It is built at the foot of a hill, and is surrounded by a wall nearly two miles in circumference. It is the seat of French judicial courts. The streets are narrow and crooked, but many of the houses are substantial and well built, and the town has been greatly improved since it came into the hands of the French in 1832. It possesses a college, schools, Roman Catholic cathedral, a convent of the Sisters of Mercy, hospital, etc. There is a good market, and also reading-rooms, coffee-houses, and a theatre. The chief manufactures are burnooses, tapestry, and saddles. It exports corn, iron ore, alfa, wine, wool, hides, wax, oil, honey, etc.; and its trade is considerable. There is regular steamboat communication between Bona and Marseilles. About one mile south of the town are the remains of Hippo Regius.

Bone, the compact hard material making up the skeleton of mammals, most of the birds, reptiles, and amphibians, and the bony fishes. It is also found in some lower forms. Chemically bone is complex. It is essentially organic substances, 30 to 35 per cent infiltrated with inorganic mineral salts, 65 to 70 per cent; to the former its toughness is due and to the latter its hardness. The organic substances of bone are ossein (collagen, gelatin), small quantities of elastin, proteids and nuclein from the cells and small quantities of fat. The inorganic salts are calcium carbonate, calcium phosphate, calcium fluoride, magnesium phosphate, calcium chloride, and small quantities of sulphates and other chlorides. The percentages of both inorganic and organic constituents vary widely in the bones of different animals, and also in the different bones of the same animal. These differences vary widely if the age varies, but are fairly constant for the same animal of the same age. Thus the amount of water may vary from 13 to 45 per cent in the different bones of the human body, being greater in amount in the spongy bones and less in the compact bones, and as the bones grow older the percentage of water diminishes. In the living body many of the bones, particularly the ribs, and the heads of all the long bones, contain a substance termed marrow. This is an important substance in the human economy, being the source of much of the blood-building material. In soups this marrow makes one of the most important factors. This bone marrow is pervaded by a network of white fibrous connective tissue and in the meshes are contained the cells, myeloplaxes, that make many of the blood corpuscles, particularly the polymorph neutrophiles, and the eosinophiles. In the red marrow the red corpuscles are developed. The bone marrow is very rich in proteids, nucleo-proteids, extractives, globulins, fats, and compounds of iron. Prepared bone marrows are therefore highly nutritious, and the modern "grilled bone," which is usually rich in marrow, is a toothsome and valuable dietary addition. The histological structure of bone is very intricate;

in the young developing animal, cartilage first makes its appearance from modified connective tissue cells. In this cartilage certain points of ossification appear, which subsequently develop bone and the bone from several points coalesces to make the completed bone structure. The bone cells in the cartilage, the osteoblasts, thicken and form a distinct cell wall in which the inorganic salts are deposited and osteoblast by osteoblast the structure of bone is made up. Bone is also formed by the periosteum, which is a covering, first of the cartilage and then of the developing bone. Bony tissue contains arteries, veins, nerves, and lymphatics, and is a distinct tissue, largely modified by the deposition of mineral salts. In a section across a long bone, at its centre, say the thigh bone, femur, there is on the outside the thin tough layer, the periosteum with its vessels and nerves and lymphatics; within this is the compact bone and in the centre the cavity usually filled with marrow at the ends. A very thin section of the compact bone viewed under the microscope shows a number of cavities, the Haversian canals; these contain blood vessels or were the sites of former blood vessels in the developmental stage. Around these Haversian canals, one sees regular lamellæ, not unlike the rings about a tree trunk; these are the Haversian lamellæ and indicate the regular growth of bone cells from the centre. Scattered between the lamellæ are numerous small spaces, containing living bone cells, the lacunæ, all of which are probably in communication with one another by minute canals, or canaliculi. Thus the entire bony system is pierced throughout by an extremely fine and exceedingly rich network of canals. As these are filled with lymph the bone substance is constantly bathed in this living life-giving fluid. The different bones of the body show minor variations in structure. The bones of the human body are grouped according to their shape, as long bones, flat bones, short, and irregular bones. They approach one another at the joints, where they are protected by cartilages, smooth synovial membrane, and bathed in a synovial fluid. The long bones consist of a shaft and two expanded ends or epiphyses, and are found in the limbs. They give support and leverage for motion and are usually slightly curved in one or two directions to give greater elasticity. Flat bones are found in the skull, pelvis, scapula, and are usually so disposed as to afford protection to the internal viscera; they also offer considerable surface for muscular attachment and hence give a good leverage for the long bones. Short bones are found in the wrist and ankle. Strength and freedom of motion are their attributes. Irregular and mixed bones, are the vertebræ and some of the bones of the skull. They each have varied and specially adaptive functions. Many bones, especially those of the skull, are composite. They develop separately, and finally unite. Thus the bones of the skull are separated until late in life, and in some individuals, some of the bones never develop thoroughly. This is frequently the case in the growth of the lower jaw, where failure to unite produces the well-known deformity of cleft palate or hare lip.

Bone is slightly heavier than water, its specific gravity varying from 1.80 to 1.90. The spongy bones, because of the large amount of air contained, float in water. The bones of birds are remarkable for their strength and lightness. The twofold nature of bones is readily demonstrated by two simple experiments. If one bone is placed in acid, 20 per cent hydrochloric, the acid will attack and dissolve out the mineral salts, after which the bone may be bent and its shape altered at pleasure, nothing but the organic material remains; another similar bone may be placed in a furnace and the heat will burn out the organic matter entirely; that which remains will be the mineral matter. It will retain the shape of the original bone, will be white, but will break down into powder at the least pressure.

Uses of the Bones.— In dietetics bones make a substratum for soups. These are important carriers of salts to the body. As for the gelatine alone, it is a tissue sparer, the body can not use it for purposes of anabolism, but it spares katabolism of proteids. It is a useful menstruum for foodstuffs. Bone marrow is highly nutritious, contains iron, and is a superlative food, and thought to be particularly valuable as a blood maker. The uses of bone in the arts are numerous. (See FERTILIZERS.) Consult Syminowitch, 'Histology'; Gray, 'Anatomy.' See ANATOMY; KINETOGENESIS; OSTEOLOGY.

Bone Black, Ivory Black, or **Animal Charcoal,** the black carbonaceous substance into which bones are converted by calcination or destructive distillation in close vessels, and which is extensively used in the process of sugar-refining. This application of it is due to the property which it possesses in common with other kinds of charcoal, but in a superior degree, of depriving various kinds of solutions, syrups, etc., of their coloring matters, and thus blanching or purifying them. Animal charcoal is prepared either by heating the bones in a retort similar to that in which the coal is decomposed in gas-works, or, which is the better plan, in small cast-iron pots piled up in a kiln. The pots are placed above each other with their mouths in contact, the mouths being luted together with loam. Two of the pots together hold about 50 pounds of bones, which should previously be freed of all fatty, fleshy, and tendinous matters, as the quality of the charcoal is in this case improved. The bones lose, on the average, about half their weight in the process of calcination. The charcoal is ground between grooved rollers in order to prevent the formation of dust, and by this means it is reduced to the condition of coarse grains varying from the size of turnip-seed to that of peas. Liquids are decolorized by passing them through a filter or bed of thin granular charcoal, which absorbs by mechanical action the coloring matters held in solution. The filtering beds used in sugar-refining are sometimes of the depth of 50 feet. After the liquor has flowed for a certain time the charcoal becomes completely saturated, and its purifying action ceases. It has then to be restored so that it may be used again, and this is effected by various means, such as washing with water or with weak hydrochloric acid, long exposure to air and moisture, or heating to redness. The last is the best method, and is the one almost invariably adopted, the charcoal being heated in iron pipes, fire-clay chambers, or in rotating cylinders. See CHARCOAL, ANIMAL.

Bone-caves, caverns containing deposits in which are embedded large quantities of the bones of animals (many of them extinct), dating from the Pleiocene or later geologic periods. See CAVE.

Bone Diseases. See OSTEOMYELITIS; PERIOSTITIS; OSTEITIS.

Bone-dog. See BONE-SHARK; DOGFISH.

Bone-dust, bones ground to dust to be used as manure. See FERTILIZERS.

Bone-fish. See LADY-FISH.

Bone-shark, or **Basking-shark,** a comparatively rare species of pelagic shark, found in the Arctic seas, and southward as far as Portugal and New York. It obtains the name "bone-shark" from the resemblance of its slender, long and close-set gill-rakers to whale-bone. It is also known as "basking-shark," because of its habit of remaining quiet for hours in one place. It reaches a length of 40 feet, and its skin is rough and covered with small spikes. It is usually seen in the brooding season, sluggishly swimming in groups, on the surface of the water, and undisturbed by the approach of boats.

Bonebreaker, the great fulmar-petrel (*Ossifraga gigantea*) of the islands and coasts of the South Pacific and Atlantic oceans. It is as large as an albatross, and feeds mainly upon the carcasses of dead seals and cetaceans, whose bones it is capable of breaking with its vulture-like beak.

Boner, John Henry, American poet and literary worker: b. Salem, N. C., 31 Jan. 1845. A contributor to the magazines, he was on the editorial staff of the 'Century Dictionary' and the 'Standard Dictionary,' and was at one period literary editor of the New York *World.* He has written 'Whispering Pines' (1883), a volume of verse.

Boner, Ulrich, ool'rĭH bō'nĕr, the most ancient German fabulist, a Dominican friar at Bern, in the first half of the 14th century. His collection of fables under the title 'Der Edelstein' (the Gem), is distinguished by purity of language and picturesque simplicity of description. The first editions of these fables were by Bodmer and Eschenburg. Benecke published a very good edition with explanatory notes and an excellent vocabulary (1816); that of Pfeiffer appeared in 1844, and a recent imprint is found in Reclam's 'Universal Bibliothek' (1895).

Boneset, or **Thoroughwort** (*Eupatorium perfoliatum*), a stout, ill-smelling perennial herb of the natural order *Compositæ,* native of America, common in moist soil. The plants, which attain a height of sometimes eight feet, are often planted as ornamentals in low ground. In midsummer when the profusion of purplish or white flowers are in full blow they are striking objects. The foliage and flowers have been used as a tonic in domestic medicine, their intensely bitter taste being supposed to commend them for this purpose. See EUPATORIUM.

Bonet, Juan Pablo, hoo-an' päb'lō bō-nĕt', Spanish teacher of the deaf and dumb of the 17th century, distinguished as one of the first teachers of this class, and the author of a remarkable work 'Reduccion de las letras y artes para enseñar a hablar a los mudos,' published in Madrid, 1620. It explained his method of instruction, containing the first alphabet for the deaf and dumb, and was of good service to Dalgarno, Wallis, and, a century later, to the Abbé de l'Epée, who acknowledged his indebtedness to Bonet's labors.

Bonfiglio, or **Buonfiglio, Benedetto,** bā-nā-dĕt'tō bōn-fē'lyō, Italian painter: b. 1425 (?); d. 1490 (?). His chief work was the frescoes of the Palazzo Comunale at Perugia, where he lived. These frescoes placed him in the first rank of the painters of the Umbrian school. It is believed that he also assisted Pinturicchio in decorating the Vatican.

Bong'abong, Philippines, a town in the southeast part of Luzon, with an estimated population of 20,000. It lies in a mountainous district, and attained military importance as the headquarters of a regiment of United States troops. The town has a municipal government based upon popular election.

Bongar, bŏn'gär, a serpent of the genus Bungarus. See KRAIT.

Bonghi, Ruggero, rood-jā'rō bōn'gę, Italian scholar and publicist: b. Naples, 21 March 1826; d. near Naples, 22 Oct. 1895. The commencement of his brilliant career indicated scholarly activities only, for he made fine studies and versions of Aristotle and Plato; but latterly he took up such subjects as 'The Financial History of Italy, 1864–8' (1868); 'The Life and Times of Valentino Pasini' (1867), and 'The Life of Jesus' (1890); 'The Roman Festivals' (1891); the popularity and value of these and other works giving him great prominence. He held professorships in several Italian universities; was minister of public instruction in 1874–6; was a member of the Chamber of Deputies nearly continuously from 1860; founded the *Stampa,* the leading Turin journal, and the magazine 'Cutura,' of which he was editor at the time of his death; and presided over the International Peace Congress held in Rome in 1891.

Bon'go, or **Obongo,** the name of a negroid people in the basin of the Ogowe River, in the French Congo. They live by the chase, grazing, and agriculture, and are skilful workers in iron.

Bongo, a large west African bushbuck (q.v.).

Bonham, Milledge L., American lawyer and soldier: b. Edgefield, S. C., 25 Dec. 1813; d. White Sulphur Springs, N. C., 27 Aug. 1890. He graduated at South Carolina College, 1834, was admitted to the bar, 1837, and served as a representative in Congress 1840–4. In 1836 he was major and adjutant-general of the South Carolina Brigade in the Seminole war in Florida; and colonel of the 12th U. S. Infantry during the Mexican war. In 1856 he was elected to Congress as a State Rights Democrat, and re-elected in 1858, but left Congress 21 Dec. 1860, when the South Carolina delegation withdrew. Commissioned a brigadier in the Confederate army, 19 April 1861; he commanded Beauregard's centre at the first battle of Manassas, but gave up his commission to enter the Confederate Congress, 27 Jan. 1862. He was governor of South Carolina 1862–4, when he was again commissioned a brigadier-general, and was serving with Gen. Johnston

at the time of the latter's surrender. In 1868 he was a delegate to the National Democratic convention in New York.

Bonham, Texas, a town and county-seat of Trannin County, situated on the Texas & P. and the Denison, B. & N. O. R.R.'s. It is the seat of Carlton College, and the Masonic Female Institute. As the centre of an agricultural region it has a large export trade, especially in cotton. Its chief manufacturing industries are flour mills, cotton-gins, machine-shops, carriage and wagon factories, tobacco factories, etc. Pop. (1900) 5,042.

Bonheur, François Auguste, fräṅ-swą â-gŭst bō-nėr, French painter, brother of Rosa Bonheur: b. Bordeaux, 4 Nov. 1824; d. 23 Feb. 1884. The beauty of his landscapes has been much praised. He was made Chevalier of the Legion of Honor in 1867 and received numerous medals.

Bonheur, Jules Isadore, zhül ẹz-ą-dôr bō-nėr, French painter and sculptor, brother of Rosa Bonheur (q.v.): b. Bordeaux, 15 May 1827. In the Salon of 1848 he exhibited both paintings and sculpture but in later years confined himself to sculpture. Medals were awarded him in 1865 and 1867. Among noted works of his are 'The Zebra and Panther'; and 'The Tiger Hunter.'

Bonheur, Marie-Rosa, mä-rẹ rō'zą bō-nėr, French artist of distinction, widely known as a painter of animals: b. Bordeaux, 22 March 1822; d. Fontainebleau, 25 May 1899. She received her earliest instruction in art from her father, and when only 18 years old exhibited two pictures, 'Goats and Sheep,' and 'Two Rabbits,' which gave clear indications of talent. In 1849 a fine work, 'Labourages Nivernais,' by her, was purchased by the French government for 3,000 francs and placed in the Luxembourg collection. In 1855 'The Haymaking Season in Auvergne' was hung at the Universal Exposition in Paris, and in the same year she sent the 'Horse Fair' to the French Exhibition in London, where it was the centre of attraction for the season. It was offered by her to Bordeaux for $6,000, but the offer being declined it was sold in England for $20,000. It was subsequently purchased by Cornelius Vanderbilt for the Metropolitan Museum in New York. She made a quarter size replica which is now in the National Gallery in London. After this work she stood at the very head of delineators of animal life, showing a wonderful power of representing spirited action. Near her studio she had an ante-chamber as a stable for the convenient study of animals, of which she collected some noble specimens. She also attended horse markets and fairs; generally wearing masculine dress, which was not unbecoming to her strong and marked features. After 1849 she directed the Free School of Design for Young Girls in Paris. During the siege of Paris the crown prince of Prussia especially ordered that her studio and residence at Fontainebleau should be spared and respected. She received a first-class medal at the French Salon in 1849, and another in 1855; and the decoration of the Legion of Honor in 1865; was made a member of the Institute of Antwerp in 1868; received the Leopold cross from the king of Belgium in 1880, and the same year received from the king of Spain the Commander's Cross of the Royal Order of Isabella the Catholic. In 1892 a celebrated painting by her, entitled 'Horses Threshing Corn,' was sold for $60,000. It is the largest animal picture ever painted, showing 10 horses large as life. In 1896, on her 74th birthday, she furnished a painting representing the historical combat between two stallions to which Lord Godolphin invited his friends in 1734. See Larnelle, 'Rosa Bonheur, sa vie et ses œuvres' (1885); Peyrol, 'Rosa Bonheur: Her Life and Works'; Stranahan, 'A History of French Painting' (1899).

Bonhomme, Jacques, zhäk bō-nŏm, a term of contempt used by the French nobility to designate the common people, especially the peasants.

Bonhomme Richard, the flagship of John Paul Jones (q.v.), in the most remarkable naval victory on record, 23 Sept, 1779; originally the Duras, a worn-out unseaworthy merchant Indiaman assigned to him by the French government because none of their own naval officers would serve under a foreigner, and renamed by Jones from Franklin's 'Poor Richard,' because he obtained her by following one of its maxims. She had 21 guns on a side, mainly 12-pounders, with three 18-pounders aft near the water line; and a mongrel crew of Americans, British, Portuguese, and other classes. With three other vessels in the squadron Jones intercepted, off Flamborough Head, on the east coast of England, a British fleet of naval stores from the Baltic, convoyed by the Serapis (Capt. Richard Pearson) and the Countess of Scarborough. The latter was captured by one of Jones' squadron; the former about 7 o'clock on a moonlight night joined battle with the Richard, having 25 guns on a side, 10 18-pounders—a much greater weight of metal than its foe, and with far more penetrating power than the 12-pounders of the American ship. To neutralize this advantage Jones' policy was to fight at close range; and in the attempt to rake the Serapis the two vessels swung broadside to and were lashed together by Jones, and fought the rest of the battle so close that the guns could not be run out full length, their muzzles touched, and the rammers of each had to be thrust into the port-holes of the other to load. Only those of the starboard side of each could be used. Two of Jones' 18-pounders burst at the first fire; his lighter guns were gradually silenced by the Serapis; the entire sides of his vessel were shot away, so that the Serapis' shot passed through without touching anything; she caught fire in several places; she had been leaking at the outset, and now had several feet of water in the hold; and an under-officer in affright let the 200 or 300 British prisoners loose and ran to tear down the colors, but finding the flag-pole gone began to shriek for quarter. Lieut. Dale with immense presence of mind set the prisoners at the pumps, not only saving a guard but releasing the pumpmen to fight; Jones broke the officer's head with a pistol-butt, and in answer to Pearson's inquiry if he was ready to surrender, replied, "I have not begun to fight yet," though the Serapis was firing heavily and his own guns were nearly still. Meantime, however, the deadly musket fire from the Richard's top gear had made the service of the upper guns of the Serapis almost sure death, and they too were silenced; a cannon-shot

brought down her mainmast; the combustibles thrown from the Richard wrapped her upper deck in fire; at last a bucket of hand-grenades flung down her hatchways set off a mass of cartridges strewn along the decks, killing or wounding nearly all those around, and wrecking five guns; and just then Jones' ship, the Alliance — whose timid, half-insane French captain had been tacking about, occasionally firing grapeshot at random into both vessels, came near, and Pearson struck his colors, though four of his guns were still firing and his ship was sound. Jones put Dale aboard the Serapis, and tried to navigate the Richard to a friendly port; but at 9 o'clock of the 25th she had to be abandoned, and she sank about an hour later.

Boni, bō'nę, a district in the island of Celebes, and one of the principal states of the Bugis nation, with an estimated area of about 1,000 square miles. This territory is mountainous, but, though contiguous to the great volcanic belt of the archipelago, exhibits no traces of volcanic action. Lompoo-Batang (great pillar), its highest peak, and the loftiest in Celebes, attains an elevation of 8,200 feet above the level of the sea. Lake Labaya, or, as called by the natives, Taparang-Danau, in the northwest corner of this territory, is a beautiful sheet of water, 24 miles long and 13 broad, with an average depth of six fathoms, and abounds in fish. It is bordered on all sides by a luxuriant and richly diversified tropical growth, except at the mouths of the numerous little streams that empty into it, where clearings, and beautiful, picturesque little villages, attest the industry, skill, and civilized tastes of the Bugis people. Boni was formerly the most powerful state in Celebes, but since 1859 has been practically a Dutch dependency. In the north the scenery is fine, and the soil fertile — rice, sago, and cassia being produced. The inhabitants have an allied language to the Macassars, with a literature of their own. Their towns and villages dot the coast, and as enterprising merchants and sailors the Bugis are found in every port of the East Indian Archipelago; they also engage in agriculture and in the manufacture of cotton and articles of gold and iron, in which they have a large trade. They are well built, active, and brave, and are lighter skinned, as well as superior in honesty and morality to other Malay races. Their institutions, said to be very ancient, partake of the character of a constitutional monarchy. The British have twice attacked the Bonese for injuring their commerce, and selling the crews of British ships into slavery. In the second attack, in 1814, the Bonese king was killed. The number of the population is unknown, being variously estimated from 200,000 to 300,000. The capital, called Boni, stands on the coast of the southwest peninsula. The Gulf of Boni separates the southeast and southwest peninsulas of Celebes. It is 200 miles long, and 40 to 80 miles broad.

Bon'iface, Saint, the apostle of Germany, who first preached Christianity and spread civilization among the Germans: b. Crediton, England, 680; d. Dokkum, West Friesland, 5 June 755. His original name was Winfrid. In his 30th year he was consecrated a priest. A great part of Europe at this period was inhabited by heathen peoples, and several missionaries set out from England and Ireland to convert them. Among these was Boniface, who in 718 went to Rome, where Gregory II. authorized him to preach the gospel to the nations of Germany. He commenced his labors in Thuringia and Bavaria, passed three years in Friesland, and journeyed through Hesse in Saxony, baptizing everywhere, and converting the pagan temples to Christian churches. In 723 he was invited to Rome, made a bishop by Gregory II., and recommended to Charles Martel and all princes and bishops. His name Winfrid he changed to Boniface. He destroyed the oak sacred to Thor, near Geismar, in Hesse, founded churches and monasteries, invited from England priests, monks, and nuns, and sent them to Saxony, Friesland, and Bavaria. In 732 Gregory III. made him archbishop and primate of all Germany, and authorized him to establish bishoprics, the only existing bishopric being the one at Passau. He founded those of Freising, Ratisbon, Erfurt, Baraburg (transferred afterward to Paderborn), Würzburg, and Eichstädt. In 739 he restored the episcopal see of St. Rupert, at Salzburg. After the death of Charles Martel he consecrated Pepin the Short, king of the Franks, in Soissons, by whom he was named Archbishop of Mainz. He held eight ecclesiastical councils in Germany, founded the famous abbey of Fulda, and undertook in 754 new journeys for the conversion of the infidels. In Fulda a copy of the gospels, in his own handwriting, is to be seen, and there is a statue to him also. At the place where Boniface built, in 724, the first Christian church in North Germany, near the village of Altenburg, in the Thuringian forest, a monument has been erected to his memory. The most complete collection of the letters of Boniface was published at Mainz, 1789, folio; and of his entire works, 2 volumes, Oxford, 1845. See Lives by Cox (1853); Werner (1875); Fischer (1880); Ebrard (1882).

Boniface, the name of several Popes. Boniface I., elected 418 by a party of the clergy, and confirmed by the Emperor Honorius, who declared the anti-pope Eulalius a usurper. Boniface condemned Pelagianism, and extended his authority by prudent measures. In a contest with the Emperor Theodosius, who endeavored to take from the bishops of Thessalonica their canonical jurisdiction over Illyria, he successfully vindicated the primacy of the Roman See. Boniface II., elected 530; d. 532. The death of his rival, the anti-pope Dioscorus, a few days after his election, left him in quiet possession of the papal chair. During his pontificate St. Benedict laid the foundations of monasticism in the West. Boniface III., chosen 607, died nine months after his election. Boniface IV. reigned 608–615. He consecrated the Pantheon to the Virgin and all the saints. Boniface V., a Neapolitan, was Pope 619–625. He confirmed the inviolability of the asylums, and endeavored to diffuse Christianity among the English. Boniface VI., a Roman, elected 896, died a fortnight after. Boniface VII., anti-pope, elected 974 during the lifetime of Benedict VI., whose death he was suspected of having caused. Expelled from Rome he returned on the death of Benedict VII., and found the chair occupied by John XIV., whom he deposed and threw into prison, where he died. Boniface died 11 months after his return. Boniface VIII.,

Benedict Gaetano: b. Anagni of an ancient Catalonian family; elected Pope 24 Dec. 1294. He studied jurisprudence, was a canon at Paris and Lyons, advocate of the consistory, and prothonotary of the Pope at Rome. After Martin IV. had elevated him to the dignity of a cardinal (1281) he went as legate to Sicily and Portugal, and was intrusted with the charge of reconciling the king of Sicily with Alphonso of Aragon, and Philip the Fair with Edward I. of England. After Cœlestine V. had resigned the papal dignity at Naples, in 1294, at the instigation of Boniface, the latter was chosen Pope. He met with opposition from the cardinals of the family Colonna, whose antagonism followed him throughout his entire pontificate. His induction was magnificent. The kings of Hungary and Sicily held his bridle on his way to the Lateran, and served him at table with their crowns on their heads. Boniface, however, was not successful in his first efforts for the increase of his power. He first opposed Albert of Austria in his contest for the imperial title, but finally yielded and crowned him emperor. He was equally unsuccessful in his attempt to arbitrate between England and France. The bulls which he issued at this time against King Philip the Fair of France obtained no consideration. This was also the case with the interdict which he pronounced against him at the Council of Rome in 1302. Intimidating the clergy in France, Philip refused to yield to the Pope's decrees. The Pope was accused of duplicity, of simony, of usurpation, of heresy, of unchastity; and it was resolved to condemn and depose him at a general council at Lyons. Philip went still further; he sent Nogaret to Italy in order to seize his person and bring him to Lyons. Nogaret united himself for this purpose with Sciarra Colonna, who with his whole family were bitterly inimical to Boniface. Boniface fled to Anagni, where Nogaret and Colonna surprised him. Boniface acted with spirit. «Since I am betrayed,» said he, «as Jesus Christ was betrayed, I will die at least as a Pope.» He assumed the pontifical robes and the tiara, took the keys and the cross in his hand, and seated himself in the papal chair. But the insignia of his holy office did not save him from seizure. Nay, Colonna went so far as to use personal violence. Boniface remained in imprisonment for two days, when the Anagnese took up arms and delivered him. After this he departed to Rome, where he died, a month later, in 1303. Boniface IX., Pietro Tomacelli of Naples, succeeded Urban VI. at Rome during the schism in the Church, while Clement VII. resided in Avignon. He was distinguished for the beauty of his person and the elegance of his manners, rather than for a profound knowledge of theology and canon law. Even the counsel of his experienced cardinals could not save him from the commission of gross blunders. He made the annates a regular tax in 1392. Many abuses in the sale of benefices were indulged during his pontificate. A notable event in his reign was the suppression of the rebellion in Rome in favor of a Republic. He supported the pretensions of Ladislaus to the throne of Naples, and during the greatest part of his pontificate was engaged in negotiations at Avignon with his rivals, Clement VII. and Benedict XIII. He died 1404.

Bonifacio, Veneziano, vā-nād-zē-ä′nō bō-ne-fä′chō, Italian painter: b. Venice, about 1525; d. about 1579. He belonged to the Venetian school and his 'Saint Jerome and Saint Margaret'; 'Saint Barnabas and Saint Sylvester'; 'Saint Anthony and Saint Mark' are still in the Venice Academy.

Bonifacio, bō-ne-fä′chō, **Strait of,** the Fretum Gallicum of the Romans, lies between Corsica and Sardinia, and at the narrowest part is only seven miles wide. The navigation is difficult owing to the rapid current and the great number of rocks, which, however, are favorable to the production of coral.

Bonifazio Veronese, bō-ne-fä′tse-o vā-rō-nā′sā (the Elder), Italian painter: b. Verona, 1490; d. 1540. He was a notable colorist of the Venetian school and many of his works have been attributed to Titian and to Giorgione, whose styles he imitated. Among known works of his are 'The Finding of Moses' in the Dresden Gallery, and 'Dives and Lazarus' in the Venice Academy.

Bonin (bō-nēn′) **Islands,** several groups of islands, North Pacific Ocean, extending from lat. 27° 44′ 30″ to 26° 30′ N., south of and belonging to Japan. The northwest island of the most northern cluster, called Parry Group, is in lat. 27° 43′ 30″ N.; lon. 142° 8′ E.; the cluster consists of small isles. The largest of the chain is Peel Island, on the west side of which is a good harbor called Port Lloyd, in lat. 27° 5′ 30″ N.; lon. 142° 11′ 30″ E., nearly surrounded by hills crowned with palm trees. Almost every valley has a stream of water. Green turtle abound in the sandy bays. Sharks are numerous, and fish of several kinds plentiful. Peel Island is inhabited by some English, Americans, and Hawaiians, who cultivate maize, vegetables, tobacco, and the sugar-cane. It is frequently visited by vessels in want of water and fresh provisions. The islands were discovered by the Japanese in 1593 and since 1876 have been in the possession of Japan. Pop. about 1,400.

Bon′ington, or **Bonnington, Richard Parkes,** English painter: b. 25 Oct. 1801, at Arnold, a village near Nottingham, where his father was a painter and lace manufacturer; d. London, 23 Sept. 1828. When Richard was in his boyhood the family removed to Calais and afterward to Paris. He early displayed a decided predilection for art, and entered as a student at the Louvre, and was also for a time in the studio of Baron Gros. His genius displayed itself in landscape-painting, and he rapidly rose to great eminence in this department, first in Paris and afterward in England, to whose Royal Academy Exhibition he contributed several pictures which created a great sensation. He worked at first entirely in water-color, but from about 1825 he also used oil. A brilliant career was in prospect for him, when he was cut off by pulmonary consumption. See Muther, 'History of Modern Painting' (1896).

Bonito, bō-nē′tō, a fish of the mackerel family (*Scombridæ*) nearly related to the gigantic tunny, but smaller, longer in body, and without teeth on the vomer. There are two American species. One (*Sarda sarda*) lives in the open seas, except at spawning time, from Cape Cod to Cape Sable, and occasionally in the Gulf of Mexico, where it weighs 10 to 12 pounds. In color it is dark steel blue above,

with numerous dark narrow strips obliquely downward and forward from the back, and the under parts, silvery. The California bonito or skipjack (*Sarda chiliensis*), is heavier and is found from San Francisco northward to Japan. In the tropics, the bonito is known as the worst foe of the flying-fish. On the Rhode Island coast the fish is called abbicore.

Bonitz, Hermann, hĕr'män bō-nĭts, German classical scholar: b. Langensalza, 29 July 1814; d. Berlin, 25 July 1888. He was professor in the University of Vienna, 1849–67, director of a gymnasium at Vienna from 1867, and a member of the Academy of Sciences. He was a profound student of Plato and Aristotle and was the author of 'Ueber die Kategorien des Aristoteles' (1853); 'Platorische Studien' (1858–60); 'Aristotelische Studien' (1862–7).

Bonn, a city of the Prussian province of the Rhine, formerly the residence of the Electors of Cologne, on the left bank of the Rhine, over which there is a magnificent new bridge, erected at a cost of $1,000,000, with a central span of 600 feet. It is a flourishing place, and has been greatly extended and improved in recent years, though it still has many narrow irregular streets. The town hall, completed 1782, is one of the handsomest of its edifices. Another important building is the cathedral, cruciform in plan, and forming an imposing and picturesque example of the late Romanesque style of architecture. The greater part of it dates from the 13th century. But all other buildings and institutions are eclipsed by the celebrity of the university, the charter of which was given 18 Oct. 1818, at Aix-la-Chapelle, by the king of Prussia, who at the same time endowed it with an annual income of about $60,000. The former residence of the Elector of Cologne was bestowed on the university, and was fitted up at great expense, being surpassed in extent and beauty probably by no university building in Europe. The university possesses a library of more than 275,000 volumes, 1,235 incunabula and 1,376 MSS.; a museum of antiquities, a collection of casts of the principal ancient statues, a collection of coins, observatory, botanic garden, etc. The paintings in the Academical Hall (among others, the great allegorical picture, the 'Christian Church') were executed by some pupils of Cornelius. In the front of the university is an extensive garden, with fine old avenues of trees, while from this quarter runs westward a broad straight avenue, half a mile long, planted with horse-chestnuts, passing the observatory, and leading to the botanic garden and natural history collections of the university, and to the chemical laboratory, the anatomy building, etc. In this quarter also are grounds and buildings for the use of the agricultural institute. Particular advantages are afforded for the education of young men intended for instructors. Many men distinguished in various branches of science have been connected with the university, including Arndt, A. W. Schlegel, and the historian Niebuhr. The exertions of the government to collect in Bonn all the means of instruction, united with the charms of the place and the beauties of the scenery, have made the place famous. In 1901 the students numbered over 2,400. The manufactures, which are not very important, comprise carpets, machinery, soap, chemicals, stoneware, etc. The means of communication are ample, both by the steamers which ply upon the Rhine and by the railways. Prince Albert studied at Bonn and Beethoven was born there, the house of his birth being now a museum. There are statues of Beethoven and Arndt, a monument commemorative of the war of 1870–1, a monumental fountain, etc. The antiquity of Bonn is considerable, and, as the residence of the electors of Cologne, it is of historical importance. Pop. (1900) 50,737.

Bonn, University of. See BONN.

Bonnassieux, Jean, zhŏn bō-nȧ-syė, French sculptor: b. Paunissieres, 1810; d. 1892. He studied in Paris and in 1836 received the Prix de Rome. He gained the favor of the French clergy by refusing to model a statue of Voltaire for the façade of the Louvre and thereafter did much work for churches. He was commissioned in 1857 to model a colossal statue of Notre Dame de France for the valley of Puy from the bronze cannon taken at Sebastopol. Other important works of his are 'Amour se conpant les ailes'; 'David Berger, 1814'; and 'Meditation,' for which last he received the cross of the Legion of Honor.

Bonnat, Léon Joseph Florentin, lā-ôn zhō-sĕf flō-rŏn-tăn bō-nȧ, French painter: b. Bayonne, 20 June 1833. When a young man he spent several years in Spain and Italy. He studied under Madrazo at Madrid, and under Léon Cogniet at Paris, first gaining recognition at the Paris Salon in 1861, when he received a second-class medal. The list of his honors is a large one, including the medal of honor at the Salon of 1869. In the Legion of Honor he was made chevalier in 1867, officer in 1874, and commander in 1882. He paints portraits and genre subjects; many of these are reminiscences of his visits to Italy and Egypt. He became a member of the Institute in 1874, and was chosen chief professor of painting in the Ecole des Beaux Arts in 1888. His work shows the influence of Velasquez and Ribera, and his portraits, such as those of Thiers, Victor Hugo, and Don Carlos, are remarkable for their realism. He has painted the portraits of many Americans and his portrait work is well known in this country.

Bonnechose, François Paul Emile Boisnormand de, frän-swȧ pōl ā-mēl bwä-nôr-mȧn bŏn-shōz, French poet and historian: b. Leyerdorp, Holland, 1801; d. 1875. He was librarian of the palace of Saint Cloud for some years and subsequently held similar posts. His one notable poetical composition is 'The Death of Bailly' (1833). Besides a 'History of France' he was author of 'Reformers Before the 16th Century Reformation' (1844); 'The Four Conquests of England' (1851); 'History of England' (1859); 'Bertrand du Guesclen' (1866).

Bonnemère, Joseph Eugène, zhō-sĕf ė-zhān bŏn-mār, French historian: b. Saumur, 21 Feb. 1813. In early life he wrote a number of plays; but owes his reputation to a series of historical publications, 'History of the Peasants' (1856); 'Vendee, in 1793' (1866); 'Popular History of France' (1874–9); 'History of the Religious Wars in the Sixteenth Century' (1886); etc.

Bonner, Edmund, English prelate: b. about 1495; d. London, 5 Sept. 1569. For his skill in canon law he was patronized by Cardinal Wolsey, on whose death he acquired the favor of Henry VIII., who made him one of his chaplains, and sent him to Rome on business connected with his divorce from Queen Catharine. In 1535 he was made archdeacon of Leicester. In 1538 he was nominated bishop of Hereford, being then ambassador at Paris; but before his consecration he was translated to the see of London. In 1542–3 he was ambassador to the Emperor Charles V. After Edward VI.'s accession in 1547 he was deprived of his bishopric for non-obedience in connection with the injunctions and the 'Book of Homilies.' He was shortly afterward restored, but still continuing to act with contumacy, he was, after a long trial, once more deprived of his see, and committed to the Marshalsea (1549); from which prison, on the accession of Mary, he was released, and once more restored in 1553. During this reign a most sanguinary persecution of the Protestants took place, many of whom Bonner was instrumental in bringing to the stake, though it appears he was hardly severe enough to meet the wishes of the king and queen. When Elizabeth succeeded he went with the rest of the bishops to meet her at Highgate, but was coldly received. He remained, however, unmolested, until his refusal to take the oath of supremacy; on which he was committed to the Marshalsea (1560), where he remained a prisoner for nearly 10 years, until his death. He was buried at midnight, to avoid any disturbance on the part of the populace, to whom he was extremely obnoxious.

Bonner, Robert, American publisher: b. near Londonderry, Ireland, 28 April 1824; d. New York, 6 July 1899. Coming to the United States in 1839 he learned the printer's trade on the Hartford *Courant,* and gained the reputation of being the most rapid compositor in Connecticut. In 1844 he removed to New York, and seven years later had saved enough money to buy the plant of the 'Merchants' Ledger,' a small business periodical. Changing its name to the 'New York Ledger,' he turned it into a literary publication, printing the most popular kind of stories. This, combined with sensational advertising methods, and the unprecedented prices paid to famous contributors, soon gave the 'Ledger' an enormous circulation. Henry Ward Beecher was paid $30,000 for his "Norwood"; Tennyson received $5,000 for a short poem, and Dickens the same amount for a short story. At times $25,000 a week was spent in advertising the paper. Retiring in 1887, the rest of his life was spent in indulging his taste for fast horses. It was his ambition to own the fastest trotters in existence, and whenever he purchased a record breaker, the animal was immediately withdrawn from public racing. His expenditures for fast horses exceeded $600,000. Some of them and their cost were: Dexter, $35,000; Rarus, $36,000; Maud S., $40,000; Sunol, $41,000. He was a generous giver to many charitable institutions and causes, to Princeton University and the Fifth Avenue Presbyterian Church. He had a genuine dislike for publicity, and many of his benefactions were never made public till after his death.

Bonnet, Charles, Swiss naturalist and metaphysician: b. Geneva, 13 March 1720; d. Genthod, 20 May 1793. His essay 'On Aphides,' in which he proved that they propagated without coition, procured him in his 20th year the place of a corresponding member of the Academy of Sciences at Paris. Soon afterward he partook in the discoveries of Trembley respecting the polypus, and made interesting observations on the respiration of caterpillars and butterflies, and on the structure of the tapeworm. Bonnet was a close and exact observer. He carried religious contemplations into the study of nature. In his views of the human soul many traces of materialism are to be found; for instance, the derivation of all ideas from the movements of the nerve fibres. Of his works on natural history and metaphysics there are two collections; one in 9 volumes 4to, the other in 18 volumes 8vo (Neufchâtel, 1779). The most celebrated are' 'Traité d'Insectologie'; 'Recherches sur l'Usage des Feuilles dans les Plantes'; 'Considérations sur les Corps organisés'; 'Contemplation de la Nature'; 'Essai analytique sur les Facultés de l'Ame'; 'Palingénésie Philosophique'; and 'Essai de Psychologie.'

Bonnet, in fortification, an elevation of the parapet at a salient angle, designed to prevent the enfilading of the adjoining front of the work, where it is situated. The bonnet accomplishes, however, only part of this object, and is subject, at least in field-works, to the disadvantage, that the men destined for its defense are too much exposed to be taken in flank by the fire of the enemy, on account of the necessary elevation of the banquette, a fault which cannot occur in the works of a fortress which are well laid out. The term also denotes a covering for the head, now especially applied to one worn by females. In England the bonnet was superseded by the hat as a head-dress two or three centuries ago, but continued to be distinctive of Scotland to a later period.

Bonnet-head, a small shark of the genus *Reniceps,* frequenting warm seas and related to the shovel-heads (q.v.).

Bonnet Monkey. See MACAQUE.

Bonnet-piece, a Scotch coin, so called from the king's head on it being decorated with a bonnet instead of a crown. It was struck by James V., and is dated 1539. Bonnet-pieces are very rare and in high estimation among antiquaries.

Bonnet-rouge, bō-nā-roozh, an emblem of liberty during the French Revolution, and worn as a head-dress by all who wished to show themselves sufficiently advanced in democratical principles. It is said by some to have been adopted in imitation of the Phrygian cap of the same color which was worn by those who had obtained emancipation from slavery, while others maintain that it had a much more lowly origin, and was borrowed either from the Marsellais bands that flocked to Paris, or from a few Swiss soldiers who, having been sentenced to the galleys for insubordination to their officers, obtained their liberty on the acceptance of the constitution in 1790. Having returned in a kind of triumphal procession, wearing the red cap, which had formed part of their galley dress, the fancy of the people was struck, and the

bonnet-rouge was considered indispensable to every true patriot. Even the unfortunate Louis XVI. wore it when paraded through the streets, after narrowly escaping with his life from the mob which had burst into his palace. After it had ceased to be generally worn, it became the distinctive badge of the men of the Mountain. During the storms of more recent periods attempts have repeatedly been made to bring it again into fashion. These have not been successful, but the revolutionary cap rejected by France has met with a more favorable reception abroad, particularly among the newly formed republics of America, where it is often stamped upon coins, or used as an emblem upon seals. Under the restoration of the Bourbons the soubriquet of bonnets-rouges was applied to individuals who either had figured in the revolution or were supposed to hold revolutionary principles.

Bonneval, bŏn-vạl, **Claude Alexander** (Count de or Achmet Pasha), French adventurer: b. Coussac, 1675; d. Constantinople, 1747. In the war of the Spanish Succession he obtained a regiment and distinguished himself by his valor as well as by his excesses. He was, in 1706, appointed major-general by Prince Eugene, and fought against his native country. At the Peace of Rastadt in 1714, by the interference of Prince Eugene, the process against him for high treason was withdrawn, and he was allowed to return to his estates. In 1716 he was lieutenant field-marshal of the Austrian infantry, and distinguished himself by his valor against the Turks at Peterwardein (1716). In 1718 Bonneval was made a member of the imperial council of war, but his licentiousness and indiscretion induced Prince Eugene to get rid of him by appointing him in 1723 master-general of the ordnance in the Netherlands. To revenge himself on Eugene, he sent complaints to Vienna against the governor, the Marquis de Prié; but the latter received an order to arrest Bonneval, and to imprison him in the citadel of Antwerp. Bonneval being afterward ordered to appear at Vienna and give an explanation of his conduct, spent a month at The Hague before he chose to comply with the summons. He was therefore confined in the castle of Spielberg, near Brünn, and condemned to death by the imperial council of war; but the sentence was changed by the emperor into one year's imprisonment and exile. Bonneval now went to Constantinople, where the fame of his deeds and his humanity toward the Turkish prisoners of war procured him a kind reception. He consented to change his religion, received instructions in Mohammedanism from the mufti, and received the name of Achmet, with a large salary. He was made a pasha of three tails, commanded a large army, defeated the Austrians on the Danube, and quelled an insurrection in Arabia Petræa. His exertions, as commander of the bombardiers, to improve the Turkish artillery, were opposed by the jealousy of powerful pashas, the irresolution of Mohammed V., and the dislike of the Turkish troops to all European institutions. He enjoyed, however, the pleasures of his situation. The memoirs of his life under his name are not genuine.

Bonneville, bŏn-vĭl, **Benjamin L. E.,** American soldier and explorer: b. France about 1795; d. Fort Smith, Ark., 12 June 1878. He graduated from West Point 1815, became a captain of infantry 1825; and in 1831–6 engaged in an exploring expedition to the far West, across and beyond the Rocky Mountains. His journal and other manuscripts were edited and enlarged by Washington Irving, who published them under the title of 'Adventures of Captain Bonneville, U. S. A.' (1837). He fought with gallantry in the Mexican war, taking part in the siege of Vera Cruz, the battle of Cerro Gordo, the capture of San Antonio, battle of Churubusco, where he was wounded, the battle of Molino del Rey, the storming of Chapultepec, and the ensuing assault and capture of the city of Mexico. In 1857 he commanded the Gila expedition, and in 1861 was retired from active service, "for disability resulting from long and faithful service, and from sickness and exposure in the line of duty." In 1865 he was brevetted brigadier-general in the regular army "for long and faithful services." See Cullum, 'Officers and Graduates of the U. S. Military Academy,' Vol. I. (1868).

Bonneville, Lake, a lake of the Pleistocene epoch that twice filled a now desert basin of Utah. At its greatest dimensions it had an area of 20,000 square miles, and was 1,000 feet deep.

Bonney, Charles Carroll, American lawyer: b. Hamilton, N. Y., 4 Sept. 1831; d. Chicago, Ill., 1903. In 1850 he removed to Peoria, Ill., took an active part in establishing the present educational system of that State; was admitted to the bar 1852, settled in Chicago in 1860, and acquired a large and successful practice. He was one of the originators of the law and order movement and was president of the National Law and Order League 1885–93. In 1893 he was the organizer and general president of the World's Congresses held at the Columbian Exposition; there were over two hundred of them, and they proved a marked feature of the World's Fair. Besides numerous pamphlets, addresses and essays on public questions he has written 'Rules of Law for the Carriage and Delivery of Persons and Property by Railway' (1864); 'Summary of the Law of Marine, Fire, and Life Insurance' (1865); 'Our Remedy in the Laws' (1887); and edited A. W. Arrington's 'Poems' (1869).

Bonney, Thomas George, English geologist: b. Rugeley, 27 July 1833. He was president of the Geological Society of London 1884–6, and in 1899 became vice-president of the Royal Society. He has written 'Outline Sketches in the High Alps of Dauphine' (1865); 'The Alpine Regions' (1868); 'The Story of Our Planet' (1893); 'Charles Lyell and Modern Geology' (1895); 'Ice Work' (1896); 'Volcanoes' (1898), and four volumes of Sermons.

Bonnie Blue Flag, a popular Confederate ballad first sung in public at the Varieties Theatre in New Orleans in 1861.

Bonnières, Robert de, ro-bār dė bŏn-nĭ-ār, French journalist and novelist: b. Paris, 7 April 1850. He began his literary career as contributor to Paris journals of spirited but waspish biographies of contemporary men; these were collected and published in three successive volumes of 'Memoirs of To-Day.' His novels are full of transparent allusions to noted persons,

and have had a very great vogue. In one of them, 'The Monarch,' he portrays high Jewish society in Paris.

Bonnivard, François de, fräṅ-swạ dė bō-nẹ-vär, Swiss patriot, a younger son of a family which held large possessions under the House of Savoy: b. Syssel about 1496; d. Geneva, 1570. In 1513 he became prior of St. Victor at Geneva, but falling under the suspicion of the Duke of Savoy, was taken prisoner by him in 1519. After 20 months' imprisonment he was set free, but in 1530 he was again seized and taken to the castle of Chillon at the east end of the Lake of Geneva, where he was imprisoned for six years, the last four in that subterranean vault which Byron has made famous by his poem on the sufferings of 'The Prisoner of Chillon.' He left the town his books, which were the nucleus of the Geneva library. His chief works are his 'Chroniques de Genève' (1551; new ed. 2 vols. 1831), and 'De l'Ancienne et Nouvelle Police de Genève' (1555). See Gribble, 'Lake Geneva and Its Literary Landmarks' (1901).

Bonny, a river of west Africa, one of the mouths of the Niger. The town of the same name is situated on the eastern bank of the river near its mouth. It has a good harbor and does a considerable trade in palm-oil, but the climate is unsuitable for Europeans. Pop. about 8,000.

Bonnycastle, Charles, English mathematician: b. Woolwich, 1792; d. Charlottesville, Va., October 1840. He was professor of mathematics at Woolwich Military Academy, professor of natural philosophy in the University of Virginia (1825–7), and of mathematics there from 1827. His publications included 'Elements of Geometry'; 'Elements of Algebra'; 'Mensuration,' etc.

Bonnycastle, Sir Richard Henry, English military engineer: b. 1791; d. 1848. He was a brother of Charles Bonnycastle (q.v.) and spent the greater part of his life in British North America. He was author of 'Spanish America' (1818); 'The Canadas in 1842' (1842); 'Canada and the Canadians in 1846' (1846); and 'Canada as It Was, Is, and May Be' (1846).

Bonomi, Giuseppe, joo-sĕp'pĕ bō-nō'me, Italian artist: b. Rome, 9 Oct. 1796; d. 3 March 1878. He was a son of Giuseppe Bonomi, the architect. He studied art in London, and became famous as a draftsman, especially of Egyptian remains. He repeatedly visited Egypt and the Holy Land, and illustrated important works by Wilkinson, Birch, Sharpe, Lepsius, and other Egyptologists. He also published a work of his own on Nineveh, and at his death was curator of Soane's Museum.

Bononcini, or **Buononcini, Giovanni Battista,** jō-vän'nẹ bō-nŏn-chē'nẹ, Italian composer: b. Modena about 1660; d. about 1750. His proficiency on the violoncello gained him admittance into the band of the Emperor Leopold at Vienna, where, at the age of 18, in emulation of Scarlatti, he wrote an opera called 'Camilla,' which was favorably received. In England for several years scarcely any opera was tolerated which did not contain some of Bononcini's airs, and upon the almost simultaneous arrival of himself and Handel in London, notwithstanding the superiority of the latter, two parties, the one for Bononcini and the other for Handel, were formed, between whom an exciting contest was waged for several years. Gradually, however, Bononcini's popularity waned, and having been detected in an act of musical plagiarism, he left England in 1733, found his way to Paris and Vienna, and finally went to Venice, where all traces of him are lost.

Bononcini, Giovanni Maria, Italian musician: b. Modena, 1640; d. 19 Nov. 1678. He was educated at Bologna, was in the service of the Duke of Modena, Francis II., and also maestro di capella of San Giovanni in Monti. He was considered an authority on the theory of music on account of his work 'Musico prattico'; he also wrote numerous musical compositions, both vocal and instrumental.

Bonone, bō-nō'nā, **Carlo,** Italian painter: b. Ferrara, 1569; d. 1632. He studied the works of the Caracci and Veronese, and shows the influence of both styles in his own work. He taught painting in Ferrara, having many prominent painters of the town under his instruction. Among his paintings are 'The Arisen Christ' and 'Patriarchs and Prophets.'

Bonpland, Aimé, ā-mā bôṅ-plāṅ, Jacques Alexandre, French naturalist, noted as the friend of Humboldt, and the companion of his wanderings: b. Rochelle, 22 Aug. 1773; d. Corrientes, Argentina, May 1858. He studied medicine, and served for a while in the French navy as surgeon. Having returned to Paris to continue his studies, he there made the acquaintance of Humboldt, then a young man actively engaged in the pursuit of scientific knowledge at the French capital. On the latter projecting his journey to the New World, Bonpland readily agreed to accompany him, and shared in all the adventures and toils of that celebrated expedition. In the course of it he collected upward of 6,000 plants, previously unknown, and on his return to France in 1804 presented his herbarium to the Museum of Natural History, and had a pension granted him by the Emperor Napoleon. A great friendship subsisted between him and the Empress Josephine, who frequently endeavored to cultivate in her garden at Malmaison the flowers whose seeds he had brought from the tropics. On the Restoration he proceeded to South America, and became professor of natural history at Buenos Ayres. He subsequently made an extensive journey across the Pampas to the foot of the Andes, and ascended the river Parana into Paraguay, but was arrested by Dr. Francia, the governor of Paraguay, as a spy, and detained a prisoner for eight years, till 1829. He afterward settled at San Borja, near Monte Video, and after 1850 lived at Corrientes.

Bonsal, Stephen, American journalist: b. Virginia, 1863. He was educated at Concord and Heidelberg. In the Bulgarian-Servian war he was special correspondent of the New York *Herald,* serving in the same capacity in Macedonia and Cuba. He has been secretary of Legation of the United States in Pekin, Madrid, Tokio, and Corea. He has written 'The Real Condition of Cuba'; 'The Fight for Santiago'; 'Morocco as It Is'; 'Across the Pacific.'

Bonstetten, bŏn-stĕt'ĕn, **Karl Victor von,** Swiss publicist: b. Bern, 3 Sept. 1745; d. Geneva, 3 Feb. 1832. He studied at Leyden, Cam-

bridge, and Paris; entered the council of Bern, and became district governor, and, in 1795, a judge in Lugano. He lived in Italy and at Copenhagen from 1796 to 1801, and after his return settled at Geneva. Among his larger works are 'Recherches sur la Nature et les Lois de l'Imagination' (Geneva 1807); 'Pensées Diverses' (1815); 'Etudes de L'Homme' (1821), and 'L'Homme du Midi et L'Homme du Nord' (1824), an examination of the influence of climate. Several volumes of his correspondence have been published.

Bontebok, bŏn'te-bŏk, a small South American antelope (*Bubalis pygargus*) closely allied to the blessbok (q.v.), but a slightly larger size, and having the continued white blaze on the face to the root of the lyrate horns. See HARTBEEST.

Bonus Bill, an act reported to the United States House of Representatives by John C. Calhoun, 23 Dec. 1816, appropriating "as a fund for constructing roads and canals" the $1,500,000 paid by the United States bank as a bonus for its charter privileges, and all future dividends from its stock. The real object was to build the Erie Canal, which New York did not feel able to do alone. Its managers,— De Witt Clinton, Gouverneur Morris, etc.,— relying on the administration holding the same ideas which Jefferson and Gallatin had formerly voiced, formed a "log-roll" in Congress with various local interests, and carried the bill by 86 to 84 in the House, and 20 to 15 in the Senate, the opposition being scatteringly local rather than sectional, or constitutional; but Madison vetoed it on strict-construction grounds. The apparent injury was to New York: the real injury was to the South. New York went on and built the canal herself, giving her an irresistible advantage over her rivals, while the South was not rich enough to build the canals from the Chesapeake to the Ohio, enriching Maryland and Virginia, nor from the Santee to the Tennessee, enriching the Carolinas and Tennessee, and if the general government had helped the Erie it must have helped the others also.

Bonvalot, Pierre Gabriel, pę-ăr gä-brē-ĕl bôn-vą-lō, French explorer: b. Espagne, Aube, 1853. He traveled in central Asia, 1880–2; Persia, Turkestan, and the Pamirs, 1885–7; and in Siberia and Tonkin, 1889–90. He has written 'En Asie Centrale'; 'Du Moscou en Bactriane' (1884); 'Du Kohistane à la mer Caspienne' (1855); 'Du Caucase aux Indes à travers le Pamir' (1888).

Bonvin, François Saint, frăń-swä săń bôń-văń, French genre painter: b. Vaugirard, 22 Sept. 1817; d. Saint Germain-en-Laye, 18 Dec. 1887. He was self-taught, exhibited often at the Paris Salon and received the medal of the Legion of Honor in 1870. For a long period his work was not popular, but his paintings are now much prized by collectors on account of their rich coloring and sober tone. Among them are 'Charity' (1852); 'Regimental School' (1853); 'Corner in a Church' (1880).

Bony-fish. See MENHADEN; TEN-POUNDER.

Bony, or **Gar Pike.** See GAR.

Bonzes, bŏn'zęs, a name given by Europeans to the priests of the religion of Fo, or Buddha, in eastern Asia, particularly in China, Burma, Tonquin, Cochin-China, and Japan. As these priests live together in monasteries, unmarried, they have some resemblance to the monks of the Christian Church. They do penance, and pray for the sins of the laity, who secure them from want by endowments and alms. The female bonzes may be compared to the Christian nuns, as the religion of Fo suffers no priestesses, but admits the social union of pious virgins and widows, under monastic vows, for the performance of religious exercises. The bonzes are commonly acquainted only with the external forms of worship and the idols, without understanding the meaning of their religious symbols.

Booby, a name given long ago by British sailors to several of the smaller tropical species of gannet (q.v.), because of their "stupidity," which consisted simply in their fearlessness when visited upon their island breeding places. Having had no acquaintance with mankind they had no reason to fear him. Most of the species are widespread, and, in their haunts abundant. One species (*Sula variegata*) is, however, confined to the coasts of Peru, where it contributes largely to the valuable guano deposits on the islands there.

Book. Used without qualification, the term currently implies a printed literary composition in many sheets; but in law and custom it has received three extensions, one of form and two of matter. The form includes anything bound like a book — volumes of accounts, or of blank leaves for keeping them or for indexing, etc., and even "books" of gold-leaf, 25 thin strips in a cover. The matter includes — by English statute law, "every volume, part or division of a volume, pamphlet, sheet of letterpress, sheet of music, map, chart, or plan separately published"; in literary usage, the written compositions of ancient times on whatever material, if of some volume.

Historically, it is curious that primitive attention has invariably seized first on, and named the writing after, neither form nor matter, nor even the method of writing, but the material on which the writing was executed: every name in common use, present or past, refers to this. "Book," A.-S. *bōc,* is from an old Teutonic *boks,* that is, "the beeches," tablets of beech-bark on which runes were cut or painted; Latin *liber,* whence French *livre* and our "library," was the same thing, the inner bark of a tree, and the name was later given to the papyrus tissue from its bark-like appearance; *codex* or *caudex,* our "code," and still used in its Latin form for old texts, meant the trunk of a tree, then wooden tablets, then square volumes like wooden blocks instead of those in scrolls; the Greek *byblos,* our "Bible," was another name for the papyrus; and modern usage clings to the same connection of ideas — we speak of reading "a paper" before an audience. On the other hand, the words "write," "inscribe," and "scripture," and the various "-graphs," all from words meaning to cut, commemorate a time when all writing was by scoring lines on some hard substance. Of course special terms refer to various aspects of the book: "volume" (Latin *volumen,* from *volvo,* to roll) was the wooden roller around which a convenient section of a long composition was twisted; "tome" means a cutting — of the book into parts, exactly the same as "section."

It is difficult to say at just what point the ancient writings may properly be called "books." It is evident that mere scorings or paintings of short compositions on a single surface — runes, hymns, poems, epistles, proclamations, business documents, or what not — cannot be called books, even if the surface is large; though Lord Macaulay facetiously speaks of a rising young Assyrian architect who "published a bridge and four walls in honor of the reigning emperor." On the other hand, long compositions carried over many tablets, grouped in numbered or lettered pages and divided into "volumes" or shelves, and even sometimes with the owner's book-plate (q.v.) attached, cannot be denied the name; nor can extensive compositions on papyrus like the 'Book of the Dead,' dating back well toward 2 000 B.C. if not earlier, nor the famous 'Papyrus Prisse,' the oldest volume known to exist. The Babylonian and Assyrian books were drawn on clay tablets or polygonal cylinders (afterward hardened) with an iron stylus, producing the wedge-shaped or "cuneiform" characters, some of them so small and skilfully executed that they suggest the use of a magnifying glass — quite likely a ball of crystal. These about the 7th century B.C. had begun to be gathered into royal or temple libraries, to the inestimable service of modern historical research: the vast majority of our knowledge of old Babylonia and Assyria comes from two great libraries, that of Ashurbanipal (Sardanapalus: 668–626 B.C.) at Nineveh, and that of the Temple of Bel at Nippur. Yet, oddly, while our civilization as a whole is a direct heir of the Babylonian, and its details owe to that, through the Greek and Latin, a score of items to one of the Egyptian, our books have no connection with the Babylonian and are the immediate progeny of the Egyptian; an unbroken sequence can be maintained from the volume in the reader's hand to the 'Papyrus Prisse,' perhaps more than 2,000 years before Christ, and containing the still older composition, regarded as the oldest extant book in the world, the 'Maxims of Ptah-Hotep,' dating probably from 2500 B.C.

Owing to the cheap and easy preparation of the papyrus tissue, by pulping the pith and spreading it out to dry, essentially like our paper, and its wonderful adaptability to literary use beyond anything discovered for many ages,— its thinness and lightness, yet hard, smooth, glossy surface showing off inks and pigments so beautifully — its use spread to Greece before the time of Herodotus at least, and to Rome, and maintained its position as a book material down to the 10th century A.D. Ali ibn el Azhad in 920 describes the different kinds of pens required for writing on paper, parchment, and papyrus (see Karabacek's 'Das Arabische Papier,' 1887). Unhappily, however, it had one insuperable defect for laws, records, or whatever else needed perpetuity: it was very sensitive to dampness, and dissolved and crumbled away in a few generations. Hence it is not merely probable but certain that the great mass of classical literature is lost forever, disintegrated and gone with its material record. The only place where any considerable finds are still possible is Egypt, whose dry climate can preserve such things for countless ages, and whose libraries had vast quantities of the best Greek and Roman works; some remarkable discoveries have already been made there, and more may be hoped for. But for this reason, papyrus was largely supplanted for public uses, and with the wealthier collectors or authors, or for very popular books, by parchment, fine dressed skin, the material used by the Jews, Persians, and other Oriental nations. When the book had outlived its popularity or a more exigent use was found for the parchment, which was costly, the former writing was rubbed off or in, and a new book copied on, and this process was repeated sometimes six or seven times. Thanks to the fact that the erasure always left the outline of the old characters possible to revive by certain chemicals, and that for clearness the new book was written crosswise to the old, so that the imperfectly erased words should not show up through and cause confusion, these *palimpsests* have yielded us many treasures supposed to have been extinguished.

As the very name "book" shows, however, paper-pulp and skin and clay were not the only materials used for books by the ancients; in fact, it would be hard to cite any common smooth-surfaced article not so used. Animal, vegetable, and mineral substances have all been drawn on; metals, wood, wax, ivory, leaves, bark, etc. Wooden books were common among both Greeks and Romans; part of one containing Solon's laws was preserved at Athens till the 1st century. For the more important purposes, laws and edicts, they employed (before the general accession of parchment) ivory, bronze, etc.; Hannibal engraved an account of his campaigns on bronze plates, which if they could be supposed existent, would be worth excavating all South Italy for, especially as the writing must have been in Carthaginian. The antiquary Montfaucon in 1699 bought at Rome a book of six thin leaden leaves, about 4x3 inches, with covers and hinges of lead; it contained Egyptian hieroglyphics, etc. For the common needs of business and social life, however,— contracts and wills, letters either of love or friendship, memoranda, etc.,— the Romans used *diptycha* and *tabulæ* or *pugillaria* — sheets covered with wax, to be written on with a stylus, and protected from contact by a raised margin, or opposite projections in the centres. Two of these, of date 169 A.D., were discovered early in the 19th century in Transylvania, and one of 1301 is preserved in the Florentine Museum. In the University of Göttingen is a Bible of palm-leaves, containing 5,376 leaves. Among the Kalmuck Tartars was found a collection of books made of long narrow leaves of varnished bark, the ink black on a white ground.

The shape of wooden and metal books, waxen and ivory tablets, and those of other hard substances, was square; but the thin flexible papyrus was too liable to dog's-ear and tear from handling in such form, and a method was adopted which has left deep traces on our book terminology — of rolling the sheets on wooden cylinders, very much in the fashion of a modern mounted map. They were written on one side only, fastened together at the edges, and glued or otherwise attached to the roller, which was called in Egyptian a *tama,* in Greek a *kulindros* (cylinder), in Latin a *volumen* (roller), our "volume." We still speak of a piece of writing poetically as a "scroll." Some of these were of huge size: specimens of Egyptian book-rolls still exist extending to 20 and even 40

yards (see Birt's 'Das Antike Buchwesen,' p. 439); but the great inconvenience of consulting such enormous sheets, and the injury to themselves in the process, caused the breaking up of lengthy literary productions into sections, each on a separate roll. Certain handy sizes became normal, like the ordinary novel or essay volume of to-day; and this conventional length of roll exercised great influence on the length of what are still called the "books"—that is, chapters—of the classical authors, one of these being about enough to make a roll or volume of. At each end of the roller was the *umbilicus* (navel) or *cornus* (knob), a boss to turn it by, and the volume was read by unrolling the scroll to expose successively the sheets or *paginæ* (things "fastened" together). The title was generally written in red, on fine vellum, and pasted on the outside, which was dyed with cedrus or saffron. Much labor and expense was often involved in the ornamentation of books, and pleasant conceits were sometimes conveyed by their color. The practice of perfuming the pages to which Martial alludes, "When the page smells of cedar and mantles with royal purple," was not abandoned till very modern times. Lord Burghley, instructing the vice-chancellor of Cambridge concerning the proper presentation of some volumes to Queen Elizabeth, cautions him to "regard that the book had no savor of spike" (spikenard), "which commonly bookbinders did seek to add to make their books savor well." It seems an odd lure to book-buyers; but in this age we can hardly realize the important part played by perfumes in ages when pretty much everything and everybody smelt ill, when filth and the lack of washing or changing of clothes assailed all noses with evil stenches, and an agreeable scent was one of the greatest and rarest luxuries of life. In Egypt the rolls were kept in jars holding nine or ten each; in Rome they were kept in wooden boxes or canisters, often of costly workmanship, or in parchment cases. The change from scrolls to *codices*, or square books, seems to have taken place generally in the ancient world after the adoption of parchment or vellum; they appear to have been coming into general use in Martial's time (last half of the 1st century A.D.), as he alludes to their advantages. The name *codex* is still used for the more important ancient MSS., as the "Codex Alexandrinus." Not all the parchments were folded or arranged in small square sheets as now, however: M. Santander owned a beautiful Hebrew Pentateuch written on 57 skins of Oriental leather, sewed together with threads or strips of the same material; it formed a roll of 113 French feet (120.45 English) long. And practically the same arrangement of successive surfaces had been enforced in the use of the clay or wooden tablets, from the nature of the articles. The form remained substantially unaltered throughout the Middle Ages, and being even more suitable for paper than for vellum, was ready on the invention of printing to facilitate its full development; though important differences in bulk, arising as well from the condition of the art and its materials as the fashion of the times, distinguish books of the earlier periods of printing from those of to-day.

Production and Prices (see also AMERICAN PUBLISHING).—It is assumed that until the invention of printing, books were of excessive rarity and costliness. This is mostly true of the Middle Ages, when the only trained chirographers were in the monasteries—working at free will and leisure and caring solely for quality, and with the express object of making the books costly. It was not so, however, in classic times, owing to that society being based on skilled slave labor. From this cause, the greatest extremes of price prevailed side by side, extreme cheapness and almost incredible dearness. When but few copies of a book were made, either by an author of slender means or by a wealthy amateur to give to friends, they were either given away, or if sold might command any price an unexpected favor of a rich man's fancy dictated; and from the same cause "unique copies"—most likely such were the three books of Philolaus the Pythagorean, for which the not rich Plato paid about $1,600, and the few books of the philosopher Speusippus for which Aristotle paid three Attic talents or some $3,500—were much commoner than now. On the other hand, Anaxagoras' works could be had for a drachma (about 18 cents) even when dear—a thing the more strange that two pieces of papyrus for copying an account cost in 407 B.C. 2 drachmæ 4 oboli, or about 45 cents. Perhaps there was a difference in the paper. In this same year a *diptychon*, or pair of wooden account tablets (pass-book), cost a drachma; but in Demosthenes' time, three quarters of a century later, one (probably smaller) cost only two *chalci* ("coppers"), less than a cent. All these contradictions are probably due to the lack of any regular publishing market.

The long agonies of dissolution of the Roman empire annihilated the book trade; and for centuries the only makers of books were the monk scribes, in whom the important conditions of skill, leisure, love, and patience were all fulfilled. Learning had become the exclusive privilege of a class, a privilege of which they were at once proud and jealous; and they surrounded the means of its acquisition with a pomp and circumstance that precluded the multitude from familiarity with it. In the earliest times books had received the adorning aid of ornamental art; but in the Middle Ages they reached the acme, if not of beauty and convenience, at least of cost. The favored works of the time, principally of the Christian writers, were laboriously transcribed by patient penmen, in *scriptoria* liberally maintained in the monasteries, and specially devoted to that purpose. In the process of preparation their books received the most careful attention in regard to accuracy, elegance, and solidity. In the monasteries also the work was completed; for not only were the monks transcribers, illuminators, and binders, but the same individual frequently combined the triple function in his own person. From the hands of the scribe, whose solemn adjuration at the conclusion of his task was evidence not only of his own care but of his desire that others should imitate his example, the book passed to the illuminator, whose gorgeous colors still delight the bibliophile; and from him to the binder, by whom its ponderous proportions were encased in massive covers of wood and leather, studded with knobs and bands, often of gold and silver, and closed with broad clasps—to unfasten which, letting the covers swing open on their stout hinges, was a privilege to which

not every one was permitted to aspire. For, as said Richard De Bury, "laymen, to whom it matters not whether they look at a book turned wrong side upward or spread before them in its natural order, are altogether unworthy of any communion with books." Precious metals and the less crude but equally costly productions of art contributed to swell their value, in respect of which they stood at times on an equality with houses and lands. When publicly exposed, they were frequently secured by chains; they were protected by special statutes; were subjects of grave negotiation; solemnly bequeathed by will, and lent only to the higher orders, who were compelled to deposit ample pledges for their return. Even so late as 1471, Louis XI. was compelled by the faculty of medicine at Paris to deposit a valuable security, and give a responsible endorser, in order to obtain the loan of the works of Rhasis, an Arabian physician. Instances of the immense prices of special books are familiar, as of King Alfred's giving eight hides (perhaps 500 acres) of land for one book, but England was well-nigh bookless then; of the countess of Anjou giving 200 sheep and other articles for a book of homilies of a bishop — an enthusiastic lady might do so if she liked the bishop; and of other fancy prices for very fine books, not however more than modern collectors might for superb copies. The form in these cases often counted for more than the matter, just as now. On the other hand, in 1431, shortly before the invention of printing, Peter Lombard's works sold at Caen for 7 francs, or $1.30, probably equal to about $10 now; but he was the most popular and widely circulated author in the Christian world before Thomas à Kempis, and it was to the interest of the Church to multiply his works. Making all allowances, books were very scarce and costly.

Arrangement of a Book.— The first page or *recto* of the first leaf or "folio" is technically known as a bastard or half-title page; the next page or *verso* of the first folio is left blank. (The term "folio," however, as usually employed by printers, means simply page number.) Then follows the title-page proper, usually with a blank page at the back. In many books there intervenes a preface or introduction, a dedication, and a table of contents, before the main body of the book begins; the table of contents is sometimes before and sometimes after the introduction and preface. If any portion of the book is out of place, there are two ways by which the true order may be discovered. At the outer corner, or in the centre above the reading matter, or in pages with a chapter heading usually in the centre at the bottom of the page, is a numeral either Arabic or Roman — 1, 2, 3, or i, ii, iii; the almost universal custom now is to use the Roman numerals for prefaces and introductions, and the Arabic for the body of the text, and in catalogues these are indicated thus: pp. xxxvii, 325 — that is 37 pages introduction paged with Roman letters, and 325 of text paged with Arabic. As a guide to the binders in gathering the sheets, also, each "form" as printed on the press — the number of pages printed on one sheet, to be folded and cut later into the proper order of reading — has at the bottom of its first page a number or letter in sequence through the book; that is, if each sheet as printed has eight pages on it, then pages 1, 9, 17, etc.,— the *outside* sheet of each form, which lies on top and visible when the sheet is folded,— will have the numbers 1, 2, 3, etc., or the letters A, B, C, etc., called "signatures," to show the binder in what order the folded sheets are to be assembled. If the forms outnumber the letters of the alphabet when these are used, the signature series continues either as AA or 2A, etc. When two sections of a book begin printing simultaneously for expedition, and as it is uncertain where the first will end, the second has its page folios begun by guesswork — if the first runs over it is necessary to duplicate a certain number of the closing pages of the first section, as 480A, 481A, etc., or else to continue the closing number, as 496A, 496B, etc., or if only one or two, 496½, 496¾.

Sizes of Books.— The copyists made up their paper or vellum books by folding four, five, or six sheets and placing one within the other, making quires or gatherings of 8, 10, or 12 leaves, known respectively as quaternions, quinterns or quinternions, and sexterns, or in Greek tetradia, pentadia, and hexadia. The first printers adopted the same method, printing one page at a time and only on one side of the sheet; the register or collation of the quires for guide to the binder was given in the colophon (q.v. below), and only later supplanted by a signature on each quire, at first inserted by hand, and first printed at Cologne in 1472. When more than one page was printed at once, the number of times the paper had to be folded was a fair guide to the dimensions of the page, at a time when (and for ages later) the paper was made by hand, on frames whose size was held closely alike by the exigencies of human arms; and folio, quarto, octavo, duodecimo, etc., expressed not only the absolute fact of folding, but the constructive fact of size. These names were conveniently abbreviated, except the first, to 4to, 8vo, 12mo; and when improved machinery and larger sheets of paper enabled still more sheets to be printed at once, the Latin names to correspond were not used at all, the terms 16mo, 24mo, 32mo, being employed at once. All these names still survive, though — with the advent of great paper-mills and machinery which make any size desired for an edition, so long as it is an "engine run," the actual printing on large editions of 64 pages at a time, and minute calculations which figure to an eighth of an inch margin — they have ceased to express any fact worth knowing; and in the United States it is now more usual to give on catalogues the height and breadth of pages. But in Europe the old fashion still prevails. So far as the names now mean anything, a 16mo indicates the usual size of a popular volume or essay volume, and an octavo the stately and dignified memoir or volume of travel or "complete works" or cyclopædia; but in fact even these are rarely printed in less than 16s. A sheet folded in the middle forms two leaves or four pages; and a book composed of such sheets is styled a folio, whether it measure a foot and a half or four feet high. When the sheet is again folded it makes a quarto. In hand-made paper (that used in nearly all the small special editions and those of bibliographical interest) the water line runs either across or down the page, according to the number of foldings. The following scheme is serviceable: Folio, folded once, 4 pages, water line perpen-

dicular; quarto, twice, horizontal; octavo, four times, perpendicular; duodecimo, six times, horizontal; 16mo, horizontal; 18mo, perpendicular; 32mo, perpendicular; 36mo, 48mo, 64mo, horizontal; 72mo, 96mo, perpendicular. In Great Britain for a long period printing paper was chiefly of three sizes — royal, demy, and crown; and the book was large or small according to which was used. Demy was the commonest, and the demy octavo was the established form of standard editions. Among books as among men there are giants and dwarfs. The British Museum has the largest and the smallest in the world. The former is an atlas seven feet high, of the 15th century, completely concealing a tall man between the pages, with a binding and clasp which make it look as solid as the walls of a room; the latter is a tiny "bijou" almanac less than an inch square, bound in red morocco, easily to be carried in the finger of a lady's glove. Certain church books in the Escurial are described as six by four feet; and the "Antiquity" volumes of the Napoleonic 'Description de l'Egypte' are 37½ inches high. The Thumb Bible or Toy Bible, on the other hand, was one by one and a half inches; it was not really a Bible, but an abstract, printed in 1693 and dedicated to the Duke of Gloucester, and repeatedly reprinted. Hoepli's 'Divina Commedia' (1878) is less than 2¼ by 2½ inches; and Pickering's diamond edition of Tasso measures 3½ inches high by 1⅞ wide.

Colophons.— These originated with the Assyrian scribes in the 7th century B.C. at latest: Ashurbanipal's in the Nineveh library put at the end of the last column of their cylinders a register of the documents composing the "book." The early printers followed the same style, using the last paragraph of the last page — now called by English bookmen the colophon (Greek, apex or terminus), by French the *souscription,* by Germans the *schlussschrift* — to give details about the book, which we should now assign to the title page, or merely for a sort of *envoi* or "send-off." The usual terminus of books was "Explicit," "Hic Finis," "Finis," "Here Endeth," or something of the sort; but some printers expanded it into elaborate epilogues or postfaces. Caxton is notable for this; see examples in Blade's 'Caxton,' and for others see Legrand's 'Bibliographie Hellénique' (1885). With development of the title-page, the colophon disappeared, though instances are found well into the 16th century.

Title-Pages.— It is curious that while the early development of printing ran to enormous and elaborate title-pages, Caxton has none at all, except one to a work not certainly his, 'The Chastising of God's Children' (?1491); and even that contains only three lines of ordinary print. But in Venice as early as 1474 a 'Calendario' by John de Monteregio was issued by Pictor, Loslein, and Ratdolt, with a quaint rhyming title-page, with place, date, and names at the foot. A facsimile is given in Bouchot's 'The Printed Book.' The treatment of the title-page has varied enormously with different periods. In the 16th and 17th centuries it was at its worst: the object apparently being to make it a digest of the entire contents of the book, (Nares' 'Life of Burleigh,' of which Macaulay says that "the title is as long as an ordinary preface," is a mild example in the 19th), and half destroying the very object of the title by making it difficult to wade through and come at the real theme. Frequently it gave a laudatory description of the book, a plan which if adopted to-day would save the reviewers the trouble of reading the preface: "A Book Right Rare and Strange," "Very Necessary to be Known," "Very Pleasant and Beneficial," etc., are familiar to the student of early printing. Modern titles are thought to violate both good taste and good business judgment in going beyond a short plain sentence or name; but they sometimes do worse by misleading the cataloguer, as when Ruskin's 'Notes on the Construction of Sheepfolds' is classed among works on live stock. Double titles, as where a sub-title is given of a seemingly different purport from the main one, are also perilous. As to the frequent practice of reissuing an old book under a new title, it is pure fraud, wasting the money of libraries and private buyers on what they have already or do not want, throwing catalogues out, and making confusion all around. The punishment of using a title already appropriated, even unknowingly, is direct and by law, for the title of a book is protected by law as much as any other part of the contents. For the lore and facsimiles of title-pages, see Andrew Lang's "Old French Title-Pages" in 'Books and Bookmen'; Le Petit's 'Principales Editions originales d'Ecrivains français' (1888); and Könnecke's 'Bilderatlas' (1887).

Dating of Books.— One of the most exasperating traits of the early printers, like the monkish scribes, was its rarely occurring to them to put dates to their books. Only five out of 21 of the known works of Colard Mansion, Caxton's master, are dated, and more than two thirds of Caxton's own are dateless. On the other hand, in the colophon to the 'Moral Proverbs' and in the 'Book of the Knight of the Tower,' the dates are set down with excessive minuteness, even to the month and day. Modern publishers only fail to date a work when it is out of date and the fact is to be concealed from the buyer; a common deception of the trade is to reissue an old work with a new title-page and usually a new copyright date, sometimes shifting the introductory matter so as to change the pagination or "folioing." The usual and now universal date is either by Roman numerals (an antiquated annoyance it would be better to abolish), or by Arabic numerals, which for some inscrutable reason are held a trifle underbred. In the earlier books some queer freaks are indulged in. One is to put Roman lower-case numerals before some of the capitals as multipliers; unfortunately, others use exactly the same as signs of subtraction, and others still use capital letters as subtractors, so that the reader's guess needs confirming from outside. For example:

M CCCC iiijXX VIII (1498: $1000 + 400 + \overline{4 \times 20} + 8$).
M iiiiC iiiiXX Viij (1488: $1000 + \overline{4 \times 100} + \overline{4 \times 20} + 8$).
M iiijD (1496: $1000 + 500 - 4$).
M IIID (1497: $1500 - 3$).

Sometimes the early printer used odd chronograms, or titles in which a date is expressed by the numeral value of the letters contained in or marked in it; in some cases repeating in this a date already given on the title-page. For instance, 'De spIrItaLI IMItatIone ChrIstI saCræ et VtILes pIIs In LVCeM Datæ a R. P. Antonio Van den Stock Societatis Jesu, Ruræmundæ, Apud Gasparem du Pres' — a

book with two chronograms on 1658 in the title, but a superfluity in the centre, and containing in the text over 1,500 on the same date. Two modern volumes of chronograms are Hilson's (1882 and 1885).

The date is often determined approximately by the water-marks on the paper; but this is one of the most persistently forged of all things, and demands the greatest knowledge and judgment.

Place of Publication.— This is not always instantly apparent even when printed, as the various local forms and their varied Latinizations or the use of obsolete terms often make a bewildering complexity for a single place; or a punning or pseudo-classical translation may be used, not a true ancient form; or the same Latin or Greek form may mean one of two or three places; or it may be used expressly to throw the inquirer off the track. The latter is of course undiscoverable except by outside evidence, which however is forthcoming in a surprising number of cases. The motive may be anything from sincere religious or patriotic zeal to the most bestial criminality; most "shady" modern literature has either no assigned place of publication or a false one, and some are "published" an immense distance from where they are printed — a common enough thing in legitimate publication in modern times, though practically unknown in early ones, printer and publisher being the same. Hundreds of European books are nominally published at Pekin, or Tokio, or Calcutta; the unsavory products of Parisian presses are usually fathered on some Dutch or Belgian city; and Sir Richard Burton's unexpurgated 'Arabian Nights' was accredited to Benares, India.

The following list of un-English forms of the chief centres of past publication will be useful (for a full one, see 'Dictionnaire de Géographie Ancienne' (Paris 1870):

Argentoratum: Strasburg.
Augusta, Augusta Vindelicorum: Augsburg.
Basilea: Basle.
Bipontum: Deux-Ponts, Zweibrücken.
Bnezieh: Venice.
Bononia: Bologna or Boulogne.
Cadomum: Caen.
Cæsaraugusta: Saragossa.
Cantabriga: Cambridge.
Ceulen: Cologne.
Civitas Tricassina: Troyes.
Colonia, Colonia Agrippina, in civitate Coloniensi: Cologne.
Corona: Cronstadt.
Cuelen: Cologne.
Dordrechum or Dortracum: Dort.
Eboracum: York.
Eleutheropolis ("Freetown"): Freistadt, Francavilla, Francheville, etc. Also a disguise name.
Gippesvicum: Ipswich.
Gratianopolis: Grénoble.
Hafnia: Copenhagen.
Hala: Halle.
Herbipolis ("plant-town"): Würzburg.
Enetiai (Greek): Venice.
Holmia: Stockholm.
Insula or Insulæ ("the Isle," l'Isle): Lille.
Irenopolis ("City of Peace"): Berœa, properly, but used as a disguise name.
Ispalis: Seville.
Keulen, Kuelen: Cologne.
Leodicum: Liège.
Leucopetra ("Whitestone"): Weissenfels.
Lipsiæ: Leipsic.
Lugdunum: Lyons.
Lugdunum Batavorum: Leyden.
Lutetia: Paris.
Massilia: Marseilles.
Matisco: Macon.
Mediolanum: Milan.
Mleczi, Mljetka, Mnezik: (Slav.) Venice.
Moguntiacum: Mainz.
Mons Regalis: Mondovi.
Mussipons: Pont-à-Musson.
Neapolis: Naples.
Neapolis ("Newtown") Casimiriani: Neustadt on the Hardt.
Œnipons: Innsbrück.
Olisipo: Lisbon.
Oxonia: Oxford.
Petropolis: St. Petersburg.
Probatopolis ("Sheeptown"): Schaffhausen.
Pontimussum: Pont-à-Musson.
Regiomontium ("Kingsmount"): Königsberg.
Rotomagus: Rouen.
Sarum (i. e. Sarisbariæ): Salisbury.
Tarvisium: Treviso.
Tornacum: Tournay.
Trajectum: Utrecht.
Trecæ: Troyes.
Tridentum: Trent.
Turoni: Tours.
Ulisipo, Ulyssipo, Ulyssopolis: Lisbon.
Ultrajectum: Utrecht.
Venetia, Venetiæ, Venezia, Venedig, Wenez (local dialect): Venice.

Pagination.—Books were printed at first exactly like manuscripts, without numbering the pages. Soon the unhandiness of this method, and the difficulty of making references, forced a numbering of the leaves; which was shortly succeeded by numbering the pages, and in some cases — of very large, closely printed books — by numbering the columns, which is occasionally done for like reasons in modern times. Books of more than one volume are usually paged separately, but in many large sets the paging is carried consecutively from beginning to end, especially where it is likely to be issued in more than one edition and divided into differing numbers of volumes; since in that case one index will answer for all, instead of having to be made over for each. In the old folios and quartos, letters were often inserted on the margin, to break the page or column into separate portions without interfering with the continuity of the text; these marginal references from the first editions of classics are often left in the modern editions, forming a convenient method of reference from one to the other. Essentially the same method is followed in some modern books, but usually by numbers instead of letters, dividing off the text into tens and fives of lines, for convenient citation and reference; in some editions of the Bible the chapters and conventional verses are marked off in the same way, to keep the original paragraphing and continuous narrative and yet be easy of comparison with the common Bibles.

Prefaces, Dedications, etc.— An *introduction* is properly a part of the body of the text, outlining its theme and the main divisions of the argument or narrative, or setting forth the general conditions from which the special theme is isolated and enlarged for study; the *preface* (for which among certain ultra-Teutonists the disagreeable affectation "foreword," German *Vorwort,* is substituted) is properly the author's introduction of himself or his work to the reader, explaining his general purpose, the need or place of his book, personal thanks, or comments, etc., and all such matter as needs to be stated yet is not pertinent to the exact subject. In old times it was like the prologue or epilogue to a play, a method of ingratiating one's self with the reader, bespeaking his indulgence or removing any unfavorable impressions with which he might begin the book; and was addressed to the "courteous reader" or the "gentle reader" (which properly meant an assumed *feminine* reader), etc. The *dedication,* in times

when there was no general book-market and an author must depend on the patronage of some person of rank (that is, down to the 18th century, and well into that), was an integral and indispensable part of the book: it meant that the author asked the patron to give him money and place in return for being celebrated, just as the old chiefs did their bards. He must have his Mæcenas; without him he would starve, with him he could disregard the masses. Sometimes, with men of hard, bold natures and a keen scent for the worst side of human life, like Martial or Aretino, they used disguised (very little disguised) threats and virtual blackmail as a supplement to appeal, and fawned and snarled alternately. In those times it was often nauseous with fulsome laudation; it is now of the simplest form, a mere survival used to express the author's liking or gratitude for some one, or acknowledgment of inspiration or encouragement, or in humorous books often a joke like the text.

Printers' Emblems.— These are the "bookplates" of the publishers, used not to imply ownership of the copies, but the credit of the work. They have been treated by Berjeu in 'Early Printers' (1866), by Silvestre in 'Marques Typographiques' (2 vols. 1867), and there was an old work of Roth-Scholtz (Nuremberg 1730); it has also been touched on by John Hill Burton in his 'Book-Hunter.' Among them may be cited the three-masted ship of Mathis van der Goes of Antwerp, 1472–94; the windmill of Andrew Myllar, Edinburgh, 1508 and later; the curious wild men and fruit-laden tree of Thomas Davidson of Edinburgh, in 1541; the Stephenses' olive-tree, and the Elzevirs' sphere. Often there is a punning allusion to the publisher's name: Froschover (*frosch* in German is frog) has frogs; Le Chandelier, a seven-branched candlestick; and Nicholas Eve has a picture of Eve giving Adam the forbidden fruit. Others use instead the armorial bearings of their cities; Leeu, the castle of Antwerp; R. Hall, Geneva's half-eagle and key on a shield; Stadelberger, the lion rampant of Heidelberg, and the diapered shield of Zurich. Ascensius, 1462–1532, has a most vividly accurate representation of his great printing press, with a pressman pulling a proof. His device bore the inscription, "Prelum Ascensianum"; and it was adopted by Jossé Bade of Paris, 1501–35, who added his initials at the foot; by De Gourmont, 1507–15; Le Preux, 1561–87; and in a modified form by De Marnef, 1567, and De Roigny, 1565. The Aldi had an anchor and a dolphin, which was employed by Turrisan, De Chenney, Brillard, Tardif, and Coulombel — sometimes, as in Coulombel's case, with the divided Aldus.

Decoration.— Besides the illustration of the text by pictures, either as frontispiece or interleaved, there are certain artistic forms which are merely decorative accessories to the book as such. The title-page may have some of its lines or letters printed with colored inks; the printer's emblem or some suitable vignette may be inserted; or even the whole title may be engraved, as often in the 16th and 17th centuries, when it was frequently an exceedingly elaborate and costly affair, and in some modern *éditions de luxe* these engraved title-pages are works of extraordinary beauty. There are also ornamental initials, as with the illuminated manuscripts; head and tail pieces, in the blank at the head of a chapter or the space left at the end. The first printers often left the initial letters off altogether, or put in a small one as a guide to the artist, who inserted them by hand, using red ink, from which he was called a *rubrisher;* he also used his taste in other decorative details, being in fact the illustrative artist of the time.

Technical Terms.— The sale and collection of books are too large subjects to be treated here, but a few of the names used in the second-hand book trade may be mentioned. "Unique," "rare," and "very rare," are intelligible as names, but need judgment in their acceptance. A book may be unique because it was not worth keeping, like disused text-books; the term does not imply any special value. Or it may be so because the original edition was limited to enhance its value, a very common device. In all such cases there must be knowledge and sense to estimate properly the intrinsic or factitious worth of the book. "Edition" means nothing whatever; properly it should mean all the issue of a book that the publisher thinks the market will bear at one time, and once it did mean that, but it has long ceased to have any definite connotation. As above, the "edition" may be artificially limited to a small number of copies with a promise to destroy the plate; on the other hand, a popular novel may sell many thousands and each thousand be called an "edition," so that it may be said to have passed through 50 "editions." "Thousand" is the honester word, and is now more used by the large houses. "Curious" is a euphemism for a much less dainty word. "Foxed" means damaged by brown or yellow spots. "Uncut" does not mean that the leaves have not been opened with a paper-knife, but that the original size of the leaves has not been cropped by the binder. The French use *non coupé* for the former, and *non rogné* for the latter.

Book Club, a private association printing books for a limited number of subscribers. The members are usually learned men, and in this way render accessible rare books and manuscripts. The earliest of these clubs was the Roxburgh Club, whose work was not important. Other English clubs of this sort have done excellent and valuable work, among them the Camden Society, whose publications relate to English history, the Percy Society, the Hakluyt Society, and the Early English Text Society.

In America there were in Colonial and Revolutionary times a number of literary societies which published the writings of their own members; such was the Junto founded by Franklin. The first association established for the purpose of publishing was the 'Seventy-six Society formed in 1854, whose publications relate to the American Revolution. This society existed for three years only, and was followed by "The Club" in New York, and by the Bradford Club. In 1858 The Prince Society of Boston was established, and it still continues its work of publication. From 1858 to 1876 a large number of clubs were formed whose work was neither important nor valuable. In 1876 the Brooklyn Historical Printing Club was established. It has done most excellent work on historical lines. The foremost of all American clubs of this sort is the Grolier Club of New York, formed in 1884 with 50 members, now numbering about

400. Its publications are of a literary and bibliographical character and are noted for their elaborate and artistic make-up.

Book-lice, wingless members of the family *Psocidæ,* order *Platyptera.* These minute insects would be easily mistaken for aphides, both the wingless as well as the winged individuals. Their bodies are oval, the head free from the prothorax, which is small and partially concealed by the unequal wings. The eggs are laid in patches on leaves, bar, or other objects, and are covered with a web. *Atropos divinatorius* is a small pale, louse-like insect, seen running over books and in insect cases, where it does considerable injury. It is one of the worst museum pests, especially injurious to the smaller lepidoptera. The same habit is also possessed by the well-known *Psocus domesticus.* Another species of atropos, probably *pulicarius,* has been found in Missouri, infesting the egg-mass of the cottony maple scale (*Pulvinaria innumerabilis*). See DEATH-TICK; DEATH-WATCH.

Book-scorpion, or **False-scorpion,** an arachnid animal of the family *Chernetidæ;* known by its large maxillary palpi, like the scorpion's claw. The abdomen is 11-jointed, flattened, without any appendage, and the living forms are minute; they breathe by tracheæ. They are found running about dusty books and in dark places and feed on mites and Psoci. They are often found attached to the leg of some fly or other insect by which they are transported about. The female chelifer bears the eggs, 17 in number, in a little bunch under her abdomen. Meuge has observed a pseudoscorpion cast its skin in a light web made for that purpose, where it remained five days in the web after its metamorphosis, and did not assume its dark colors for four weeks; three months after it returned to the same web for hibernation. Meuge describes eight species from the Prussian amber, belonging to genera still living, and Corda one (*Microlabris sternbergi*) from the coal formation in Bohemia, an inch long. Schiödte has found a curious blind species in the caves of Adelsburg, and several kinds occur in American caves. In chelifer there are no eyes. *C. cancroides* is dark brown, with many short spines on the thorax.

Book-selling. The earliest history of book-selling is extremely obscure. The tablets and cylinders of Assyria and Babylonia will be found treated under BOOK, and the article BOOK OF THE DEAD should also be consulted. About the middle of the 6th century B.C., is found in ancient Athens an approximation to a systematized book-trade as it has been understood in modern times. Pisistratus, with funds from the municipal treasury, paid scholars for preparing a standard text of Homer and Hesiod for copyists' use. The books then made were very costly. Diogenes Laërtius states that for three books of Philolaus (q.v.) Plato paid three Attic talents ($3,240), money being then, of course, worth far more than it now is. The first book-sellers prepared by their personal labor the scrolls they sold; then capitalists came to employ and organize staffs of copyists. About 250 B.C. Alexandria became one of the great book-centres of the world. In this it was favored by having at its disposal the scholars of the university and the facilities for distribution which the commerce of Alexandria afforded. Skilled scribes were also carefully trained there. The book-trade of Rome commenced about the 2d century B.C. Slaves who could write Greek were rated highly. The great publisher of Cicero's time, Atticus, is well known. His editions were famed for their accuracy under the name *Ἀττικιανά.* In addition to his central publishing house he had distributed in various portions of Rome and in provincial centres, tabernarii, or retail dealers. Horace's publishers were the Sosii in the Vicus Tuscus. Argiletum, Martial says, was the street of the book-sellers, as it was, likewise, of the tailoring shops of fashion. By the close of the 1st century A.D., the Roman book-trade was extensive and well organized. Papyrus was imported in great quantities from Egypt, and large staffs of copyists were kept busy preparing editions of various works, the average edition for the general public running from 300 to 1,000 copies. Very considerable shipments were made to the provinces.

During the Middle Ages book-making and selling belonged to the monasteries. The different monasteries transcribed the particular manuscripts treasured in their libraries, and their editions came to have a peculiar value, depending upon the character of the original text and the accuracy of the copy. At the beginning of the new learning, the manufacture and sale of books passed to the universities, within which the manifolding of MSS. was done by an organized guild. Outside the universities, however, there was a considerable trade in MSS., beginning with the end of the 14th century. The invention of printing naturally revolutionized the book-trade. The publications of Gutenberg, Fust, Froben of Basel, Aldus Manutius of Venice, Estiennes (Stephani) of Paris, Caxton of Westminster, Plantin of Antwerp, and the Elzevirs of Leyden and Amsterdam, are well known. For further information, see the article BOOK, above referred to; and AMERICAN PUBLISHING.

Book-worm, the "book-worm" of librarians is probably the larva of a boring beetle (*Anobium paniceum*) one of the family *Ptinidæ.* These worms are small white grubs like those of weevils, which live in various drugs, dried meat, etc. It also burrows in hard biscuits, resulting in the weevily biscuits complained of on ship-board. It more commonly bores in old furniture, causing it to be "worm-eaten." These grubs become the beetles known as "death-ticks" or "death-watches" (q.v.). See the various works on entomology and Blade's 'Enemies of Books.'

Book of Days, The, a noted work edited by Robert Chambers, 1863. It has for its subtitle 'A Miscellany of Popular Antiquities in Connection with the Calendar.' In bringing it out the editor expressed a desire to preserve interest in what is "poetical, elevated, honest, and of good report, in the old national life" — recognizing the historical, and even the ethical, importance of keeping this active and progressive age in touch with obsolescent customs, manners, and traditions. Beginning with 1 January each day of the year has its own curious or appropriate selection, and its allowance of matters connected with the Church Calendar, — including the popular festivals, saints' days, and holidays,— with illustrations of Christian antiquities in general.

Book of the Dead, The.—The literal translation of the hieroglyphic title is: «Coming

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Forth by Day.» Modern Egyptologists have adopted the name given by Lepsius: *Das Aegyptische Todtenbuch,* «The Egyptian Book of the Dead.» That title, however, is considered unsatisfactory, for the simple reason that it is not one single book dealing exclusively with funereal ritual, but is a collection of books and chapters treating of psychostasia in the «Double Hall» before Osiris; the peregrinations of the *Ka* in the «valley of the shadow of death;» the Osirian doctrine of resurrection, etc.

No better laconic definition of the Book of the Dead can be given than that of the late Sir Peter le Page Renouf. He says: «It is not a book in the usual sense of the word; it is not a literary whole, with a beginning, middle and end; it is a mere unmethodical collection of religious compositions (chapters) as independent of each other as the Hebrew Psalms.»

Part of the Book of the Dead is of remote antiquity, dating back to the pre-dynastic period. There are numerous late copies of it in the museums of Europe and of this country, but the best and most complete copy is the Papyrus Ani, in the British Museum. It contains one hundred and eighty-six chapters, and is beautifully illuminated; and, although about 3,400 years old (belonging to the XVIII Dynasty), it is well preserved. A fac-simile of that Papyrus was published by order of the trustees of the British Museum, and translated (1895) by the eminent Egyptologist, Dr. E. A. Wallis Budge. Several excellent translations have been made into French, German, and English of various papyri of the Book of the Dead. There are several versions of the book extant. That of Heliopolis, which was subjected to numerous modifications and recensions, is considered the most ancient; then the Theban version of which the Papyrus Ani is an example — dating from the middle of the XVIII Dynasty. These two versions are written in hieroglyphics, in vertical columns and in cursive linear style. Two other versions of a later period are written in hieratic as well as in hieroglyphic characters. Complete translations of the Book of the Dead were made by Birch, Brugsch, Pierret, Pleyte, Massy (Davis, from the French translation by Pierret), Le Page Renouf, and Budge.

The style of writing and the vignettes, representing embalming, funeral processions, weighing of the heart, etc., have undergone great changes in the course of time, and the texts of some of the Theban school in the XVIII Dynasty differ materially from later productions; *i. e.*, the *Papyrus Ani* (Theban recension), contains one hundred and eighty-six chapters, and the Turin papyrus, of a later period, contains only one hundred and sixty-five chapters. The late Sir Peter le Page Renouf, for many years keeper of the Egyptian antiquities in the British Museum, says: «Out of many manuscripts which are extant, no two contain exactly the same chapters or follow exactly the same arrangement.»

The earliest texts, before the XVIII Dynasty, are fragmentary, inscribed on the walls of tombs, monuments, sarcophagi, mummy cartonages, etc. The plate is one of the numerous representations upon the walls of the Egyptian tombs of that period, many of which have been faithfully reproduced in the magnificent volumes of the Description de l'Egypt, and in Lepsius, etc. It represents part *a* of tomb XXIV, now in the Sepulchral Chamber of the Royal Museum, Berlin, showing Prince Merab, son of Khufu, the builder of the great Pyramid of Gizeh (about 4000 years B.C.) enjoying himself after his beatification with the same good things he was accustomed to have in his former life.

The sum and substance of the Book of the Dead is chapter CXXV, generally considered the most ancient. It is always connected with a vignette, which depicts the beatification of «The Osiris,» in the presence of the presiding deities in Amenti, when the «Negative Confession» and the weighing of the heart of the dead before the supreme deity in the netherworld takes place.

Before proceeding with the description of *psychostasia,* it is necessary to say a few words concerning the deities taking part in the weighing of the heart in the supreme tribunal of Osiris, called «The Double Hall,» represented in this plate.

The name which every dead Egyptian assumed was that of the chief deity of Amenti, called «Osiris.» As Osiris was considered the type of life after death, it was only natural that in the development of their mythology he should become the chief god of Amenti — the Justifier of the dead.

Osiris, according to Egyptian legend, was a prehistoric king, the embodiment of goodness. His brother, the wicked Set, becoming envious, treacherously killed him, cut the corpse in pieces and hid them in different parts of the land. Osiris' sister-wife, Isis, accompanied by her sister Nephthys, collected the scattered parts, which were then embalmed by the god Anubis. By means of magic, which Thoth, the god of letters and science, taught Isis, she resuscitated the body. Finally, Horus, son of Osiris and Isis, avenged the death of his father, by engaging Set, or Typhon, in combat and killing him. In the course of time Isis, Horus, etc., came to be considered as gods, and Osiris became identified with *Tum,* the setting sun, symbolizing death; and Horus on the horizon (Her-em-khu, sometimes called Her-em-Khuti), the type of birth and resurrection.

Thus the *Ka,* whilst wandering through the regions of darkness and molested by demons, is the dead Osiris. After the weighing of his heart and if found not wanting, he is beatified and obtains new life. He is no more Osiris the dead, but Osiris Horus, the resurrected.

Plate *b* represents the weighing of the heart in the tribunal of the netherworld, *Amenti;* presided over by the supreme deity Osiris (Ausar). On the extreme right and left of the hall are two massive piliars, carved to imitate bundles of lotus stalks, fastened together near the top of the column. The deceased at the entrance to the hall is in an adoring attitude; his uplifted arms are supported by *Maat,* the goddess of truth and justice. She is always

MERCHANT KENNA WEIGHED IN THE BALANCE IN THE DOUBLE HALL OF JUSTICE

MERCHANT KENNA JUSTIFIED

present in the Judgment Hall and is represented headless, with an ostrich feather in place of the head. Her figure, sometimes only the feather of her headgear, is placed in the scale-pan, opposite the one containing the vase with the heart.* The jackal-headed Anubis and the hawk-headed Horus superintend the weighing. In the scale-pan to the right is the weight in the shape of the goddess *Maat*. This scale is adjusted by another divinity un-named in the hieroglyphic text. In the scale-pan to the left is a jar containing the heart of the departed. Upon the beam of the balance sits the dog-headed ape deity called *Hapi*. The little figure seated on the crook to the left represents the new birth after the justification of the "Osiris." Close to the balance stands the ibis-headed scribe *Thoth*, with his tablets, recording the result of the weighing. Close in front of him, upon a shrine, sits the adversary (the Egyptian *Cerberus*), called in hieroglyphics *Amemit*, the devourer of the dead, in the shape of a strange being composed of three beasts: hippopotamus, lion and crocodile, ready to destroy the *Ka* in case he should, after weighing, be found wanting. Immediately facing the throne is an altar full of sacrifices, consisting of bread, geese, onions, lotus flowers, buds, and burning incense. Beneath the altars are jars containing wine and other liquids for oblations. At the head of the hall is Osiris himself, sitting upon a throne which is richly decorated with *ankhs*, emblems of life, and *uas*, emblems of purity. He is closely shrouded, and wears the white crown of Upper Egypt, called *Atef*, ornamented with two ostrich feathers, the symbols of truth and justice; his hands crossed upon his breast, on his wrists are bracelets. He holds in his right hand the *Nekhekh*, scourge; and in his left, *Hek*, the crooked staff, symbolical of justice. Above are the forty-two divine assessors, seated in two rows of twenty-one each, with different type of head, such as the heads of apes, serpents, crocodiles, etc., adorned with the feather representing truth and justice, and each holding in his hand a sharp-pointed knife. The *Ka* of the deceased stands, in beseeching posture, with hands raised, in front of each row of the judges.

The same chapter (125) contains the confessions of the deceased. Every one of the forty-two judges whom the deceased called by their proper names had to pronounce him innocent, he emphatically affirming before each of them in turn that he did *not* commit any of the forty-two sins. The negative confession is very interesting but space forbids the mentioning of more than a few of them. The judge having to consider the crime of theft was addressed by the deceased as follows: "O Devourer of Shades, coming out of the orbits . . I have not stolen;" another was addressed: "O Eyes of Flames, coming out of the shrine . . I have not played the hypocrite;" "O Cracker of Bones, coming out of *Suten Khem* (Bubastis) . . I have not told falsehoods;" "O Swallower, coming out of *Khnem* . . I have not blasphemed;" "O Eater of Hearts, coming out of the thirty . . I have not made conspiracies;" "O Eye in the Heart, coming out of the land of *Sahu* . . I have not defiled the river," etc.

Among other sins denied are: "I am not sluggish; I have not made to weep; I am not a landgrabber; I committed not adultery; I am not a slayer of man; I tamper not with the balance; I do not cheat," etc.

Howsoever absurd the Egyptian Pantheon may appear to our eyes, we must acknowledge from the evidence of these forty-two confessions, that they possessed a superior code of morality, a code which included not only our decalogue, but much of the ethical teachings and humanity of modern civilization.

The vignettes of this chapter, as we have already remarked, vary. The finer illuminated papyri made for royal personages or high priests and priestesses are exquisitely illuminated and the texts are unabridged. For instance, the Papyrus of *Nu* is more than sixty-five feet long. The Papyrus of *Ani* is seventy-eight feet long by one foot and three inches wide.

Most copies of the Books of the Dead are defective, others betray gross ignorance on the part of the scribe or copyist. The common people who were unable to purchase a well-written and illuminated text for their dead had to be satisfied with a cheaply, badly written, abridged copy. The scribes must have possessed a large stock of blanks on hand, containing spaces to be filled with the deceased (Osiris') name. Some of the Egyptian scribes were as dishonest as most of the embalmers. As the papyrus was to be placed with the mummy, the mercenary scribe or embalmer substituted a spurious for a good one.

SAMUEL A. BINION,
Author of 'Ancient Egypt or Mizraim.'

Book of Mormon, a collection of 16 distinct books professing to be written at different periods by successive prophets. Its style is an exceedingly clumsy and verbose imitation of that of the common English translation of the Bible, portions of which, to the number in all of 300 passages, are incorporated without acknowledgment. It constitutes the scriptures of the members of the Church of Jesus Christ of Latter-Day Saints. Joseph Smith, an American, of Manchester, N. Y., professed to have heard in 1823 the Angel Moroni reveal to him in visions that the Bible of the Western Continent was buried in a box near his residence. This, according to his own account, he at length found — a volume six inches thick, with leaves of thin gold plate, eight inches long by seven broad, bound together with three gold rings; on which leaves was a mystic writing that he characterized as reformed Egyptian. With the book he professed to have found a pair of magic spectacles, by means of which he was able to read the contents, which he dictated to an amanuensis. This book consists of an alleged history of America from 600 B.C., when Lehi and his family (descended from the dispersion after the building of the Babel tower) landed in Chile. Between the descendants of Nephi, Lehi's youngest son, and the offspring of his older brothers, who are the North American Indians, long conflicts waged; the Nephites finally being almost annihilated. There remained a fragment, among whom were Mormon and his son, Moroni. They collected the records of their people, and buried them in the hill of Cumorah, on the Divine assurance that they would be found by the Lord's prophet. Besides this history, the book, as it finally was received, has various moral and religious teachings. The real

* Many of the Pharaohs adopted her name in their royal titles, *i. e.*, Ramesis II styled himself *Se Ra Usur Ma*, "Son of the Sun, the Keeper of Truth."

history of it is as follows: Solomon Spalding, an eccentric Presbyterian preacher, wrote a historical romance in 1809, which a compositor, into whose hands it fell, sold to Smith. This was, in substance, the 'Book of Mormon,' which Smith issued, and to which various additions have since been made. See MORMON.

Book of Nonsense, A, a nursery classic by Edward Lear. It is made up from four minor collections published at intervals during a long life. The author began as an artist; colored drawings for serious purposes were supplemented by others for the amusement of the groups of little ones he loved to gather around him; and the text added to them has proved able to endure the test of time without the aid of drawing, and much of it has become part of the recognized humorous literature of the language.

Book of Snobs, The, a series of sketches by William Makepiece Thackeray. It appeared first in 'Punch,' and was published in book form in 1848. The idea of the work may have been suggested to Thackeray when, as an undergraduate at Cambridge in 1829, he contributed to a little weekly periodical called the 'Snob.'

Bookbinding, the art of arranging, fastening together, and covering sheets of paper composing a book, including the ornamentation or decoration of the covers. Following the use of rolls of papyrus or wax-covered tablets, leaves of parchment were introduced, and it became necessary to fasten or bind them together. This improvement in form is, on somewhat doubtful authority, attributed to Attalus II., king of Pergamus, about 150 B.C.

The monks were the early bookbinders, up to the time of the invention of printing, and examples in the British Museum dating as far back as 700 A.D. illustrate the great labor bestowed on their most precious manuscripts.

All the early specimens were bound in heavy boards, strong metal clasps, and bands, and the material used in covering varied from the parchment and iron to ivory, enamels, and jeweled silver and gold.

The invention of printing made a great change in the art of bookbinding, the delicate, beautiful specimens, the workmanship of Jean Grolier and many nameless Italian and French binders employed by Grolier, Macoli, and others contrasted strikingly with the rather clumsy, inartistic work of the monks.

It was not until 1820 that cloth was introduced as a covering, invented, it is said, by Archibald Leighton, one of the most enterprising and successful of London binders. In the 'Bookseller' of 4 July 1881 there is an interesting account by Robert Leighton of the invention of cloth by his father. The embossing of bookbinding cloth was suggested to the late Mr. de la Rue, and was carried out so admirably by him, with the appliances he possessed for embossing paper, that his process remains comparatively unaltered. The desired pattern was engraved on a gun-metal cylinder, and transferred in reverse to one made of compressed paper, strung upon an iron spindle, and turned in the lathe the exact circumference of the gun-metal one, and these two being worked together in a machine, and the pattern transferred from one to the other, the cloth was passed between them and received the impress of the pattern.

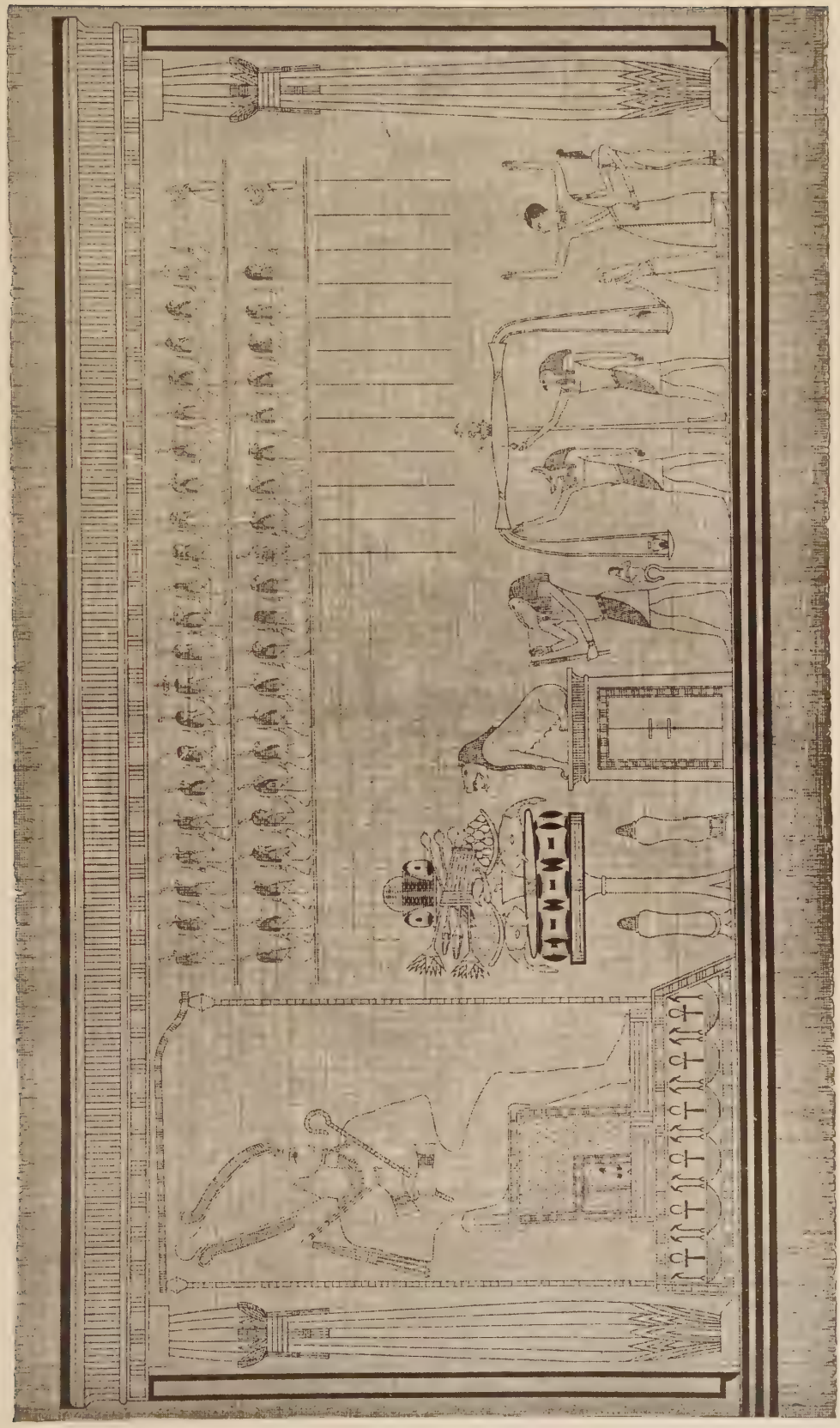
Extra work and edition work are the two classes into which bindings may be divided. Extra work bound with greater care, and largely by hand methods, forming a small portion of all books bound. Edition work being the binding of quantities, principally by machinery.

The following description will apply to extra work, and methods in vogue do not differ greatly from the process of hundreds of years ago, although the use of the press and plow, hammer and backing boards is giving way to the trimming, smashing and backing machines. The first process takes the sheets from the printing press, folds them in sections of 8, 16 or 32 pages, done generally by a girl pressing each fold down with a bone folder in such a manner that the pages come in consecutive order. If a book contains 320 pages it will be seen that 20 sections or signatures are required to complete it. When all the sections are folded, they are gathered up in order and collated, that is, examined to see that each signature follows in proper sequence. Smashed or hammered, the book is then ready to sew.

Throughout the world in binderies given up to extra work will be found a frame of peculiar make called a sewing-bench. On this is stretched bands or cords of soft twine in a vertical position, and to these the signatures are attached by passing the needle and thread through the middle of the signature and around each band or cord, and the raised bands showing on back of book inform how many cords the book has been sewn on, although in many cases grooves are sawed in the back of the book into which the cords fit, and false bands are pasted on back to show the raised band effect.

The book is taken down from the sewing bench and an inch or more of twine is left on each side to be later laced through holes punched in the boards. Before this is done the marble or colored linings are pasted on the front and back of book inside the first fly leaf. Leather or cloth joints in some cases are added.

The book is then trimmed in a cutting or trimming machine; formerly the edges were trimmed by a knife called a plow while the book was clamped firmly in a press. Before cutting the back is struck forcibly against an iron plate, to square up the signature, then placed against gauge, set to position desired and clamped, knife descending and cutting book while under pressure. After trimming the three sides the book is again carefully knocked up and a thin coating of glue, sometimes flexible in character, is well rubbed in between signatures, for unless this is done the signatures will show a tendency to split open, where one signature joins another. The book is then rounded by drawing or shaping the curve, at same time beating in a peculiar manner with a flat-faced hammer, then clamped in pair of jaws, and the joints drawn over by repeated taps of hammer, or in some shops by a heavy roller set in a machine called a backing machine, which clamps the back under treadle movement. Many extra forwarders round the book before trimming, then knock the round out. After cutting, the book will spring back to its former round, leaving the front concave. In most particular classes of work the boards are laced to book before it is cut. The book is now laced to boards forming the cover and the ends of cords glued down on



JUDGMENT OF THE DEAD.

the inside of the cover. If the edges are to be marbled, gilt or colored, they must go through that process before books are rounded.

Marbling.—Prepared colors are thrown in a shallow trough containing gum tragacanth, on which the colors float and spread as desired. The pattern is formed by various combs that mingle the colors. The edges of the book are dipped into the liquid just deep enough for the colors to adhere, and when removed from trough, a sizing is drained over the edges, removing the surplus gum and fastening the colors more securely to edge. After edges are thoroughly dry they may be burnished with an agate or stone burnisher. Gilding is done by laying thin sheets of gold leaf on the edges of books previously scraped and smoothed with steel scraper and fine sandpaper, and sized heavily with a preparation of white of egg. When dry it is then burnished with bloodstone, flint and agate burnishers.

Colored Edges.—Mix aniline colors with alcohol, adding a little ammonia to drive color in, spread over surface of edges with a fine sponge. If desired, then clamp in press and burnish. The book is then ready for the headbands, linings and cover. The headbands are merely ornamental, and are woven with a colored silk, by machine or made over cords with muslin. The older process was to work over a piece of parchment with colored silks and partially fasten to back of book in the weaving or sewing. The back is then lined with strong paper glued on, the amount of stiffening varying with the size of book and style of binding, most books being made with loose backs on which false bands are glued.

Coverings.—The leather cover is dampened and covered with paste, then drawn smoothly over and turned in, over boards which have previously been laced to the book. After leather has dried, clean out joints and paste against covers the lining papers.

Finishing.—Artistic taste of the highest order finds employment in this branch of bookbinding, and an expert finisher must be at once artist and craftsman of much ability. The ornamentation and lettering of fine bindings all are done by hand, the finisher bringing into use many tools and ornaments, cut on brass and fastened into small wooden handles, much depending on the manner of cutting and shaping the tools. The leather must first be prepared with paste wash and a glair or sizing generally made from the white of an egg, over which the gold leaf is laid, and the tools which are heated over a gas burner are then impressed on the gold leaf, the surplus gold being brushed off with a piece of crude rubber. Upon the most careful preparation of leather, the proper heat of tools, and the tooling of book before sizing is too dry, depend the brilliancy or gloss of the impression.

Ornamentation without gold is called "blind tooling" and is produced by rubbing or stamping the hot tool on the dampened leather. Few books bound now have such a wealth of ornamentation and so great an amount of time given to the finishing as was common in Grolier's time, although there are still many novel effects produced by the use of inlaid colored leathers, incised leather, etc.

After the period of Grolier, the taste for magnificent binding in France ran riot and many indulged in most sumptuous bindings, and designs were prepared under the superintendence of the most celebrated artists.

During the 16th and 17th centuries bindings were produced in England which compared favorably with the contemporary masterpieces of French, Italian, and German bibliography, but in the 18th century England took the leading place in the workmanlike forwarding and artistic finishing of books.

EDITION WORK.

So slow was the process of hand folding, 2,500 signatures of three folds being a fair day's work, a single sixteen folding machine was built with steel points set about fifteen inches apart, over which the sheet is placed, registered exactly on the points, or holes punched into the sheet as it was being printed, a knife descending makes first fold, carrying through rollers to gauges, when the second knife drops, forcing sheet through second roller, and third knife likewise, making three complete folds, and dropping them in a trough at the rate of ten thousand a day, or in other words, one machine doing the work of four hand folders.

It was soon found possible to build double 16-folding machines doing nearly 20,000 sheets daily, and at present in some of the larger edition binderies, special machines have been built which will take a sheet nearly 40 x 60 inches in size, and will turn out 40,000 signatures of 16 pages each, equivalent to the work of 16 girls folding by hand.

When the books are found complete, they are put through a powerful machine called a smashing machine, which compresses and makes solid the book, then to the sewing machine, where each signature in turn is laid over the arms, is carried to a position under a row of curved needles, punches concealed within the arms first make an incision through which the curved needle carries a thread meeting a looper which fastens each stitch. The first and last sheet is pasted before they are placed over the arms, and when finished the book is cut apart from the following book, and the thread is held by the pasting of signature, from unraveling.

Following the sewing, books are re-smashed, the linings and cloth joint pasted in and books are ready for trimming. If it is to be marbled or gilt, the back is tipped with glue to keep the signatures from getting out of square or becoming irregular.

Trimming.—To remove the rough and uneven edges of the signatures, the book should be cut or trimmed. This may be accomplished in the straight cutter, a machine using one knife which, making a clean, smooth cut, descends while book is clamped, in some machines with a hand clamp, in others, automatically. This machine, while very satisfactory in its results, has given way for the trimming of editions of books to automatic trimmers of various makes, which, unlike the process of trimming in the straight cutter, trims the edges of the top, front and bottom of book without removing from machine. An improvement on the automatic trimmer is a machine using two knives with each cut of machine, and while the output of this machine is very large, there has just been installed in one of our large school-book binderies, a continuous cutter which permits the books to be

constantly fed into the machine, and the output is so large, the machine is in a class by itself.

After trimming and gilding, marbling or coloring, it is glued over back with thin coating of glue well rubbed in between the signatures to prevent the breaking between signatures, which, while not taking from the strength of binding, looks as if poorly bound; just before glue is dried too thoroughly, book is fed against the gauges of the rounding and backing machine, the front rolls of machine drawing or rolling the round under pressure, then carried to back part of machine where a backing plate rotates against the back and forms the joints. This machine will do the work of six to eight men.

After the process of rounding and backing, headbands are prepared by forming muslin over a cord or twine; the backs of books are thoroughly glued, headbands affixed at top and bottom of back, crash lining cut to extend about one inch or more over the joints, is rubbed on with a bone folder, heavy manila paper is then glued against the book and well rubbed in, after which books, when thoroughly dried, are ready to case in, or in other words, put in the covers which have previously been prepared.

Boards called binder's boards are cut in rotary cutters to proper size for books; cloth is cut sufficiently large to overlap about one half to three quarters of an inch, and fed over a cylinder which, revolving, carries it against glue rollers, which place a thin coating of glue thereon. This glued piece of cloth is carried to a certain part of machine and awaits the laying thereon of boards and strip of back lining paper which has been forwarded by a clever device from the rear part of machine. Grippers then carry it through rollers after end and side slides have turned in the cloth over the board, and a rubber belt delivers it on stand completely finished.

Stamping.—The ornamentation of both cloth and leather covers for most bindings other than single books or single sets is rapidly and neatly accomplished by a process called stamping. Stamping was introduced to overcome the difficulty in hand tooling the cotton cloth and principally for reason of the need of a much cheaper and quicker method for lettering and ornamenting the increased quantities of books sold when the muslin or cloth was introduced as a binding for books.

The process of casing, as it is called, consists in pasting the outer end leaves of a book, placing in proper position on cover, and cover then is drawn over and book shifted to secure evenness of squares or margins, then built up on press boards with brass rims which press into the joints, and after several hours' pressure, sufficient time being given to thoroughly dry, the books are removed from press, opened up and examined, wrapped and boxed for delivery.

EDWIN S. IVES,
Of Edwin Ives & Sons, New York.

Bookkeeping is the recording of the transactions of a business so that the resources and liabilities may be readily exhibited. Transactions are recorded in the order of their occurrence in such books of original entry as may be imposed by the nature of each business or which conform to the requirements of the accounting system in use. If but a single book is used for this purpose, its form is usually that of the day-book, which contains a narrative of all the transactions as they occur. Formerly this was the general procedure, but it is found that business can be expedited by classifying the transactions in separate books, consequently the cash-book, purchase-book, and sales-book are now commonly used concurrently. Whatever may be the character and extent of the original records, the transactions are ultimately transferred in classified form to the ledger, which is the principal book of accounts. There are two systems of bookkeeping in use, namely, single and double entry. The primary element in each of the two systems is the Account. In bookkeeping by single entry only accounts with persons are kept in the ledger, and the profits and losses are ascertained solely by comparison of past with present conditions; in other words, by taking the difference between the net worth at the beginning and the net worth at the close of a stated period. The principal books used in single entry are the day-book, cash-book, and ledger. Being a simple though necessarily imperfect method, single entry is used chiefly by retail traders. Bookkeeping by double entry, as the term implies, is that mode in which every transaction is entered twice, first on the debtor side of one or more accounts, and next on the creditor side, thereby keeping the ledger perpetually in balance. The chief objects of keeping accounts, it may be stated, are to determine (1) the amount of profit or loss during a definite period, and (2) the amount of net capital or net insolvency at the end of such period. The system of double entry gives the net capital or net insolvency in two different ways, from two different sources, the one corroborating the other, and constituting what is called the balance of the books. Upon the classification resulting from this arrangement rests the claim of double entry bookkeeping to be considered as a science.

Bookkeeping, like most other sciences, has adopted a terminology of its own to avoid circumlocution. For example, the terms debtor and creditor, usually abbreviated Dr. and Cr., are used arbitrarily to designate the right-hand and left-hand side, respectively, of an account. An account is a collection of items, under an appropriate title, so arranged as to give a result by comparison.

Journalizing is the mental process of deciding how every transaction is to be disposed of in the ledger; that is, what accounts are to be debited and credited in each case. Posting is the transferring of debit and credit items to their proper accounts in the ledger. A trial balance is a list of the open accounts in a ledger together with the debit and credit footing of each account. A business statement is a summarized exhibit of those accounts which comprise all items of revenue, otherwise denominated a profit and loss account. A financial statement is a compilation of those accounts having to do with capital, in other words, a balance sheet. A balance sheet is a condensed statement of the resources and liabilities of a business. It is usually compiled from the trial balance and inventory schedules at the end of a fiscal period and it is frequently accompanied with a profit and loss statement which confirms the increase or diminution of finance as displayed in the balance sheet proper. The function of a balance sheet is,

therefore, to present a scientific statement of the financial condition of a business at a specified date.

The problem presented in bookkeeping, as may be inferred from the foregoing, is that of exhibiting financial transactions as they occur in the most minute detail, and ultimately in the most condensed form. The best solution of this problem in any given instance, depends largely upon the nature of the individual business the operations of which are to be recorded.

The advantages of the double entry system over the single entry system may be summarized briefly as follows: (1) The susceptibility of infinite modification in its minor features without disturbing the general results as shown in the balance sheet; (2) the constant equilibrium of debits and credits, the mathematical proof of which is afforded in the trial balance; (3) the separate classification of capital and revenue accounts, the resultant statement of each class being confirmatory of the accuracy of the other; (4) the displaying of the channels through which profit and loss items have accrued, thus revealing the methods by which the movements of the business have been financed; (5) the provision for the ascertainment of gross profit on the different departments of a business by means of the trading accounts; (6) the working economy resulting from the introduction of special columns in the books of original entry; and (7) the ease with which a thorough audit can be conducted at any time, this circumstance serving as a check upon erroneous entries.

A double-entry ledger, as before stated, is the book of accounts. As such it is a concrete expression of the principle of classification, and the philosophic basis of the «science of accounts» is displayed therein with mathematical precision. Each separate account contained in the ledger is built up on the theory of comparison. Thus, the items of one side denote increase or plus of financial ability, those of the other side denote its decrease or minus. Hence, to know the proper place in the ledger in which to assign each item in a transaction, is to know the laws, principles, and objects of each account in the ledger; and a false entry can only be proved false by showing its want of conformity to some principle of the ledger. Take the cash account for illustration: The left-hand or debit side contains the items of cash received; and the right-hand or credit side the items of cash disbursed; the difference between the receipts and payments will, necessarily, be the balance or amount of cash on hand, which, in this case, can be confirmed by actual count. Again, the merchandise account shows on the debit side the value of the goods on hand at the beginning and the cost of all subsequent purchases; the credit side shows all returns or sales of such goods, to which is added the value of the goods on hand at the end; the difference or balance, being the excess of production over cost, or of cost over production, as the case may be — in other words, the gain or loss. Each separate account, therefore, is constructed in accordance with a fixed and unalterable plan and each contributes a definite result which must be considered in the final showing. Being based upon the theory of the equation, there follows a double record of each item in every account with the result that the total debits always equal the total credits when the several accounts are taken together. It should be noted in this connection that finance, only, is the essential object of accounts, namely, cash, notes, book debts, or their equivalents; any other property is only introduced into the books to show how far it contributed to the increase, or occasioned the diminution of finance, and so to corroborate the actual amount of financial ability found to exist. The great and almost the only source of confusion in double entry is that of confounding an account kept to show financial ability with an account to ascertain how much the profit on some property dealt in has contributed to whatever augmentation may be found in the state of the finances after a certain period of business.

It will be apparent that two distinct ideas are concurrently promulgated through all movements of the business directed toward an increase of wealth. These two ideas are concentrated in the cash and merchandise accounts, respectively, as types of the two classes of accounts. These two classes of accounts have been denominated, business and financial: the former revealing the movements of the business, the latter its financial results. In other words, business accounts show the losses and gains, and financial accounts show the resources and liabilities. Thus it will appear that the debits of the financial accounts show an increase of wealth and the credits decrease, and that the business accounts simply show the same thing reversed. Accordingly, the sum of all the resources of a concern less the sum of all its liabilities is its net capital. All increase or diminution of net capital comes from the receiving of more or less for property than its cost or the appreciation or depreciation of property while in possession, or from rent, interest, taxes, and service. The net gain or net loss of a concern, therefore, during any specified period must be exactly equal to the increase or decrease of net capital during the same period. In a manufacturing concern, for example, it is important that the progress of the business be shown at frequent intervals. It should be possible at any time to ascertain the cost of production of each article manufactured and to verify this cost by a statistical comparison with previous costs. This implies (1) that such a system of stock-keeping be inaugurated as shall show the amount of material consumed in the process of manufacture; (2) that the expenditures for labor be shown for each of the successive steps essential to bringing the article to a completed condition; (3) that costs of superintendence and incidental shop charges be pro-rated; (4) that the general expenses be distributed among the goods manufactured; (5) that adequate provision be made for depreciation; (6) that specific reserves be set aside for bad debts, taxes, contingencies, etc., and (7) that final profit shall be based on the total inclusive cost of production. The application of scientific principles to the accounting system should enable the management to have placed periodically before it, such facts relating to the cost of production as are essential to the shaping of a successful policy in these times of intense industrial competition.

The manner of recording transactions before they are arranged in the ledger, varies in almost every business, but this variation presents no confusion whatever when the different accounts embodied in the ledger are thoroughly under-

stood. Double-entry accounting, in fact, admits of a great variety of modifications, erroneously, in many cases, called systems. The so-called voucher system, for instance, now extensively used in railway and manufacturing corporations, is an expedient for eliminating from the ledger individual accounts with creditors. At the same time, by the device of special columns in a voucher register, it facilitates the most minute subdivision of revenue expenditures and renders periodic comparison of such items possible to any degree desired. In most lines of business special columns may also be introduced in the cash-book, sales-book, and journal for the purpose of minimizing the mechanical labor of posting, the aggregate of each column being transferred to the corresponding ledger accounts instead of the separate items. The principle of consolidated postings is applied in dividing the accounts of the general ledger among a series of subordinate ledgers, a common division being: general, sales, and purchase ledgers. Each of these ledgers can be made self-balancing, if desired, by means of special columns in the books of original entry, a controlling account being kept in the general ledger, representing the aggregate sums in each of the subordinate ledgers. A separate ledger can thus be appropriated, if the magnitude of the business demands it, to the names beginning with each letter of the alphabet, or any number of letters may be included in one, as A to K, A to G, etc. By this means separate duties may be assigned by the accountant to a large number of subordinates, the general ledger consisting of but few accounts, from which, however, he is enabled to show promptly the condition of the entire business. A private ledger is kept by some proprietors for the purpose of withholding from subordinates certain information. The difference between the total debits and credits of the private ledger accounts should complete and confirm the general trial balance. Capital, profit and loss, investments, and other accounts can be kept in this manner with perfect security.

Loose leaf and card ledgers, impression sales-books, duplicate order blanks, and the many mechanical devices for the curtailing of labor or the securing of expediency or directness in recording, do not come within the limits of this discussion which is intended rather to give a general view of the subject and its underlying principles.

Auditing.— Broadly stated, it is the province of the accountant to devise the accounting system and to specify the nature and character of the records that shall be kept; it is the duty of the bookkeeper to perform the routine work of recording the transactions of the business in accordance with the plan outlined by the accountant; it is the function of the auditor to examine critically the completed records of the bookkeeper, to compare the entries with the documents, to ascertain if the plans of the accountant have been strictly followed, and, finally, to prepare the profit and loss account and certify to the correctness of the balance sheet. It is incumbent upon the auditor to exercise every faculty and means in his power to determine (1) that the liabilities are all stated; (2) that the resources are not overstated; (3) that the profit and loss account contains all expenses chargeable to the period under review; (4) that the profits earned are all included; (5) that proper charges against revenue have not been capitalized; and (6) that intentional errors, irregularities, and fraudulent entries have not been permitted. The professional duties of the competent public accountant and auditor, therefore, cover a wide range of technical knowledge and commercial experience. A large number of text-books on elementary bookkeeping have been published, principally for schoolroom instruction. For a broader treatment of the subject application for special reference books may be made to members of the State Societies of Certified Public Accountants and the American Association of Public Accountants, or the following works may be consulted: Lisle, 'Accounting in Theory and Practice'; Dicksee, 'Auditing'; Broaker, 'American Accountants' Manual';

FORM OF DAY BOOK.

New York, July 1, 1903.

	Joseph Hardcastle began business this day with the following resources and liabilities:				
	Cash on hand,	6000			
	Bills receivable, note signed by B. F. Williams,	4000			
	Elston E. Gaylord owes him on account,	2500			
	Stock of goods on hand at present value,	5000	40		
	Total resources,			17500	40
	Bills payable, for note favor Charles W. Haskins,	8400			
	Leonard H. Conant for amount owed him on account,	2850			
	Total liabilities,			11250	
	Joseph Hardcastle's net capital,			6250	40
	2				
	Bought of Henry R. M. Cook on account 200 bush. potatoes @ $1.10,			220	
	3				
	Received cash for B. F. Williams' note now due,			4000	
	4				
	Sold Edgar M. Barber on account at 30 days,				
	60 bbls. apples @ $3.50,	210			
	400 bush. corn @ 80c.,	320		530	
	5				
	Received from Elston E. Gaylord, cash in full of account,			2500	
	6				
	Lent O. P. Kinsey, cash, receiving his note at 90 days with interest at five per cent,			1000	

Dawson, 'Accountants' Compendium'; 'American Business and Accounting Encyclopædia'; Gottsberger, 'Accountants' Guide for Executors'; Arnold, 'Complete Cost Keeper'; Millener, 'Cost Accounts'; Keister, 'Corporation Accounting and Auditing'; Metcalf, 'Cost of Manufactures'; Lewis, 'Commercial Organization of Factories'; Matheson, 'Depreciation of Factories'; Whinney, 'Executorship Accounts'; Garcke & Fells, 'Factory Accounts'; Norton and Feasey, 'Newspaper Accounts'; Soule, 'New Science and Practice of Accounts'; Fischer, 'Railway Accounts and Finance'; Norton, 'Textile Manufacturers' Bookkeeping.' It is proper to state that in the preparation of this article the undersigned is also indebted to the writings of Mr. Thomas Jones and to suggestions from Prof. Joseph Hardcastle, two of the ablest writers on accounting that America has produced.

EDGAR M. BARBER.
Certified Public Accountant.

FORM OF JOURNAL.

New York, July 1, 1903.

	L.F.					
	2	Cash,	6000			
	3	Bills receivable,	4000			
	9	Elston E. Gaylord,	2500			
	5	Merchandise,	5000	40		
	15	Bills payable,			8400	
	12	Leonard H. Conant,			2850	
	1	Joseph Hardcastle,			6250	40
		2				
	5	Merchandise,	220			
	11	Henry R. M. Cook,			220	
		3				
	2	Cash,	4000			
	3	Bills receivable,			4000	
		4				
	12	Edgar M. Barber,	530			
	5	Merchandise,			530	
		5				
	2	Cash,	2500			
	9	Elston E. Gaylord,			2500	
		6				
	3	Bills receivable,	1000			
	2	Cash,			1000	

FORM OF CASH BOOK (DEBIT SIDE).

1903 July							
	1	Balance on hand,				16428	42
	2	Merchandise, cash sales,	5	450	65		
	6	Bills receivable, A. C. Lobeck's note,	3	3500			
	9	Herbert H. Swasey, on account,	10	4000			
	15	Bills receivable, M. A. Bigelow's note,	3	692	48		
	15	Interest on above	7	7	20		
	20	James G. Cannon, on account,	11	1200			
	25	Merchandise, cash sales,	5	1570	83		
	28	Lyman J. Gage, on account,	16	230	09		
		Cash Dr.,	2			11651	25
						28079	67

FORM OF CASH BOOK (CREDIT SIDE).

1903 July							
	4	Merchandise, Invoice No. 45, Garner & Co.,	5	12000			
	7	Bills payable, note favor W. F. Wakeman,	15	1740			
	8	John L. N. Hunt, on account	12	1235	75		
	10	Expense, cartage,	4	14	50		
	16	Bills payable, acceptance Charles E. Sprague,	15	2000			
	16	Interest on above, 30 days,	7	10			
		Cash Cr.,	2			17000	25
		Balance,				11079	42
						28079	67

FORM OF LEDGER ACCOUNT.

MERCHANDISE.

Dr. Cr.

1903 July						1903 July					
	1	On hand,		5000			4	W. J. Kinsley,	18	2764	25
	12	Chas. H. Parkhurst,	31	8471	39		16	Note at 30 days,	24	6041	90
	31	Profit and Loss	10	974	76		31	Inventory.		5640	
				14446	15					14446	15

FORM OF BALANCE SHEET. —— COMPANY JULY 1, 1903.

Resources.	$	$	*Liabilities.*	$	$
Cash on hand,			Mortgages payable,		
Cash in bank,			Interest due and accrued,		
Stocks and bonds, as per Schedule A,			Sundry trade creditors as under:		
Properties as under:			Bills payable as per Schedule D,		
Land, per Ledger valuations,			Accounts payable as per Schedule E,		
Buildings, per Ledger valuations,			Capital stock,		
Plant and machinery, less depreciation,			Reserve for ——		
Inventory of stock, valued by Mr. —— as under:			Surplus,		
Raw material,					
Goods unfinished,					
Goods manufactured,					
Sundry trade debtors as under:					
Bills receivable as per Schedule B,					
Accounts receivable, as per Schedule C,					
Less reserve for discounts,					
Prepaid charges as under:					
Insurance premiums,					
Rent for July, 1903,					

Book-plate, a printed or engraved label, usually decorative, placed on the inside cover of a book as the owner's symbol. In a certain sense, any individualized label is entitled to the name; but as usually understood, the term is restricted to those with some special artistic design, which, however, may range from the simplest to the most elaborate and ornate composition. The elements are — the owner's name; his coat of arms if he has one, usually, but not invariably; allegorical emblems or compositions; landscape designs; mottoes; quotations, etc. In purpose they are probably very ancient: some of the small tablets found in Assyrian libraries are intelligible only as book-plates, and they are accredited to Japan in the 10th century. Indeed, something of the sort may almost be predicated of any society where books circulate much. But our modern book-plates are of German descent, and seem to have been nearly contemporaneous with printing, one being mentioned as of the mid-15th century; the earliest actually known, however, is a hand-colored heraldic wood-cut of about 1480, in some books and manuscripts presented to the monastery of Buxheim, Swabia. The earlier ones were all mere indices of ownership, rough wood-cuts with no artistic design; they were permanently raised into the domain of an art by the great Albrecht Dürer (1471–1528), the "father of the book-plate." He made two for Bilibald Pirckheimer, probably before 1503 — one a mixture of armorial and allegorical elements, and the other a large bold portrait of the famous Nuremberg senator; but his earliest dated one is for Hieronymus Ebner of the same city, in 1516. Several of the great German artists of that age — Holbein, Cranach, Amman, and others — designed book-plates; indeed, since Dürer's time the best have not disdained this branch of art, and wealthy collectors have vied with each other in costly designs.

The idea was soon adopted in other European countries. The French wrought with great delicacy and beauty, but with too elaborate and profuse decoration. The English were very late in adopting the fashion: the number of examples which have come down from before the Restoration is singularly few, and the first engraved one we possess is that of Sir Nicholas Bacon, father of the Chancellor, dated 1574; though an old folio volume from Henry VIII.'s library, now in the British Museum, contains an elaborately emblazoned drawing which formed the book-plate of Cardinal Wolsey, with his arms, supporters, and cardinal's hat. But after the Restoration they multiply so rapidly that owing to the great number of wealthy English collectors, they far outnumber all the rest of the world, and some of them have considerable historical interest. Pepys had several, one with initials and crossed anchors probably as early as 1668, one with his portrait not earlier than 1685. Among other English names highly prized by book-plate collectors may be mentioned Bishop Burnet, William Penn, Robert Harley, Matthew Prior, Lawrence Sterne, David Garrick, Horace Walpole, John Wilkes, and Charles James Fox. Among the artists who have engraved them are those of William Marshall and Robert White, Hogarth, Bartolozzi, Bewick, and Vertue. Bewick at one time was regularly employed in their production. One of the prettiest of book-plates is that designed in 1793 by Agnes Berry for the Hon. Mrs. Damer, and engraved by Francis Legat.

The style of design, naturally, has varied with the taste of the age, and is no mean index of its characteristics. The chief English styles have been classified by Lord de Tabley, the leading modern authority, as follows: Early English, entirely armorial, with profuse mantling, and large full-rounded curves surrounding three and often four sides of the shield. Jacobean, from about the time of James II. to 1745, with a heavy carved appearance, an even balance of proportions, always a regular outline, and often a carved molding around it which makes a massive rectangular frame — a dignified and reposeful if rather formal style. The Chippendale succeeded, lighter and more graceful, with rich curves and airy scrolls, the helmet gone, no set form of shield, and a profusion of careless sprays and garlands, etc. This degenerated with poor artists into an incongruous mass of overdone and rococo ornamentation, a heap of all the unrelated objects of nature and art and the most artificial frivolities of design, portraits, and castles, and ruined abbeys, Watteau shepherdesses and shepherds, lambs and dragons, dogs and ships, etc. About 1770 came in the Ribbon and Wreath, with a shield decorated as the name implies, much simpler and more tasteful.

The American settlers for more than a century made no attempt at book-plates of their

own manufacture: the richer colonists looked to England for everything, especially luxuries and articles of culture, and the others had no time or taste for superfluities. Naturally enough, most of these early plates belong in the southern colonies, where there was more of leisure and cultivation of the decorative side of life; but for the same reason, their more intimate connection with England and preference for its ways, as well as superior taste, they continued to use its book-plates almost exclusively long after American engravers were actively employed upon this branch of work. Very few of the old southern plates are of American design, and consequently they are much less valued by collectors (except for the owner's sake, as with Washington's) than the northern; though the latter are much cruder in heraldry, design, and execution. The earliest dated and signed American plate by a native engraver is that of Thomas Dering, engraved in 1740 by Nathaniel Hurd of Boston; the next is of John Burnet (1754), by Henry Dawkins, who settled in 1730–77, the best of our early engravers, though there is no doubt that an earlier one of Hurd's was that of Edward Augustus Holyoke; Philadelphia and later in New York; then comes that of Benjamin Greene (1757), by Hurd; then of the Albany Society Library (1759). Paul Revere also engraved book-plates; as did Amos Doolittle of New Haven, Peter Maverick of New York, Alexander Anderson of New York (the first American wood engraver, sometimes called the «American Bewick»), and others, in the northern States, especially around the great centres like Boston, New Haven, Philadelphia, and Baltimore. They worked mainly in the Chippendale style till it gave place to the Ribbon and Wreath, and originated no new style.

The earliest book-plates were of large size, as if made specially for folios; but a smaller size soon became general, and was used for books of all sizes. Some owners, however, have used different plates for different sizes; some of Sir William Stirling-Maxwell's were of gigantic proportions.

The collection of book-plates is a very modern amusement, but has risen to enormous proportions. The first collector known was Dr. Joseph Jackson Howard, and his collection numbered over 100,000. Sir Augustus Wollaston Franks of London had one of some 200,000, which he left to the British Museum. A German nobleman, Count Karl Emich zu Leiningen-Westerburg, had also an exceedingly fine one. A number of large and valuable ones exist in the United States, including that of the Grolier Club, which gave in 1894 the first American public exhibition of them. There is a cosmopolite association of collectors and connoisseurs, the Ex Libris Society of London (1890), issuing a monthly journal, and there are also periodicals devoted to it in France and Germany. There are regular «prices current» of book-plates among dealers, and auction sales as of books. The intelligent study of them is based on the work of the English poet John Byrne Leicester Warren, afterward Lord de Tabley, who published, in 1880, his 'Guide to the Study of Book-Plates,' which has no rival, and whose classifications are universally accepted. Special works on particular divisions, besides works in foreign languages, are, among others, Castle's 'English Book-Plates' (1892); Hamilton's 'French Book-Plates' (1892); Hardy's 'Book-Plates' (1893); C. D. Allen's 'American Book-Plates' (1894), Labouchere's 'Ladies' Book-Plates' (1895); Hamilton's 'Dated Book-Plates' (1896); etc.

Books, Censorship of. Unless we consider the burning of condemned books under the Roman emperors as a censorship, the establishment of this institution must be attributed to the popes; but it cannot be denied that it would have sprung up in a thousand other places even if it had not existed in their dominions. Soon after the invention of printing, the popes perceived the influence which this art exerted over the diffusion of knowledge. It was besides doubly dangerous at a time when the authority of the Church had been assailed, and was shaking under the load of its abuses. They endeavored therefore to prohibit first the reading, and secondly the printing, of certain literary works. They enforced the ancient decrees of the Church against the reading of heretical books, and introduced an ecclesiastical superintendency of the press in 1479 and 1496, more completely established by a bull of Leo X. in 1515. In this the bishops and inquisitors were required to examine all works before they were printed, and thus to prevent the publication of heretical opinions. They went still farther: as this papal decree could not be carried into execution in all countries on account of the Reformation, they prepared an index of books which nobody was allowed to read under penalty of the censure of the Church. This index was commenced by the Council of Trent, in the fourth session of which (1546) the decree of the censorship was renewed; but it was not executed, and was finally left to the popes (25th session of 1563), by whom several such 'Indices Librorum Prohibitorum' have been published. Works of an established character, which could not well be prohibited, it was determined to expurgate. The Duke of Alva caused such an 'Index Expurgatorius' to be prepared in the Netherlands; another was drawn up at Rome in 1607; but there are serious difficulties in expurgating books. The papal government still continues the policy of prohibiting to the faithful the reading of works deemed dangerous, and the Congregation of the Index has still its place and functions at Rome.

In Germany the politico-theological controversies gave the first occasion for the introduction of this institution, as they were carried on with the greatest violence on both sides. The decree of the German diet in 1524 prohibited them. By the diet of 1530 a more severe superintendence of the press was established; and this was confirmed by later laws of the empire in 1541, 1548, 1567, and 1577, etc. It was also provided at the Peace of Westphalia, 1648 (Osnabr. Instr., cap. v. sec. 50), that the states should not suffer attacks on religious parties. From that time the emperors have promised, in their elective capitulations, to watch strictly over the fulfilment of this article. In the capitulations of the Emperor Leopold II., 1790, and of the Emperor Francis II., it was further added (art. vi. sec. 8), «that no work should be printed which could not be reconciled with the symbolical books of both Catholics and Protestants, and with good morals, or which

might produce the ruin of the existing constitution, or the disturbance of public peace." It was, however, not difficult in most Protestant countries for individual authors or literary journals to obtain an exemption from the censorship; and many institutions, academies, universities, etc., were privileged in this way as far as concerned their regular professors. The governments sometimes protected their subjects with great energy; as, for instance, that of Hanover, in the case of Putter and Schloezer. Censorship was first abolished in England. It was formerly exercised by the well-known Star-chamber, and, after the abolition of this court in 1641, by the Parliament. In 1662 it was regulated by a particular statute, but only for a certain number of years. This statute was renewed in 1679, and again in 1692 for two years more. In 1694 the right of the crown to render the printing of writings, journals, etc., dependent on its permission,— that is, the censorship,— ceased entirely. In Holland, and even in the Austrian Netherlands, a great liberty, if not an entire freedom of the press, prevailed. All that was not permitted to be printed in France appeared in the Netherlands or in Switzerland, at Lausanne and Geneva, to the great advantage of the Dutch and Swiss book-trade.

In Sweden, by an edict of 1766, and accordingly under the aristocratical constitution, the abolition of the censorship was ordered; yet Gustavus III., personally a friend to the liberty of the press, was obliged to retain the censorship, and even to execute it with severity, during the aristocratical machinations which disturbed his reign, and which were but imperfectly counteracted in the Revolution of 1771. Gustavus IV. issued an edict soon after he ascended the throne, by which the censorship was retained only in matters of religion, and was administered by the consistories. This, however, was not permanent; at first penalties were enacted, and in 1802 the censorship was entirely re-established, committed to the chancellor of the court, and executed with severity. French and German books were prohibited. King Charles XIII., immediately after his ascension to the throne, abolished it entirely by a provisional order of 12 April 1809, which was confirmed as an article of the constitution (sec. 86), 6 June 1809. In Denmark, by a royal rescript of 14 Sept. 1770 (under the minister Struensee), the censorship was wholly abolished; neither has it been restored, though the laws by which the liberty of the press has been regulated have been changing, and have sometimes been very oppressive. In France the censorship, which had belonged to the department of the chancellor and been administered by royal censors, was annihilated by the revolution. All the constitutions, from 1791 to the Charte Constitutionelle in 1814, declare the liberty of the press one of the fundamental laws. During the republic there was no censorship, but the revolutionary tribunals took its place. Napoleon restored it in another form by the decree of 5 Feb. 1810 (Direction de l'Imprimerie). Since the Restoration it has also undergone various changes. Books of more than 20 sheets have always remained free, but the censorship has been exercised over pamphlets and journals at different periods. Under the government of the Emperor Napoleon III. the censorship was re-established with new penalties, and is still maintained.

In the kingdom of the Netherlands the censorship was abolished by a fundamental statute of 24 Aug. 1815 (art. ccxxvi.), and this statute is still in force in the kingdom of Holland. By art. xviii. of the constitution of Belgium, 1831, it is declared that the press is free, and that no censorship can ever be established. In the German states the liberty of the press was much restrained till 1806, the state-attorney having till then had control over it. After 1814 several states abolished the censorship, though with very different provisions as to the responsibility of authors, printers, and booksellers. In accordance with the unhappy decrees of Carlsbad, 1819, and the resolutions of the German diet of 20 Sept. 1819, the censorship in all the states of the German confederation became one of the conditions of union, but only with regard to books of less than 20 sheets, and journals. These laws were repealed in 1849, but in the course of a few years they were gradually introduced, although in a modified form, and in this form they still exist in most of the separate German states as well as in the empire. In Russia and Austria there is naturally a despotic censorship. In the United States of America a censorship has never existed.

Besides the different degrees of severity with which the censorship is exercised in different countries, it may be divided into different kinds, according to the field which it embraces. (1) A general censorship of the book-trade and of the press, under which even foreign books cannot be sold without the consent of the censors, exists in Russia, Austria, Spain, etc. (Austria has, in the censorship of foreign books, four formulas: (a) *admittitur,* entirely free; (b) *transeat,* free, but without public advertisements for sale; (c) *erga schedam,* to be sold only to public officers and literary men on the delivery of a receipt; (d) *damnatur,* entirely forbidden.) (2) A general censorship of the press, extending only to books printed in the country, exists in Prussia (edict of 19 Sept. 1788; order of the cabinet of 28 Dec. 1824; law of 12 May 1851). (3) A limited censorship, only over works of less than 20 sheets, and journals, is at present the law in the states of the German empire. See PRESS, LIBERTY OF THE.

Boolak, boo-läk', **Boulak,** or **Bulak,** an Egyptian town on the Nile, and the port of Cairo. Its site was once an island, but that part of the river which separated it from Cairo has been filled up. In 1799 Boolak was burned by the French. Mehemet Ali rebuilt it, and established extensive cotton-spinning, weaving, and printing works, a school of engineering, and a printing establishment, from which is issued a weekly newspaper in Arabic. The town contains a mosque, a naval arsenal, a dockyard, and a custom-house, and is surrounded by the country residences of numerous Egyptian grandees. An electric railway connects it with Cairo. Pop. about 13,000.

Boole, George, English mathematician and logician; b. Lincoln, 2 Nov. 1815; d. Cork, 8 Dec. 1864. Educated in his native place, he opened a school in his 20th year, and by private study gained such proficiency in mathematics that in 1849 he was appointed to the mathematical chair in Queen's College, Cork, where the

rest of his life was spent. In mathematics he wrote on 'Differential Equations'; 'General Method in Analysis'; 'The Comparison of Transcendents,' etc. In logic he wrote 'An Investigation of the Laws of Thought' (1854), an amplified edition of his earlier 'Mathematical Analysis of Logic' (1847), a profound and original work, in which a symbolic language and notation were employed in regard to logical processes.

Boom, in fortification, and in marine defenses, a strong chain or cable stretched across the mouth of a river or harbor, to prevent the enemy's ships from entering, and having a number of poles, bars, etc., fastened to it; whence the name; as, to cut or burst the boom. It often denotes a long pole employed to extend the sails of a ship, as the main boom, jib boom, etc. The term may also be applied to a pole set up as a sea mark to point out the channel to seamen, when navigating in shallows. The word also designates a hollow, roaring sound; as, the boom of a cannon; the reverberating cry of the bittern. In recent years it is often used to denote a sudden rise in the market value of real estate, stocks, or commodities; an enthusiastic popular movement in favor of any person, cause, or thing; as, a real estate boom, a political boom, a boom in sugar.

Boomerang, a missile or weapon of a peculiar nature used by the natives of Australia. It is from 30 to 40 inches in length, and is made of hard wood. In shape it is curved somewhat like a scimitar or a parabola, or it may have a decided bend in the middle nearly approaching a right angle, the bend being a natural one. The breadth is usually about three inches, and while one surface is flat the other is somewhat rounded. Boomerangs are of different kinds, some being used in war, others in the chase, others for amusement. One variety can be hurled so as to turn while in the air and come back almost to the place whence it was thrown. It is this peculiarity that has made the boomerang so famous, though the returning boomerang, if not used merely for amusement, is only used to bring down birds. In throwing, the weapon is grasped by one end, and after a short run hurled straight in front. It then takes a horizontal position and revolves rapidly as it moves obliquely upward into the air. After a time it curves round, and if he so intends, comes back close to the thrower. It may move for a considerable distance horizontally at only a few feet above the ground, and then suddenly rise vertically upward with great velocity. The peculiarly irregular character of its path through the air, and the rapid change in its direction of movement, render it a very efficient weapon for killing birds. There is also a special boomerang for killing birds capable of being thrown in a straight course of 200 yards. The Australian natives often throw the boomerang in such a way as to cause it to strike the ground about 30 feet off; this is said to impart increased velocity, and the weapon may even hit the ground a second time and rebound into the air. The war boomerang is larger and heavier than that used in hunting. Weapons similar to the boomerang, or kiley, as the Australians also call it, but lacking the property of returning, have been, and still are, used by other races, notably the ancient Egyptians and the modern Abyssinians. Sir Samuel Baker describes the latter as about two feet long, and made of a piece of flat hard wood, whose end turns at an angle of 30°. Various derivations of the word have been suggested, one connecting it with a root meaning strike or kill, and another with the native word for wind.

Boondee, boon-dē', or **Bundi,** a native state of Hindustan, in Rajputana, under British protection; area 2,300 square miles. A range of hills running from southwest to northeast, penetrated by few passes and rising to the height of 1,793 feet, divides the state into two almost equal portions, that on the south being the more fertile. Much of the state is underwood. The chief river is the Mej, which penetrates the central range, and joins the Chambal near the northeast extremity of the state. It was much more extensive before Kotah and its territory were separated from it. The inhabitants are of the Hara tribe, which has given birth to many famous men, and, among others, to Ram Singh Hara, one of Aurungzebe's most renowned generals. The ruler is practically absolute in his own territory. Pop. (1901) 171,227. BONDEE, the capital, is picturesquely situated on a steep slope in a gorge in the centre of the hills above mentioned, and its antiquity, numerous temples, and magnificent fountains, give it a very interesting appearance. It is crowned by a fort and surrounded by fortified walls. For picturesque effect its main street is almost unequaled. At its upper extremity stands the palace, built of stone, with turreted windows and battlements, supported partly by the perpendicular rock, and partly by solid piers of masonry 400 feet high. At its lower extremity is the great temple dedicated to Krishna. Pop. 31,000.

Boone, Daniel, American pioneer: b. Bucks County, Pa., 11 Feb. 1735; d. 26 Sept. 1822. He was one of 11 children. His father emigrated from England, and when Daniel was very young removed with his family from Bucks into Berks County, not far from Reading, then a frontier settlement, exposed to Indian assaults. It abounded with game, and thus, Daniel became accustomed to a life in the woods, and formed an intense love for uncultivated nature. His education was confined to a knowledge of reading, writing, and arithmetic. When he was about 18 his father removed to North Carolina and settled on the Yadkin. Here, in 1755, Daniel married Rebecca Bryan, and for some years followed the occupation of a farmer, but about 1761 his passion for hunting led him, with a company of explorers, along the wilderness at the head waters of the Tennessee River. In 1764 he joined another company of hunters on the Rock Castle, a branch of the Cumberland River. He had become dissatisfied with life in North Carolina. The customs of the colony were becoming luxurious; the rich were exempt from the necessity of labor, and the people were much oppressed by taxes. Boone imbibed a chronic hatred of law forms which lasted through life, and his neglect of these, in securing his titles to land, reduced him to poverty on more than one occasion.

In 1767 a backwoodsman named John Finley made an excursion farther west than had before been attempted, and returned with glowing accounts of the border region of Kentucky, which he represented as a hunter's paradise. Boone

headed a party of six for its exploration, leaving his Yadkin home 1 May 1769. On 7 June, in the same year, they reached an elevation from which they beheld the whole region watered by the Kentucky River and its tributaries. At this point on the waters of the Red River, a branch of the Kentucky, and supposed to be within the present limits of Morgan County, they halted and hunted until December without seeing a single Indian, although they were continually on the alert for them. They then separated into parties, Boone and a man named Stewart keeping company, and on 22 December these two were surprised and captured by Indians, who robbed them and kept them prisoners for seven days, when they managed to make good their escape. Early next month Boone and Stewart were gratified by the arrival in the wilderness of Daniel's younger brother Squire and another hunter from North Carolina, bringing tidings of the family at home and a much-needed supply of powder and lead. Soon after this event Stewart and Boone were again attacked by Indians. Boone escaped, but his companion was shot and scalped, and the man who came with Squire having perished in the woods the two brothers were left alone together. On 1 May it was decided that Squire should return for supplies, while Daniel remained to take care of and increase the store of peltry. They parted, and until 27 July, when Squire returned, Daniel remained in utter solitude, without bread, salt, or sugar. The brothers then continued their explorations over other parts of Kentucky until March 1771, when, taking as much peltry as their horses could carry, they returned to their families on the Yadkin, Daniel having been absent about two years, during which time he had seen no human beings but his hunting companions and the hostile Indians. He was now anxious to remove to Kentucky, and although his wife and children were easily persuaded to do so, two years elapsed before he could make the necessary arrangements. He sold his farm, and on 25 Sept. 1773, the two brothers, with their families, set out for Kentucky. At Powell's Valley, through which their route lay, they were joined by five families and 40 men well armed, but on approaching Cumberland Gap, near the junction of Virginia, Kentucky, and Tennessee, they were attacked by Indians and were forced to retreat 40 miles to Clinch River, leaving six of their party slain, among whom was Boone's eldest son, James. The emigrants were much disheartened, and Boone remained at Clinch River until June 1774, when Gov. Dunmore sent him a message to proceed to the wilderness of Kentucky and conduct thence a party of surveyors who were believed to be in danger from the Indians. This undertaking was successful, but no incidents of it have been preserved excepting that Boone was absent 62 days, in which he traveled on foot 800 miles. While he was gone to Kentucky the Shawnees and other Indians northwest of the Ohio River became hostile. Boone was appointed to the command of three contiguous garrisons, with the commission of captain, and, having fought several battles and defeated the Indians, he returned to his family on Clinch River and spent the next winter in hunting. He was shortly after employed by the Transylvania Company, established to purchase lands in Kentucky, to explore, mark, and open a road from settlements on the Holston to the Kentucky River. In the face of great dangers this was accomplished, and on 1 April 1775, a site having been selected on the bank of the Kentucky River, the party erected a stockade fort and called it Boonesborough. Boone soon removed his family to the new settlements, his wife and daughters being the first white women that ever stood on the banks of the Kentucky. The winter and spring of 1776 wore away without any particular incident, as the Indians, though by no means friendly, made no direct attack. On 14 July a daughter of Boone and two female companions were captured by a party of Indians, but next morning Boone and his companions followed the trail and surprised the Indians so suddenly that they had not time to murder their captives, and the three girls were restored to their families. During the whole of 1777 Boone was employed with his command in repelling the attacks of the Indians, who were incited to the most savage deeds of cruelty by the British during the Revolutionary War. His services were of incalculable advantage to the new settlements. On 1 Jan. 1778, the people suffering greatly for want of salt, he headed a party for the lower Blue Licks to manufacture it, and on 7 February, while at some distance from the camp, he was surprised and made prisoner by a party of 100 Indians. Again in this instance his consummate knowledge of the red man's character saved him and his friends. He ingratiated himself in their regard, and obtained favorable terms for his party at the Licks, who became prisoners of war under the promise of good treatment. He knew that the Indians would march to attack Boonesborough, and that if he and his party resisted they would all be murdered and those at the fort massacred, as no warning could reach them. He was conducted to old Chillicothe, and thence to Detroit, where he was kindly received by the English commander, Gov. Hamilton. In order to baffle his captors he pretended to be very much pleased with his mode of life among the Indians, went through the form of adoption by them, having his hair pulled out excepting the scalp-lock, "his white blood washed out" in the river, and his face painted. On 16 June he went out to hunt, and when out of view, started direct for Boonesborough, more than 160 miles distant, which he traveled in less than five days. He reached Boonesborough in time to warn the garrison. All supposed him dead, and his wife, under that impression, had returned with her children to North Carolina. The fort was at once put in complete order for defense, and on 8 August it was besieged by 444 Indians, led by Capt. Duquesne and 11 other Canadians, having French and British colors. Summoned to surrender, Boone replied with defiance, and after a savage attack upon the fort the assailants, six times greater in number than the garrison, raised the siege, leaving 37 of their party killed and many more wounded. Boone was now promoted to the rank of major. In 1778 he went to North Carolina to see his family. The next year, having invested nearly all his little property in paper money to buy land warrants, and having, besides his own, large sums of money to invest for other people, he was robbed of the whole, about $20,000, on his way from Kentucky to Richmond, where the court of commissioners was held to decide on

Kentucky land claims. In 1780 he returned with his family to Boonesborough, and in October of that year his brother, on a hunting excursion with him, was killed and scalped by the Indians, and Boone himself narrowly escaped. The Indians being exceedingly troublesome, a large party of militia was formed to follow and punish them, who, against Boone's counsel, suffered themselves to be drawn into an ambuscade, and the disastrous battle of the Blue Licks followed, in which Boone lost another son and had a brother wounded. At the close of the Revolutionary War Col. Boone returned to the quiet life of his farm and to his passion for hunting. In 1792 Kentucky was admitted into the Union as a sovereign State, and as courts of justice were established, litigation in regard to land titles commenced, and was finally carried to great lengths. From defective titles, Boone, with hundreds of others, lost the lands he possessed, with their valuable improvements, and thus after the vigor of his life was spent, he found himself without a single acre of the vast domain he had explored and fought to defend from savage invaders. Disgusted with his treatment he resolved to abandon Kentucky and move to the far West, which he did in 1795. He settled first on the Femme Osage, about 45 miles west of St. Louis, where he remained until 1804; he then removed to the home of his youngest son until 1810, and finally went to live with his son-in-law, Flanders Callaway. As the country, at the time of his removal, was under the dominion of Spain, on 11 July 1800, he was appointed commandant of the Femme Osage district; and as his fame had preceded him, 10,000 arpents, or about 8,500 acres, of choice land were marked out on the north side of the Missouri River, and given to him for his official services. This princely estate he also subsequently lost, because he would not take the trouble to go to New Orleans to complete his title before the immediate representative of the Spanish crown. Having left Kentucky in debt, he was much troubled for a while by ill success in hunting, but at length he obtained a valuable store of peltry, turned it into cash, went to Kentucky, without book account, paid every one whatever was demanded, and on his return to upper Louisiana with but half a dollar left, said that he was ready to die content. In 1812 he petitioned Congress to confirm the title to his claim of 1,000 arpents of land, which he had neglected to have done in proper form, and was in danger of losing, as he had everything else. He sought the aid of the legislature of Kentucky, and his petition was successfully urged in Congress, in requital for his eminent services. He continued to hunt occasionally as long as his strength remained, but was obliged to give up his rifle several years before his death. Chester Harding, who in 1820 painted the only portrait of him ever taken, informs us that his first sight of the old pioneer found him lying in his bunk in the cabin, engaged in cooking a venison steak on a ramrod. His memory of immediate events was very defective, but of past years as keen as ever. He was quite feeble, but able to walk out with Harding every day. This portrait now hangs in the State House at Frankfort, Ky. He died surrounded by his children and descendants, some of the fifth generation, in the 88th year of his age. On 20 Aug. 1845 the remains were deposited with appropriate ceremonies in the cemetery at Frankfort. In all the relations of private life Boone was a model for imitation. In spite of his many Indian encounters he was a lover of peace, modest in disposition, of incorruptible integrity, moral, and temperate.

Boone, William Jones, American bishop: b. Walterborough, S. C., 1 July 1811; d. Shanghai, China, 17 July, 1864. He graduated from South Carolina College in 1829, was admitted to the bar, but, deciding to devote himself to a missionary life, he prepared for orders at the Virginia Theological Seminary, and was ordained priest in 1837. In order to equip himself thoroughly for his work, he took a course of medical study and received the degree of M.D. from the South Carolina Medical College. He sailed for China in July 1837; in 1844 he was chosen the first American Protestant Episcopal missionary bishop to China, and was consecrated at Philadelphia 25 Oct. 1844. The remainder of his life, save for an occasional visit to the United States for rest or health, was spent in the work of his diocese. He came to be well known for his knowledge of the Chinese language. He began his translation of the Prayer Book into that tongue in 1846, and later was one of a committee appointed to secure an accurate translation of the Bible into Chinese.

Boone, Iowa, a city and county-seat of Boone County, on the Chicago & N. W. and the Chicago, M. & St. Paul R.R.'s, 36 miles northeast of Des Moines. It is an important milling, manufacturing, and coal-mining centre, and in the vicinity are large deposits of fire and pottery clays. The chief industries are the manufacture of flour, brick, tiles, and pottery, and the mining and shipping of coal. The city has five banks, a Federal building, public library, and hospital. It was settled in 1848 and incorporated in 1866. Pop. (1900) 8,880.

Boonton, N. J., a town of Morris County, situated 30 miles from New York, on the Delaware, L. & W. R.R., the Morris and Essex Canal, and the Rockaway River. It has very extensive ironworks, to the early establishment of which (1700) the town owes its foundation. There are also manufactories of agricultural implements, paints, paper, rubber, etc. Pop. (1901) 3,901.

Boonville, or **Booneville,** Mo., a city and river port, capital of Cooper County, on the right bank of the Missouri River, here crossed by a fine railway bridge, 43 miles northwest of Jefferson City. It is built on a healthful site about 100 feet above the river. Its manufactures are of but little importance, but some trade is carried on. On 16 June 1861, a Confederate force under Marmaduke was put to flight here by Federal troops under Lyon. Pop. (1900) 4,377.

Boorde, or **Borde,** bôrd, **Andrew,** English traveler and physician: b. near Cuckfield, Sussex, about 1490; d. 1549. He entered the Carthusian order at the Charterhouse, London, and in 1521 was appointed suffragan bishop of Chichester. The rigor of the Carthusian discipline was too much for him, and about 1528 he obtained a dispensation relieving him from his

vow. He then studied medicine on the Continent, returning to England in 1530, but soon afterward again visited the Continent, where he studied at the chief medical schools, including those of Orléans, Poitiers, Toulouse, Montpellier, and Wittenberg. His journey extended to Rome and Compostella, and in 1534 he was again in England. His next journey was undertaken at the instance of Thomas Cromwell, in order to ascertain continental opinion about Henry VIII. In 1536 he was in Scotland, studying and practising "in a lytle vnyuersyte or study named Glasco," and he speaks of Scotchmen as deceitful, and inveterate haters of the English. During the years 1538–42 he was again on the Continent, and this time he went as far as Jerusalem. While staying in Winchester his open immorality got him into trouble, and he was afterward lodged in the Fleet Prison, London. Boorde, who jocularly calls himself Andreas Perforatus, was the author of several works, among which are the following: 'Fyrst Boke of the Introduction of Knowledge' (about 1547); a 'Handbook of Europe,' the first of its kind; a 'Dyetary' (1542); a medical treatise entitled 'Breuyary of Health' (1547); 'Boke of Berdes,' a condemnation of the beard, known only through an extant portion of a reply by another writer; a book on 'Astronamye'; an 'Itinerary of England'; an 'Itinerary of Europe'; 'Boke of Sermons'; etc. His 'Fyrst Boke' contains the first printed specimen of the Gypsy language. Many other works, such as 'The Merry Tales of the Mad Men of Gotham,' have been ascribed to Dr. Boorde. Dr. Furnivall edited his 'Introduction' and his 'Dyetary' for the Early English Text Society in 1870.

Boorhanpoor, boo-rŭn-poor′, India, a town of the Deccan, in the division of Nerbudda and the district of Nimar, formerly capital of the province of Candeish, on the north side of the Taptee. When viewed from the opposite side of the river it presents rather an imposing appearance. Many of the streets are wide, regular, and paved with stone; as are also the Raj Bazaar and the market-place, an extensive square, the two handsomest places in the town. The most remarkable public edifices are the Lal Kilah, or Red Fort, a palace built by Akbar, and though much dilapidated, exhibiting still many remains of imperial magnificence; and the Jumma Musjeed, or great mosque, built by Aurungzebe. A singular sect of Mohammedans, named Bohrah, have their headquarters here. They are the chief merchants in this part of India, have Arab features, wear the Arab costume, and derive their origin from a disciple of their great prophet. Boorhanpoor was formerly famous for its muslin and flowered silk manufactures, which are still carried on to a considerable extent. Pop. (1891) 32,252.

Booro, boo′rō, one of the Molucca Islands, in the Indian Archipelago, west of Amboyna, belonging to the Dutch. It is oval in shape, 92 miles long, and 70 broad. It has several bays, of which Cajeli is the largest, and contains a safe harbor sheltered from the monsoons. Viewed from this bay the island has a very fine appearance. In the foreground the minarets and native houses are seen through the openings of the rich tropical vegetation; while lofty mountains, wooded to their summits, shut in the view. The island is watered by 125 streams, large and small. On the northwest side there are vast swamps swarming with crocodiles. The island contains some high mountains — Mount Tumahu having an altitude of 8,530 feet. Booro produces a variety of valuable woods, balsams, resins, and odoriferous flowers. The chief article of export is cajeput oil, of which about $50,000 worth is exported yearly; most being sent to Java. The tree from which it is obtained (*Melaleuca cajeputi*) grows also upon the islands of Amboyna, Ceram, Celebes, and Sumatra; but the best oil is procured in Booro. The population (about 60,000) consists of Alfoories in the interior, and Malays on the coast.

Booroojird, Burujird, or **Boorojerd,** boo-roo-jĕrd, Persia, a town in the province of Luristan, capital of a district of same name, 190 miles northwest from Ispahan, with a castle and several mosques. It lies in a fertile and well-cultivated valley, yielding saffron, belonging to the Lack tribe. Pop. 20,000.

Boot, an article of dress, generally of leather, covering the foot and extending to a greater or less distance up the leg. The sandal formed the chief foot-covering among the Greeks and Romans, and it is still in common use among Eastern nations. The boot, properly so called, came into use as part of the warrior's equipment about the 14th or 15th century, and since then it has assumed many different forms. The jack-boot, a kind of top-boot not yet altogether discarded, was in common use during the latter half of the 17th century, but was to a great extent displaced by the Hessian, which in its turn has given way to more recent forms. The name was given to an instrument of torture made of iron, or of iron and wood, fastened on to the leg, between which and the boot wedges were introduced and driven in by repeated blows of a mallet, with such violence as to crush both muscles and bones. The special object of this form of torture was to extort a confession of guilt from an accused person.

Bootan. See BHUTAN.

Boötes, bō-ō′tēz ("ox-driver," from Gr. *bous,* an ox), a northern constellation; called also by the Greeks, Arctophylax. Arcturus was placed by the ancients on his breast; by the moderns, on the skirt of his coat. Fable relates that Philomelus, son of Ceres and Jason, having been robbed by his brother, Plutus, invented the plough, yoked two bulls to it, and thus supported himself by cultivating the ground. Ceres, to reward his ingenuity, transferred him, with his cattle, under the name of *Boötes,* to the heavens.

Booth, Agnes (Mrs. JOHN B. SHOEFFEL), American actress: b. Sydney, Australia, 1846. She made her first American appearance in New York in 1865, becoming later Edwin Forrest's leading lady. She has assumed numerous famous roles with success. She has been three times married.

Booth, Ballington, general of the Volunteers of America: b. Brighouse, England, 28 July 1859. He is a son of William Booth (q.v.), founder of the Salvation Army, with which body he was officially connected until 1896, when he seceded and founded the Volun-

teers, a religious body under the form of a military organization, organized in the interest of the unchurched masses.

Booth, Barton, English actor: b. 1681; d. May 1733. He was educated under Dr. Busby, at Westminster School. An early attachment for the drama was fostered by the applause he met with while performing a part in one of Terence's plays at the annual exhibition in that seminary. He ran away from school at the age of 17, and joined Ashbury's company of strolling players, with whom he went to Dublin. After performing three years in the Irish capital with great applause, he returned in 1701 to London, and, engaging with Betterton, met with similar success. On the death of that manager he joined the Drury Lane Company, and on the production of 'Cato' in 1712, raised his reputation as a tragedian to the highest pitch by his performance of the principal character. It was on this occasion that Lord Bolingbroke presented him from the stage box with 50 guineas — an example which was immediately followed by that nobleman's political opponents. Declamation, rather than passion, appears to have been his forte, though Cibber speaks of his Othello as his finest character. He became a patentee and manager of the theatre in 1713, in conjunction with Wilks, Cibber, and Doggett. He was buried in Westminster Abbey, where there is a monument to his memory. He was the author of Dido and Æneas, a mask, various songs, etc., and the translator of several odes of Horace.

Booth, Edwin Thomas, American actor (fourth son of Junius Brutus Booth, q.v.): b. near Belair, Md., 13 Nov. 1833; d. 7 June 1893. When 16 years of age he made his first appearance on the stage, in the part of Tressel, his father acting as Richard III. Two years later he himself successfully assumed the part of Richard in place of his father, who unexpectedly refused to fulfill an evening's engagement. The following year the two went to California, where the son remained for several years, visiting Australia meanwhile. Meeting with little pecuniary success, in 1856 he returned to the Atlantic States, and from that time forward was recognized as a leading member of his profession. He visited England (1861–2), and in 1864 produced 'Hamlet' at New York for 100 nights consecutively. In 1869 he opened a splendid theatre in New York, whose building cost over $1,000,000, but which involved him in pecuniary ruin. He revisited California in 1876, and in the spring of 1877 was able to settle with his creditors, having earned during the season over $600,000. Booth visited Great Britain and Germany in 1880–2, and was everywhere received with enthusiasm. He was founder and first president of the Players' Club, New York.

Booth, James Curtis, American chemist: b. Philadelphia, 28 July 1810; d. West Haverford, Pa., 21 March 1888. He graduated at the University of Pennsylvania in 1829, and in December 1832 went to Germany and entered the private laboratory of Prof. Friedrich Wöhler in Cassel, being, it is thought, the first American student of analytical chemistry to study in Germany. Later he studied in Berlin and made a practical study of applied chemistry in European manufacturing centres. Returning to Philadelphia in 1836 he opened a laboratory for instruction in chemical analysis and applied chemistry. This soon became widely known and attracted students from all parts of the country. In 1836 he was made professor of chemistry applied to the arts in the Franklin Institute; during 1837–8 he had charge of the geological survey of Delaware, and assisted in that of Pennsylvania; in 1849 he was appointed melter and refiner at the United States mint in Philadelphia, an office he held until his resignation, 7 Jan. 1888. His studies of the nickel ores of Pennsylvania led, in 1856, to the adoption of nickel as one of the components of the alloys used in the coinage of the 1857 cent. Publications: 'Annual Report of the Delaware Geological Survey' (1839); 'Memoirs of the Geological Survey of Delaware' (1841); 'Encyclopædia of Chemistry, Practical and Applied' (1850); 'Recent Improvements in the Chemical Arts' (Wash. 1851); and he edited, with notes, a translation of Regnault's 'Elements of Chemistry' (2 vols. Phila. 1853).

Booth, John Wilkes, American actor (son of Junius Brutus Booth, q.v.): b. Hartford County, Md., 1839; d. 1865. He sided with the Confederates in the Civil War, and to avenge the defeat of their cause he formed a conspiracy against the life of President Lincoln. He mortally wounded the President while the latter was attending a performance in Ford's Theatre, Washington, 14 April 1865; in escaping from the building he broke his leg, and concealed himself in Virginia till the 26th, when, on being discovered, and refusing to surrender, he was shot.

Booth, Junius Brutus, English tragedian: b. London, 1 May 1796; d. Dec. 1852. After fulfilling engagements at Deptford, near London, and other places, and even performing at Brussels, in 1814 he made his debut at Covent Garden Theatre, London, as Richard III. His personal resemblance to the crookbacked tyrant conformed exactly to the traditions of the stage, and his personification of the character was in other respects so striking that he competed successfully with Edmund Kean, then just rising into fame. In 1821 he made his first appearance in the United States, at Petersburg, Va., and in New York, at the Park Theatre, in the succeeding year, on both of which occasions he assumed his favorite character of Richard III. From that time until the close of his life he acted repeatedly in every theatre in the United States, and in spite of certain irregular habits, which sometimes interfered with the performance of his engagements, enjoyed a popularity which a less gifted actor would have forfeited. During the latter part of his life he resided with his family at Baltimore, making occasional professional excursions to other cities. He had just returned from a lucrative tour to California when he died. The range of characters which Booth assumed was limited, and was confined almost exclusively to those which he had studied in the beginning of his career. He is most closely identified with that of Richard, in which, after the death of Edmund Kean, he had no rival. Among his other most familiar personations were Iago, Shylock, Hamlet, Sir Giles Overreach, and Sir Edmund Mortimer In his peculiar sphere,— the sudden and nervous expression of concentrated passion,— as also in the more quiet and subtle passages of his

delineations, he exercised a wonderful sway over his audience, and his appearance upon the stage has been known to awe a crowded and tumultuous house into instant silence. His presence and action, notwithstanding his short stature, were imposing, and his face, originally molded after the antique type, was capable of wonderful expression under the influence of excitement. Several of his children inherited a portion of his dramatic talent, and became prominent actors on the American stage.

Booth, Mary Louise, American journalist and author: b. Yaphank, Long Island, N. Y., 19 April 1831; d. New York, 5 March 1889. She was widely known as the editor of 'Harper's Bazaar,' which place she held from 1867 till her death. Her 'History of the City of New York' was the first complete work upon the subject and is still probably the best. It was published in 1859, a second edition in 1867; a third, thoroughly revised, in 1880. No book has been a greater favorite of local collectors. One copy was extended to nine large volumes and enlarged by many thousand illustrations; another, owned by the author, had 2,000 illustrations inserted; and a third was extended to 22 volumes. Miss Booth's translations number over 30 volumes. They are chiefly from the French of About, Victor Cousin, Méry, Gasparin, and Laboulaye. The most pretentious is Henri Martin's 'History of France,' six volumes of which she finished.

Booth, Maud Ballington, a leader of the Volunteers of America: b. near London, 1865. She was active in the work of the Salvation Army in England, and established a corps of the Salvation Army in Switzerland. In 1887 she married Ballington Booth, and in 1896 joined him in seceding from the Salvation Army and organizing the Volunteers of America. She has been active in work for prisoners, both during their imprisonment and after their release. She is author of 'Branded' and 'Look Up and Hope.'

Booth, William, founder of the Salvation Army: b. Nottingham, England, 10 April 1829. He was educated in his native town, and from 1850 to 1861 acted as minister of the Methodist New Connection. From the first he was zealous in holding evangelistic services, but the new departure which led to the creation of the Salvation Army on military lines began in 1865 with mission work among the lower classes in the East End of London. Since 1878 Booth's movement has been known as the Salvation Army, of which he has continued to be the mainspring and controlling power, directing its movements at home and abroad from his headquarters in London. His enthusiasm and wonderful organizing power have given life to the religious military system, of which he is "general." The property of the Salvation Army is held for its exclusive use by Booth. His wife was associated with him in the publication of several hymns and religious works dealing with the movement, till her death in 1890.

Booth-Tucker, Emma Moss, a leader in the Salvation Army: b. Gateshead, Eng., 8 Jan. 1860; d. 1903. She was a daughter of William Booth, the organizer of the "Army"; in 1880–8, she had charge of international training homes; in 1888 she married Commander Booth-Tucker, went with him to India, and in 1896 came to the United States. She held the rank of consul in the Salvation Army, and had joint authority with her husband in the United States.

Booth-Tucker, Frederick St. George de Latour, American evangelist: b. India, 1853. He held important official posts in India, but resigned them in 1881 to join the Salvation Army. Upon his marriage with Emma Moss Booth, daughter of "Gen." William Booth of the Salvation Army, he prefixed Booth to his own name of Tucker. From 1896–1904 he was commander of the Salvation Army in the United States, but resigned to become secretary of all the branches of the Army outside of Great Britain.

Boothby, Guy Newell, English novelist: b. Adelaide, South Australia, 13 Oct. 1867; d. London, England, 27 Feb. 1905. In 1891 he crossed Australia from north to south, and also traveled in the East. His novels include: 'On the Wallaby'; 'A Bid for Fortune'; 'Beautiful White Devil'; 'Dr. Nikola'; 'Fascination of the King'; 'Billy Binks, Hero, and Other Stories'; 'Across the World for a Wife'; 'Pharos, the Egyptian'; 'Love Made Manifest'; 'Dr. Nikola's Experiment'; 'A Sailor's Bride'; 'A Maker of Nations'; 'My Indian Queen'; 'Farewell Nicola' (1901); and 'The Viceroy's Protégé.'

Boothia Felix, a peninsula on the north coast of North America, in which is the most northern part of the continent, Murchison Point, lat. 73° 54′ N. It is joined to the mainland by Boothia Isthmus, is bounded on the north by Bellot Strait, and to the east is separated from Cockburn Island by Boothia Gulf (q.v.) It was discovered by Sir John Ross (1829–33), and named after Sir Felix Booth, who had furnished $85,000 for the expedition. Here, near Cape Adelaide, Ross discovered the magnetic pole, lat. 70° 5′ 17″ N.; lon. 96° 46′ 45″ W.

Boothia, Gulf of, a southward continuation of Prince Regent Inlet in the northern part of Canada, lying between Boothia Felix (q.v.) on the west and Cockburn Island on the east.

Bootle, England, a municipal and county borough in Lancashire, near the mouth of the Mersey, and adjoining Liverpool, the docks of which great seaport extend into the borough, covering 370 acres and constructed at a cost of £2,500,000. The principal buildings are the town hall and municipal buildings, school-board offices, and hospital. Many churches provide for the public worship of the inhabitants. The trade of the town is almost exclusively connected with shipping, timber being the chief import; most of the American steamers have their loading berths here. There are large jute-mills, corn-mills, foundries, etc. Bootle has ample railway facilities and tramway cars. The Leeds and Liverpool Canal passes through it. There is a municipal electrical station. The history of the place is included in that of Liverpool. It was incorporated in 1868. Pop. (1901) 58,558.

Boot'on, or **Bou'ton,** an island of the Malay Archipelago, separated by a narrow strait from the southeast ray of Celebes, and from the island of Muna. Area, 1,700 miles. It is high, but not mountainous, and thickly wooded; produces fine timber, rice, maize, sago, etc. The people are Malays. The sultan, who resides at Bolio, is in allegiance to the Dutch, an under-resident being stationed on the island. Pop. 17,000.

Boots and Saddles, or **Life in Dakota with General Custer,** by Elizabeth B. Custer (1885). The author says that her object in writing this book, which records her experiences in garrison and camp with her husband, was to give civilians a glimpse of the real existence of soldiers in the field. Her married life was not serene; she was left in 1864 in a lonely Virginia farmhouse to finish her honeymoon alone, her husband being summoned to the front; and at scarcely any time during the next 12 years was she free from fear of immediate or threatened peril. Gen. Custer was ordered to Dakota in the spring of 1873. Mrs. Custer's book gives a lively and detailed account of their life there from 1873 to 1876, the time of the general's death. There is an interesting chapter on Gen. Custer's literary habits, and an appendix containing extracts from his letters.

Boots and Shoes. The sandal is the most ancient foot covering of which there is any record. The shoe frequently referred to in the Old Testament, and which played an important part in buying and selling, and in other social usages, was a sandal. The common sandal of the ancient Egyptians consisted of strips of papyrus plaited into a kind of mat, and that form remains the type of sandal of plaited grass or straw worn to this day by multitudes in Central Asia, India, China, and Japan. The sandal was the ordinary shoe of the ancient Greeks. In Greece shoes were used only in exceptional circumstances. Sandals were the everyday wear of the Roman populace; the patricians wore shoes of black leather; red leather shoes were reserved for the senators; and the long buskin, reaching, sometimes, to near the knee, and frequently supplied with a thick sole to add to the apparent stature of its wearer, was appropriated to tragedians and hunters. Boots are said to have been invented by the Carians. They were at first made of leather, afterwards of brass or iron, and were proofs against both cuts and thrusts. It was from this that Homer called the Greeks brazen-booted. The boot only covered half the leg; some say the right boot, which was more advanced than the left, it being advanced in an attack with the sword; but in reality it appears to have been used on either leg, and sometimes on both. Those who fought with darts or other missile weapons advanced the left leg foremost; so that in such cases this only was booted. Boots were much used by the ancients, either for riding on horseback, or walking. The boot was called by the ancient Romans, *ocrea.* The Chinese had a kind of boots made of silk, or fine stuff, lined with cotton, a full inch thick, which they always wore at home. These people are always booted; and when a visit is made to them, if they happen to be without their boots, their guest must wait till they put them on.

The Middle Ages.— Different kinds of half-boots were worn by the Anglo-Saxons and Anglo-Normans; and in the reign of Edward IV., if not earlier, the boot proper, with tops and spurs, was established as an article of knightly dress. In the reign of Charles I., a species of boot, exceedingly wide at the top, made of Spanish leather, came into use; and with Charles II. the highly decorated French boot was introduced as an article of gay courtly attire. Meanwhile the jack-boot had become indispensable in the costume of cavalry soldiers and horsemen generally; and by William III. and his followers it was regularly naturalized in England. This huge species of boot remained in use in British cavalry regiments until comparatively recent times, and, in a somewhat polished and improved form, it is still worn by the Horse Guards. The jack-boot is almost entitled to be called the parent of the top and some other varieties. Boots with tops of a yellow color were commonly worn by gentlemen in the 18th century. Formerly in France, a great foot was much esteemed, and the length of the shoe, in the 14th century, was a mark of distinction. The shoes of a prince were two feet and a half long; those of a baron two feet; those of a knight 18 inches long.

In America.— The introduction of the boot and shoe industry in America is almost coincident with the first settlement of New England, for it is a matter of history that in the year 1629 a shoemaker named Thomas Beard, with a supply of hides, arrived on board the *Mayflower.* The pioneer of the American boot and shoe trade was accredited to the governor of the colony, by the company in London, at a salary of $50 per annum and a grant of 50 acres of land, upon which he should settle. Seven years after the arrival of Beard, the city of Lynn saw the inception of the industry which has given it a world-wide fame, for there, in 1636, Philip Kertland, a native of Buckinghamshire, began the manufacture of shoes, and 15 years later the shoemakers of Lynn were supplying the trade of Boston. As early as 1648, tanning and shoemaking was an industry in the colony of Virginia, and history records that a planter named Matthews employed eight shoemakers upon his own premises. Legal restraint was placed upon the business of the cordwainer in Connecticut in 1656, and in Rhode Island in 1706, while in New York the business of tanning and shoemaking is known to have been firmly established previous to the capitulation of the province to the English, in 1664. In 1698 the industry was carried on profitably in Philadelphia, and in 1721 the colonial legislature of Pennsylvania passed an act regulating the materials and the prices of the boot and shoe industry. During the Revolution most of the shoes worn by the Continental Army, as well as nearly all ready-made shoes, sold throughout the colonies, were produced in Massachusetts, and we find it recorded that "for quality and service they were quite as good as those imported from England." Immediately after the Revolution, in consequence of large importations, the business languished somewhat. It soon recovered, however, and was pursued with such vigor that in 1795 there were in Lynn 200 master workmen and 600 journeymen, who produced in the aggregate 300,000 pairs of ladies' shoes. One manufacturer in seven months of the year 1795 made 20,000 pairs. In 1778 men's shoes were made in Reading, Braintree, and other towns in the Old Colony for the wholesale trade; they were sold to dealers in Boston, Philadelphia, Savannah, and Charleston, a considerable portion being exported to Cuba and other West India islands. About the year 1795 the business was established in Milford and other Worcester county towns, where brogans were made, and sold to the planters in the Southern States for negro wear. The custom at this time was for the manufacturer to make weekly trips to Boston with his horse and wagon, taking his goods

in baskets and barrels, and selling them to the wholesale trade.

Early Methods.— Prior to 1815 most of the shoes were hand-sewed, a few having been copper nailed; the heavier shoes were welted and the lighter ones turned. This method of manufacture was changed, about the year 1815, by the adoption of the wooden shoe peg, which was invented in 1811 and soon came into general use. Up to this time little or no progress had been made in the methods of manufacture. The shoemaker sat on his bench, and with scarcely any tools other than a hammer, knife, and wooden shoulder stick, cut, stitched, hammered, and sewed, until the shoe was completed. Previous to the year 1845, which marked the first successful application of machinery to American shoemaking, this industry was in the strictest sense a hand process, and the young man who chose it for his vocation was apprenticed for seven years, and in that time was taught every detail of the art. He was instructed in the preparation of the insole and outsole, depending almost entirely upon his eye for the proper proportions; taught to prepare pegs and drive them, for the pegged shoe was the most common type of foot-wear in the first half of the 19th century; and familiarizing himself with the making of turned and welt shoes, which have always been considered the highest type of shoemaking, requiring exceptional skill of the artisan in channeling the insole and outsole by hand, rounding the sole, sewing the welt, and stitching the outsole. The change from which has been evolved our present factory system began in the latter part of 1700, when a system of sizes had been drafted, and shoemakers more enterprising than their fellows gathered about them groups of workmen, and took upon themselves the dignity of manufacturers. The entire shoe was then made under one roof, and generally from leather that was tanned on the premises; one workman cut the leather, others sewed the uppers, and still others fastened uppers to soles, each workman handling only one part in the process of manufacture. This division of labor was successful from the very start, and soon the method was adopted of sending out the uppers to be sewed by the women and children at their homes. Small shops were numerous throughout certain parts of Massachusetts, where the shoemaker, with members of his family or sometimes a neighbor, received the uppers and under-stock from the factories near by, bottomed the boots and shoes, and returned them to the factories, where they were finished and sent to the market packed in wooden boxes. Thus the industry developed and prospered and was carried on without any further improvement in methods until the introduction of machinery.

Machinery.— The first machine which proved itself of any practical value was the leather rolling machine, which came into use about 1845, and with which it was said "a man could do in a minute what would require half an hour's hard work with a lapstone and hammer." This was closely followed by the wax-thread sewing machine, which greatly reduced the time required for sewing together the different parts that formed the upper, and the buffing machine, for removing the grain from sole leather. Then came a machine which made pegs very cheaply and with great rapidity, and this in turn was followed by a hand-power machine for driving pegs. In 1855 there was introduced the splitting machine, for reducing sole leather to a uniform thickness. Peg-making and power-pegging machines were soon perfected, and there had appeared a dieing-out machine, which was used for cutting soles, taps, and heels by the use of different size dies. The year 1860 saw the introduction of the McKay sewing machine, which has done more to revolutionize the manufacture of shoes, perhaps, than any other single machine. The shoe to be sewed was placed over a horn and the sewing was done from the channel in the outsole through the sole and insole. The machine made a loop stitch and left a ridge of thread on the inside of the shoe, but it filled the great demand that existed for sewed shoes, and many hundreds of millions of pairs have been made by its use. At the time of the introduction of the McKay machine inventors were busy in other directions, and, as a result, came the introduction of the cable nailing machine, which was provided with a cable of nails, the head of one being joined to the point of another; these the machine cut into separate nails and drove automatically. At about this time was introduced the screw machine which formed a screw from brass wire, forcing it into the leather and cutting it off automatically. This was the prototype of the "rapid standard screw machine," which is a comparative recent invention and is very widely used as a sole fastener at the present time on the heavier class of boots and shoes. Very soon thereafter the attention of the trade was attracted to the invention of a New York mechanic for the sewing of soles. This device was particularly intended for the making of turn shoes, and afterwards became famous as the Goodyear "turn shoe machine." It was many years before this machine became a commercial success, and mention of its progress is made later. Closely following the Goodyear invention came the introduction of the first machine used in connection with heeling — a machine which compressed the heel and pricked holes for the nails — and this was soon followed by a machine which automatically drove the nails, the heel having previously been put into place and held by guides on the machine. Other improvements in heeling machines followed with considerable rapidity, and a machine came into use shortly afterwards which not only nailed the heel but was also provided with a hand trimmer, which the operator swung round the heel immediately after nailing. From these have been evolved the heeling machines in use at the present time. Notable improvements had during this time been made in the Goodyear system, and a machine was made for the sewing of welts which was the foundation of the Goodyear machine now so universally used. This machine sewed from the channel of the insole through upper and welt, uniting all three, and was a machine of the chain-stitch type, which left the loop on the outside of the welt. This machine was closely followed by the introduction of one which stitched the outsole, uniting it to the welt by a stitch made from the channel in the outsole, through outsole and welt. This machine afterwards became famous as the Goodyear "rapid outsole lock-stitch machine." The great demand that existed for shoes of this type made it necessary that accessory machines should be invented, and those which prepared the insole, skived the welt, trimmed the insole,

rounded and channeled the outsole, as well as a machine which automatically rolled or leveled the shoe, and the stitch separating machine were soon produced. These formed the Goodyear welt system which has been the subject of constant improvement up to the present time. Factory-made boots and shoes are now entirely cut out by machinery, the upper are sewn by strong sewing machines, and soles and uppers are fastened together either by (1) sewing, (2) pegging with wooden pegs, (3) riveting with metal pins, or (4) screwing by means of the Standard screw machine. The latter most ingenious apparatus uncoils a reel of screwed brass wire, inserts it into the sole, and cuts off the wire flush with the outsole with remarkable rapidity; and for solidity and durability the work leaves nothing to be desired.

Manufacturing Methods. — The following gives a fair idea of how a pair of shoes is turned out under modern methods in the factory of to-day: First, the cutters are given tickets describing the style of shoe required; the thickness of sole, and whatever other details are necessary. From this ticket the vamp cutter blocks out the vamps and gives them with the ticket to the upper cutter, who shapes the vamps to the pattern and cuts the tops or quarters which accompany them. The trimming cutter then gets out the side linings, stays, facings, or whatever trimmings are needed. The whole is then made into a bundle and sent to the fitting department. Here they are arranged in classes by themselves. Pieces which are too heavy are run through a splitting machine, and the edges are beveled by means of a skiving machine. Next they are pasted together, care being taken to join them at the marks made for that purpose. After being dried they go into the hands of the machine operators. The different parts go to different machines, each of which is adjusted for its particular work. The completed upper next goes to the sole-leather room, in which department machinery also performs the major part of the work. By the use of the cutting machine the sides of leather are reduced into strips corresponding to the length of the sole required. These strips are passed through a powerful rolling machine, which hardens the leather and removes from its surface all irregularities. They are then shaved down to a uniform thickness, also by machinery, and placed under dies which cut them out in proper form. The smaller pieces are died out in the form of lifts or heel pieces, which are joined together to the proper thickness and cemented, after which they are put into presses which give them the greatest amount of solidity. The top lift is not added to the heel until after it has been nailed to the shoe. The remaining sole leather is used for shank pieces, rands, and bottom leveling. For the insole, a lighter grade of leather is used, which, being cut into strips and rolled, is cut by dies to the correct shape, shaved uniformly, and channeled around the under edge for receiving the upper. The counters are died out and skived, by machine, and the welts cut in strips. The uppers and soles are then sent to the bottoming department, where the first operation is that of lasting, the uppers being tacked to the insoles. From the laster they go to the machine operator, where the upper, sole, and welt are firmly sewed together by the machine. The bottom is filled and leveled off and the steel shank inserted. Next, the bottom is coated with cement, and the outsole pressed on it by a machine. Thence it is sent through the rounding machine, which trims it and channels the sole for stitching. From there it goes again to the sewing machine, which stitches through the welt outside of the upper. The next step is that of leveling, then heeling, both of which processes are accomplished by machinery. The heels are nailed on in the rough and afterwards trimmed into shape by a machine operating revolving knives; a breasting machine shaping the front of the heel. Still another machine drives in the brass nails and cuts them off flush with the top pieces. The edging machine is next used, which trims the edges of both sole and heel. The sole bottom is then sandpapered, blacked, and burnished by machinery, after which the shoe is cleaned, treed, and packed.

Factory Centres.— Prior to 1800 little attempt to establish the shoe industry outside eastern Massachusetts was made. Yet it was not to be expected that other enterprising sections would be content always to depend entirely on New England for so important an article of merchandise as shoes. In New York City and other cities of New York State, especially in Rochester, the industry has attained large proportions, and has reached a perfection not excelled anywhere. In Newark, N. J., where the business was early established, are made many of the finest shoes for men's wear. Philadelphia has made the shoe industry a leader among the many manufacturing industries for which she is celebrated. At Cincinnati and St. Louis ladies' shoes are produced in great quantities, and of a style and finish that have won a reputation. Chicago has taken up the business with an energy that has already placed her in the front rank. Throughout the West, including the Pacific Coast, there are many thoroughly equipped, financially successful shoe factories. Notwithstanding the enterprise of other parts of the country, New England still maintains the lead as the home of this industry. Boston is the center from which are sold nearly all the goods made in New England, amounting to about two-thirds of the entire production of the country. The flourishing New England cities and towns of Lynn, Brockton, Haverhill, Marlboro, Milford, Whitman, and Weymouths, and many others, are built up and maintained solely by the boot and shoe and allied interests. The force which this industry has exerted on the community at large becomes apparent.

Convict Labor.—No account of the manufacture of boots and shoes would be complete without reference to the employment of convict labor. The business offers many advantages to the authorities of prisons who are seeking remunerative work for the men and women in their charge. The great number of operations in producing a shoe makes it possible to use all classes of convicts, from the strong to the weak; and as far back as 1850, even before machinery was introduced, it was not an uncommon thing for houses of correction and prisons to produce footwear not only for their own convicts, but to be sold in the market. After the introduction of machinery, and during the demand for cheap shoes, which followed the close of the Civil War, many of the states leased the labor of their convicts to shoe manufacturers. In the year 1870 there were employed in this industry in 26 different States, 6,581 convicts,

while there were only 129,989 employed in the industry in the same States outside the prisons. In the year 1900 there were made by 7,609 convicts, 6,634,960 pairs of shoes, valued at $10,990,-173, and it is probable that the number employed and the annual production are steadily increasing. In States where the system was believed to have a harmful influence on the wages of the workman outside the prisons, the business has been conducted on the States' account, and in some instances, at least, the result has been disastrous.

Export Trade.—Early manufacturers shipped goods to the West Indies, more especially to Cuba, and up to the time of the Civil War the export business was prosecuted with considerable vigor and profit. In 1810, 10 per cent of all the boots and shoes sold in Boston were for export. In the year 1865 shoes to the value of more than $2,000,000 were exported. From that time the trade fell off sharply. This may be accounted for by the great advance in 1866, when values rose at least 50 per cent. Since 1895 interest has been renewed in the export trade. Manufacturers have become convinced that there is nothing in the conditions which will prevent competition with foreign countries. The raw materials are available, and, while many hides and skins are imported, the supply of the domestic product is constantly increasing and leather manufacturers have been able to produce materials for making boots and shoes as advantageously, both in regard to quality and price, as any other country. Styles have been adapted to the wants of such countries as import their footwear. Many of the leading manufacturers are alive to the situation and are endeavoring to secure a greater share of the world's trade. The following tabular statement shows the value of the exports of leather boots and shoes from 1870 to 1901:

YEARS.	VALUES.
1901	$5,526,290
1900	4,276,656
1899	2,711,385
1898	1,816,538
1897	1,708,224
1896	1,436,686
1895	1,010,228
1894	777,354
1893	590,754
1892	914,974
1891	651,343
1890	662,974
1885	598,151
1880	441,069
1875	420,363
1870	419,612

The exports, with the exception of the year 1865, appear to have been unimportant until 1895, when the first decided gain was made, the exports for that year being valued at $1,010,228. Since that date there has been a steady increase until, in 1901, these exports amounted to $5,526,-290. The maximum yearly capacity of the combined factories of the United States, on a basis of 300 working days, is slightly under 400,000,000 pairs, showing that all the factories running at full capacity would require not exceeding seven months to produce all shoes consumed in the United States, and those exported for the year ending 30 June, 1900.

Statistics of Manufacture.— In 1901 a capital of $101,795,233 was invested in the manufacture of boots and shoes. This sum represents the value of the land, buildings, machinery, tools, and implements, but does not include the capital stock of any of the manufacturing corporations of the State. The value of the products was $261,028,580, to produce which involved an outlay of $7,757,749 for salaries of officials, clerks, etc., $59,175,883 for wages, $10,766,402 for miscellaneous expenses, including rent, taxes, etc., and $169,604,054 for materials used, mill supplies, freight, and fuel.

The following table gives the leading statistics of the boot and shoe industry in the United States from 1880 to 1900:

	1900	1890	1880
Number of establishments	1600	2082	1959
Capital	$101,795,233	$95,282,311	$42,994,028
Wage-earners	142,922	133,690	111,152
Total wages	59,175,883	60,667,145	43,001,438
Miscellaneous expenses	10,766,402	9,217,519	
Cost of material used	169,604,054	118,785,831	102,442,442
Value of products	261,028,580	210,649,353	166,050,354

The output of 12 leading manufacturing cities for 1890 and 1900 was as follows:

Cities.	1900		1890	
	Rank.	Value of Product.	Rank.	Value of Product.
Brockton, Mass.	1	$19,844,397	2	$16,171,624
Lynn, Mass.	2	16,830,733	1	20,190,695
Haverhill, Mass.	3	15,231,440	3	16,137,352
Cincinnati, Ohio	4	8,788,424	7	6,024,454
St. Louis, Mo.	5	8,286,156	9	4,250,960
Rochester, N. Y.	6	6,933,111	6	6,489,382
Philadelphia, Pa.	7	5,931,045	5	6,851,834
Brooklyn, N. Y.	8	5,733,432	12	2,489,885
Chicago, Ill.	9	5,723,126	4	7,257,034
Auburn, Me.	10	4,176,826		
Manchester, N. H.	11	4,052,204	23	39,024
Boston, Mass.	12	3,882,655	17	1,508,697

The total quantity of boots and shoes manufactured in 1900 was 219,235,419 pairs, an increase over 1890 of 45,372,479 pairs. This is about the same as the percentage of increase in population for the United States. In 1900 89,123,318 pairs of men's, youth's, and boys' boots and shoes were manufactured, valued at $129,505,235. Women's, misses', and children's shoes were made to the number of 107,415,855 pairs, valued at $112,823,914. Slippers were produced for men, youths, and boys to the number of 4,456,965 pairs, valued at $2,812,213. Another item "slippers, oxfords, and low cuts for women, misses, and children," is represented by 12,655,876 pairs, valued at $10,146,393. In 1900 capital to the amount of $33,667,533 was invested in the manufacture of rubber boots and shoes, with a total product valued at $41,089,819.

FREDERICK D. HULL,
Vice-President 'The Shoe Retailer,' New York and Boston.

Bora, Katharina von, wife of Luther: b. 29 Jan. 1499; d. 20 Dec. 1552. She took the veil very early in the nunnery of Nimptschen, near Grimma; but feeling very unhappy in her situation, applied, with eight other nuns, to Luther, whose fame had reached them. Luther gained over a citizen of Torgau, by the name of

Leonard Koppe, who, in union with some other citizens, undertook to deliver the nine nuns from their convent. This was done the night after Good Friday, 4 April 1523. Luther brought them to Torgau, and from thence to Wittenberg. At the same time, to anticipate the charges of his enemies, he published a letter to Koppe, in which he frankly confessed that he was the author of this enterprise, and had persuaded Koppe to its execution; and he also exhorted the parents and relations of the virgins to admit them again into their houses. Some of them were received by citizens of Wittenberg; others who were not yet too old Luther advised to marry. Among the latter was Katharina, whom Philip Reichenbach, at that time mayor of the city, had taken into his house. Luther proposed to her several of his friends. She declined these proposals, but declared her willingness to bestow her hand on Nicholas von Amsdorf, or on Luther himself. Luther, who in 1524 had laid aside the cowl, was not averse to matrimony, yet appears to have been led to the resolution of marrying by reason rather than by passion. This step gave rise to many disadvantageous rumors, some of them as shameful as they were unfounded. After Luther's death Katharina removed from Wittenberg to Leipsic, where she was compelled to take boarders for her support. She afterward returned to Wittenberg and finally removed to Torgau, where she died. In the Church of Torgau her tombstone is still to be seen, on which is a life-size image of her.

Borac'ic (-ras'-) **Acid,** or **Bo'ric Acid** (from «borax»), a compound of boron with oxygen and hydrogen, having the formula H_3BO_3, and possessing feebly acid properties. It occurs in an impure state in the crater of Vulcano, one of the Lipari islands. It is also found plentifully in Tuscany, where it issues from fissures in the soil, together with sulphurous exhalations, ammonia, and other substances. On account of its having been obtained at Sasso, the acid is called by mineralogists Sassolite. The principal supply of boracic acid is obtained from Tuscany, the exhalations above referred to being passed through water which absorbs the acid. The preparation of boracic acid from these aqueous solutions is an interesting process on account of the natural obstacles which have to be surmounted. The apparently simple operation of concentrating the solution, so as to obtain the acid by crystallization, in reality involves great practical difficulties, because in Tuscany the fuel supply is limited. This drawback has been overcome by utilizing the volcanic heat of the district to concentrate the solution. Around the cracks in the soil (called «fumaroles» or «soffioni»), from which the steam containing the acid issues, and enclosing the small lakes or lagoons in which it condenses, brick tanks are built on different levels, but communicating with each other. These are supplied with cold water, in which the steam is further condensed. When the water in the tanks is sufficiently saturated, it is run off into a deep vessel, where it is allowed to stand until the black mud mechanically suspended in it falls to the bottom, and then the clear fluid is run into a series of shallow evaporating pans of lead. These pans are heated by steam from the soffioni, the steam being made to pass under them by a system of flues. As the evaporation proceeds the fluid becomes richer in boracic acid, and when it attains a certain specific gravity, it is passed into a deep vat, where it is allowed to cool. Boracic acid then crystallizes out. The first crop of crystals is quite impure, but it is improved by re-crystallization, and the second crop as thus obtained is packed in casks and exported. Commercial boracic acid sometimes contains as much as 25 per cent of foreign matter, consisting largely of clay, salts of calcium and magnesium, and sulphates and other salts of the alkalis. About 2,000 tons of crude boracic acid are exported from Tuscany per annum. Boracic acid is also prepared artificially by decomposing a hot solution of borax with sulphuric acid. The boracic acid separates out upon cooling. Boracic acid is a white, glassy substance, slightly soluble in cold water, and considerably more soluble in hot water. It possesses strong antiseptic properties, and is used as a preservative for meat. It is also used for glazing porcelain, and in the manufacture of certain kinds of glass. Boracic acid forms salts called «borates» with various metallic bases, of which borax (q.v.) is the most important. See Boron.

In medicine, boracic acid is used very widely. It is a mild antiseptic, and its solutions are useful for cleansing the eyes, nose, mouth, bladder, etc. It forms with aromatic oils the basis of most mouth washes and nasal sprays. Boracic acid is also very useful in the nursery for keeping nipples free from bacteria, and it is of great service in washing out nursing-bottles, babies' mouths and eyes, and the mother's nipples while nursing. Large doses may prove poisonous.

Bo'racite (from «borax»), a mineral, tetrahedral and isometric in external form, but orthorhombic in molecular structure, and becoming isotropic only when heated to 510° F. It has the composition $6MgO.MgCl_2.8B_2O_3$, and a little iron is also occasionally present, probably as an impurity. It occurs in beds of anhydrite, gypsum, and salt, notably at Stassfurt, Prussia, also in crystals at Lüneberg, Hanover and Westeregeln, Saxony. The mineral has been prepared artifically by melting together 10 parts of boracic acid, 100 of sodium chloride, and 5 of magnesium borate. Boracite is strongly pyroelectric. Its molecular structure has been the subject of much study, on account of its exhibiting double refraction, although the mineral is apparently isometric in crystalline form.

Borage, the small genus, typical of the natural order *Boraginaceæ*, the species of which are most numerous in the Mediterranean region. Common borage (*Borago officinalis*), a coarse growing annual herb frequent in waste places, is about two feet tall with erect stem, rough, hairy leaves, and blue flowers arranged in racemes. Like many other innocuous plants, borage was highly valued medicinally, but is now not so employed. It is occasionally raised as a pot herb or salad plant, its young leaves being palatable. The flowers are still used to make the beverage known as cool tankard, a mixture of wine, lemon, sugar, and water. The plant's chief use, however, is as bee pasturage, its flowers being rich in nectar.

Boras, Sweden, a town in the province of Elfsborg, 36 miles east of Gothenburg. It was founded by Gustavus Adolphus in 1632. There are some cotton and linen manufactures, and also some dyeworks. Pop. (1903) 15,837.

Borassus Palm. See Palmyra Palm.

Bo'rax, a compound of the metal sodium with boracic acid (q.v.). The formula of boracic acid may be written $HBO_2 + H_2O$; and if the hydrogen of the HBO_2 is replaced by sodium, a compound known as sodium borate is formed, which crystallizes as $NaBO_2 + 4H_2O$. Fused borax is this salt deprived of its water of crystallization, and combined with boron trioxide in the form $2NaBO_2 + B_2O_3$, or $Na_2B_4O_7$. Common borax, when crystallizing from aqueous solution, however, contains 10 molecules of water. Other forms of borax are easily obtained, crystallizing with different quantities of water. Borax occurs native, both as a saline efflorescence on the soil, and as monoclinic crystals. Until recent times the principal borax supply of the world was obtained from the salt lakes of Tibet. It was brought to Europe in the crude state, under the name of Tincal. Enormous quantities of borax are now obtained from California and Nevada. Borax Lake, some 80 miles north of San Francisco, was discovered in 1856. It contains borax in solution, and crystals of the mineral also occur in the surrounding mud and marshes. The crystals are occasionally quite large, weighing as much as a pound each. It is also found in large quantities at Borax Lake in San Bernardino County, Cal., and it occurs abundantly as an efflorescence in Death Valley, Inyo County, Cal. Borax is extensively used in the household, and it is used also as an antiseptic and preservative. Like boracic acid, it is employed in glazing porcelain. Its property of dissolving metallic oxides makes it of great value in blowpipe analysis (q.v.) and as a flux in the soldering of metals. In the United States commercial borax is chiefly derived from the colemanite deposits of California.

Borax is of toxicological interest because it is widely used as an antiseptic, a preservative for meats and other foodstuffs, and also as an abortifacient. In large doses there is marked gastro-enteritis, in addition to which there are symptoms of collapse, coldness of the skin, bad pulse, psychical depression, and diminution in the quantity of urine eliminated. Similar symptoms may occur from the use of borax in washing out large abscess cavities. Singultus and general motor paralysis are the symptoms in fatal cases. Borax certainly has atoxic action on the kidneys when taken in large amounts. There is albumen in the urine, casts, pain in urination, and even bloody urine. While the kidneys are markedly affected by large doses it is questionable whether borax, in the small amounts used in food preservation, causes any grave symptoms of kidney irritation, even when taken for a considerable length of time. It may well be that certain individuals have an idiosyncrasy to boron salts, in which case their use would prove detrimental. See Boron.

Borchgrevink, Carsten Egeberg, Norwegian explorer and lecturer: b. Christiania, 1864, his mother being English and his father a Scandinavian. He went to sea at an early age, but returned to go to college. In 1898 he went to Australia, joined the survey department, and scaled Mount Lindsay. In 1894–5 he was in Antarctic waters, a region more fully explored by him in 1897, when he attempted to reach the South Pole without success. In 1899 (17 February) he had, however, reached Robertson Bay. Returning to London in 1900 he reported having reached lat. 78.50 S.; lon. 195.50 E., the farthest point south ever reached by man. Consult his work, 'First on the Antarctic Continent.'

Borda, Jean Charles, French engineer, and afterward a captain in the French marine, famous for his mathematical talents: b. Dax, department of Landes, 4 May 1733; d. 20 Feb. 1799. In 1756 he was chosen a member of the Academy of Sciences, and occupied himself in making experiments on the resistance of fluids, the velocity of motion, and other topics relating to dynamical science. In 1767 he published a dissertation on hydraulic wheels, and afterward one on the construction of hydraulic machinery. In 1771, with Verdun de la Crenne and Pingré, he made a voyage to America, to determine the longitude and latitude of several coasts, isles, and shoals, and to try the utility of several astronomical instruments. In 1774 he visited the Azores, the Cape Verde Islands, and the coast of Africa for the same purpose. In the American war he was very useful to the Count d'Estaing by his knowledge of navigation. Borda was the founder of the schools of naval architecture in France. He invented an instrument, of a very small diameter, which measures angles with the greatest accuracy, and which has been used in measuring the meridian; the reflecting circle, which has made his name immortal; besides an instrument for measuring the inclination of the compass-needle, and many others. On the establishment of the National Institute, he became one of its members, and was occupied with other men of science in framing the new system of weights and measures adopted in France under the republican government. Among the latest of his labors was a series of experiments to discover the length of a pendulum which should vibrate seconds in the latitude of Paris. The principal of his writings are: 'His Voyage' and his 'Tables Trigonométriques Décimales.'

Bordeaux, France, capital of the department of Gironde, is situated on the left bank of the Garonne, about 70 miles from the sea, and 284 southwest of Paris. It is built in a crescent form round a bend of the river, which is lined with fine quays for more than three miles, and is crossed by a magnificent stone bridge of 17 arches, finished in 1821 at a cost of $1,200,000. There is another bridge, a fine iron structure, for the railway from Paris. Bordeaux consists of an old and a new town, the boundary between them being formed by a wide and handsome street which, commencing at the quay near the centre of the crescent, stretches across the city from east to west. The objects chiefly deserving of notice in the old town are the arch called the Porte de Bourgogne at the extremity of the bridge, forming the principal entrance to the town; the cathedral, a fine Gothic edifice built at different periods; St. Michael's Church, with a lofty detached tower, and a superb front of florid Gothic; the Church of St. Croix, a specimen of gorgeous Romanesque; the bourse or exchange, the custom-house, the Hôtel de Ville, once the residence of the archbishops of Bordeaux, and the Palais de Justice. The new town is not so rich in public buildings. The most conspicuous are the library (200,000 volumes), the museum, and the theatre, a Grecian structure, regarded as the handsomest edifice

in Bordeaux. Among the beneficent establishments the first place is due to the grand hospital or infirmary, which occupies the highest site in the town and is admirably arranged. Few cities are so well supplied with extensive and finely planted promenades. Bordeaux is the seat of a court of appeal, of courts of the first instance and of commerce; and has an academy of science, literature, and art; a preparatory school of medicine and pharmacy; a lyceum; a normal school for female teachers; a school of hydrography and navigation; a school of painting and design; a botanic garden, an observatory, various literary and scientific associations and a branch of the Bank of France. There are consuls resident here from all the states of Europe and America. The position of Bordeaux gives it admirable facilities for trade, and enables it to rank next after Marseilles and Havre in respect of the tonnage employed. Large vessels can sail up to the town, which by railway, river, and canal communicates with the Mediterranean, with Spain, and with the manufacturing centres of France. The chief exports are wine and brandy; drugs, dyes, and fruits are also largely exported. Sugar and other colonial produce and wood are the chief imports. Ship-building is the chief branch of industry, and there are also sugar-refineries, woolen and cotton mills, potteries, soap-works, distilleries, etc.

Bordeaux is the Burdigala of the Romans. In the 5th century it was in possession of the Goths, and it was pillaged and burned by the Normans. By the marriage of Eleonor, daughter of the last Duke of Aquitaine, to Louis VII., it fell into the hands of France. But in 1152 the princess was repudiated by her husband, and married to Henry of Anjou, who ascended the throne of England in 1154, as Henry II., and transferred Bordeaux to that crown. After the battle of Poitiers, Edward the Black Prince carried John, king of France, prisoner to Bordeaux, where he resided 11 years. Under Charles VII., in 1451, it was restored again to France. In 1548 the citizens rebelled on account of a tax on salt, and the governor, De Morems, was put to death, for which the constable of Montmorency inflicted a severe punishment on the city. During the revolution it was devastated as the rendezvous of the Girondists, by the Terrorists, almost as completely as Lyons and Marseilles. The oppressiveness of the continental system to the trade of Bordeaux made the inhabitants disaffected to the government of Napoleon, so that they were the first to declare for the house of Bourbon, 12 March 1814. The Roman poet, Ausonius, was a native of Bordeaux. Montaigne and Montesquieu were born in the neighboring country, and the latter lies buried there in the Church of Saint Bernard. Pop. (1903) 268,330.

Bordeaux Mixture. See FUNGICIDES.

Bordeaux Wines. The finer red wines of the country around Bordeaux are the best which France produces. They contain but little alcohol, keep well, and even improve by removal. As the original fermentation is complete, they are, if judiciously managed, less subject to disorder and acidity than the Burgundy wines. None of the very best quality, however, is exported pure; a bottle of the best Château-Margaux, or Haut-Brion, is a rarity hardly to be procured in Bordeaux itself, at the rate of six or seven francs a bottle. For export, the secondary growths of Médoc are mingled with the rough Palus. The red wines of Bordeaux are known in America under the name of claret. They have less aroma and spirit, but more astringency than the Burgundy wines. They are the safest wines for daily use, as they are among the most perfect of the light wines, and do not easily excite intoxication. In this respect they contrast with the Burgundy wines, which have more generous qualities than those of Bordeaux, although these wines have sometimes been accused of producing the gout, but this disparagement is without reason. Persons who habitually drink madeira, port, etc., and indulge in an excess of claret, may indeed be visited in that way; because a transition from the strong, brandied wines to the lighter is always followed by a derangement of the digestive organs.

The principal vineyards are those of Médoc, Graves, Palus, and Vignes Blanches; after these, those of Entre-deux-Mers, Saint Emilion, and the Bourgeais are the most important. The first growth of Médoc are the famous wines of Château-Margaux, Lafitte, and Latour. The Lafitte is characterized by its silky softness on the palate, and a perfume partaking of violet and raspberry. The Latour is fuller, has more aroma but less softness. The Château-Margaux is lighter than the Latour, and delicate like the Lafitte, but has not so high a flavor. Of the second growth, we may mention the Rauran and the Léoville. The average produce of the first growth is 217,000 gallons. The soil of Médoc is a sandy and calcareous loam. The gravelly lands (*les Graves*) to the south and west of Bordeaux produce the Graves. The first growth of the red Graves is the Haut-Brion, which rivals the first growth of Médoc; it has more color and body, but is inferior in aroma and taste. The principal white Graves are Saint Bris and Carbonieux. The best Médoc ought to be kept three or four years before removal; the Graves five or six. The wines of Palus, which is a bed of rich alluvial deposits, are inferior to the preceding; they are stronger and more deeply colored than those of Médoc. Being hard and rough, they are improved by a voyage, and are principally sent to the East Indies and America as *vins de cargaison*, or are mixed with Médoc which is intended for exportation. By the voyage they become more light and delicate, but are not to be compared with the growths of Médoc and the Graves. The best are Queyries and Mont Ferrand. The former are deeply colored, and have much body. Age gives them an agreeable aroma, resembling that of a raspberry.

Among the white Bordeaux wines, besides those already mentioned, the finest growths are **Sauternes, Preignac, Barsac**, and Bommes. Martillac and Saint Médard are of a good quality, and have lightness and body. Dariste, formerly Dulamon, is equal to Saint Bris and Carbonieux. Among other red wines are the Bourgeais, which are of a fine color, and acquire by age lightness and an agreeable almond aroma; of all the Bordelais wines they most resemble the Burgundy wines. The first growths are Debosquet, Château-Rousset, Tajac, and Falfax. The Bourgeais wines were formerly preferred to Médoc. The wines of Saint Emilion have been much esteemed. The Fronsac and Canon are the best. Those of Entredeux-Mers become

agreeable with age. The *vins des Côtes* are good *vins ordinaires;* they are generally *fermes* and hard, and improve by age. The best are those of Bassens and Cenon. Consult Henderson's 'History of Ancient and Modern Wines.'

Borden, Simeon, American inventor and surveyor: b. Fall River, Mass., 29 Jan. 1798; d. 28 Oct. 1856. He instructed himself in mathematics and devised successful surveying instruments. The first American geodetic survey was his work. In 1846 he began the construction of railroads.

Bordentown, N. J., a city on the Delaware River, the Delaware and Raritan Canal, and the Pennsylvania R.R.; 57 miles southwest of New York. It is noted as being a former residence of Joseph Bonaparte (q.v.), brother of Napoleon I., and for many years the house and grounds belonging to the estate possessed much interest for the tourist. The city is the seat of the Bordentown Military Institute, the St. Joseph's Academy for girls (Roman Catholic), and the Bordentown Female College. There are steam forge and iron works, foundry and machine shops, worsted mills, shirt factory, canning factories, a shipyard and other industries. The city was incorporated in 1866. Pop. (1900) 4,110.

Border Ruffians, a name given, after the Kansas-Nebraska Bill of 1854, to the pro-slavery Missourians who acted as the allies of the slave element in Kansas, crossing the boundary to vote, by which means they organized the first government against the *bona-fide* free-labor residents by a vote of nearly double the inhabitants of the Territory. They kept the State in anarchy for three years, terrorizing the inhabitants by murder, arson, the sack of towns, and other outrages. The most graphic comment is the fact that they adopted this term of their enemies and prided themselves on it as an excellent joke. See KANSAS-NEBRASKA BILL.

Border States, before the War, the line of slave States lying next the free States: Delaware, Maryland, Virginia, Kentucky, and Missouri. The term was sometimes improperly made to include North Carolina and Tennessee, probably because their mountain districts held so large a proportion of loyalists; and Arkansas, for no special reason. Their political position was dictated by the facts that: (1) After the prohibition of the slave trade one of their chief industries was breeding slaves for exportation to the cotton, rice, and sugar plantations of the southernmost States. In the Virginia convention of 1832 it was said to be the most profitable in the State. (2) From their position they were the chief sufferers from the escape of fugitive slaves; in 1850 this was estimated at a loss of $3,000,000 a year, and these States were the most insistent advocates of the Fugitive Slave Law and its enforcement; and in 1860 a Missouri senator urged the creation of a Federal police to patrol the border line for this purpose. (3) In case of war they would be the chief battlefield. They therefore furnished the backbone, if not the genesis of every political movement to stop the slavery agitation or conciliate the sections. The strength of the Know-Nothing party of 1856 and the Constitutional Union party of 1860 (Bell-Everett) was almost exclusively in the border States; the Peace Conference of 1861 and the proposed Crittenden Compromise were the work of these States. They tried to prevent the outbreak of hostilities, and when the war began the governor of Kentucky went so far as to attempt making his State a neutral power outside both governments, and forbade either of them occupying it without the consent of the State authorities. Finally, however, they split up according to their natural affinities; the three not border States at all — North Carolina, Tennessee, and Arkansas — seceded, with Virginia; while in Kentucky, Maryland, Delaware, and Missouri, the loyal element, with government help, prevented the State from going out. They never gave up hope through the war, however, of reconciling differences by a convention of all the old States, North and South.

Border War, a name given during the struggle for Kansas to the intermittent civil war in that Territory, about 1854–8, between the free-soil and the slavery parties. It was begun by the attempt of the Missouri slaveholding party ("Border Ruffians," q.v.) to reclaim by violence what the actual settlers had won by colonization; many of the worst atrocities were perpetrated, and all the temporary success of the slavery side won, by bodies of men who were not residents of Kansas at all. This caused up John Brown (q.v.) to move there from northern Ohio with his sons, and fight against them. Of the other partisan leaders on that side, the most notable was James Montgomery, who, however, was a *bona fide* settler. The most efficient leaders among the Missourians, or border ruffians, were James R. Atchison of Missouri and the Federal courts.

Bordighera, Italy, a town on the Mediterranean coast, in the district of San Remo and province of Porto Maurizio, a favorite winter residence for invalids, having been made fashionable by the visits of the members of the English royal family. Few places on the Riviera are better fitted for the accommodation of invalids and tourists. In addition to the usual facilities for the entertainment of strangers, the town has a library, museum, and a theatre. Pop. (1903) about 6,000.

Bordone, Paris, Italian painter of the Venetian school: b. Treviso, 1500; d. 1570. Under Titian he made rapid progress in painting. The execution of many works for his native city and for Venice spread his fame as far as France, whither he was invited by the king. The galleries of Dresden and Vienna possess several of his pieces. His most famous picture is the 'Old Gondolier Presenting a Ring to the Doge'; it is considered one of the masterpieces of the Venetian school. Other examples of his work are: 'Prophecy of the Tiburtine Sibyl,' in Florence; 'Combat of the Gladiators,' in Vienna, and 'The Chess Players,' in Berlin.

Bore, a word probably of Icelandic origin, and used to designate a very remarkable phenomenon which occurs in some rivers in spring-tides. At such times as the tide advances the water is suddenly thrown in as if in a mass, and then pursues its course up the river, and in opposition to the current, presenting a volume of water moving with great rapidity and resistless force, and with a height varying from two or three feet, as in the Severn, Trent, Solway, and Dee, to more than 12 feet in the Brahmapootra, and Tsien-Tangkiang. The last is said

to have a rise of 20 feet, and advances with a loud roar, at the rate of 10 miles an hour. The tide in the Bay of Fundy rises with great rapidity, and is sometimes spoken of as the bore of Fundy. The circumstances in which the bore occurs afford an easy explanation of its cause, and show that it is produced by the disproportion between the volume of the tidal wave and the receiving power of the rivers into which it is thrown.

Bore, the cavity of a steam engine cylinder, pump barrel, pipe, cannon, barrel of a firearm, etc. In mechanics it is expressed in inches of diameter; in cannon formerly in the weight in pounds of solid round shot adapted thereto, but since the introduction of modern rifled ordnance of the breech loading pattern, the bore of cannon is always expressed in inches of diameter or in the equivalent of inches.

Boreas, the north wind, worshipped by the Greeks as a deity; residing in Thrace, and represented with wings, which, as well as his hair and beard, were full of flakes of snow; instead of feet he had the tails of serpents, and with the train of his garment he stirred up clouds of dust. Boreas was the son of Astræus and of Eos. When Apollo and his favorite Hyacinthus were once playing at quoits, he blew the quoit of the former, of whom he was jealous, upon the head of the youth, who was killed by the blow. By Oreithyia, daughter of Erechtheus of Athens, he was father of Cleopatra, Chione, Calaïs, and Zetes. The last two took part in the Argonautic expedition.

Borecole, a pot-herb. See KALE.

Boregat. See ROCK TROUT.

Borelli, Giovanni Alfonso, Italian physician and scientist: b. Naples, 1608; d. Rome, 31 Dec. 1679. After studying medicine he both practised and professed it at various places, but particularly at Pisa and Florence, and distinguished himself as the leader of those who have been called mathematical physicians, from regarding the human body as a kind of hydraulic machine, and then attempting to explain all its motions and functions in accordance with the principles of mathematics. He appears to have possessed very original and inventive powers, and made various discoveries, among which may be mentioned that of an apparatus apparently of the nature of a diving-bell, by which persons could descend into the water, remain in it and move about or rise and sink at pleasure, and of a boat by which two or more persons might row themselves beneath the water in any direction. His works discuss many important subjects in medicine, mathematics, and philosophy; but the great work on which his fame rests, though not published till after his death, is entitled 'De Motu Animalium,' and in so far as it relates to mere animal mechanics is full of interest and instruction; but when he attempts to apply his mathematical principles he falls into egregious blunders, and stumbles at every step.

Borelli's Comet. See COMET.

Borer, Round-headed and Flat-headed, insect enemies of several trees. See APPLE.

Borghese, the name of a patrician family of Sienna, Italy, which has been more or less distinguished since the middle of the 15th century. A jurisconsult, of the name of Marco Antonio Borghese, who was employed by the papal court in the early part of the 16th century, appears to have laid the foundation of its fortunes at Rome. His third son, Camillo, became Pope Paul V. (q.v.), in 1605, and he lavished the honors and riches which his place enabled him to command on his relatives. For a son of his elder brother, named Marco Antonio Borghese, he procured the princedom of Sulmona and a grandeeship in Spain. His brother, Francesco, he made the leader of the troops sent against Venice in 1607, to maintain the papal cause against the opposition of that republic. Scipione Caffarelli, a nephew, he created cardinal. Paolo, the son of Marco Antonio, married Olympia Aldobrandini, the only child of the prince of Rossano, and grandniece of Clement VIII., and thus introduced the wealth of the Aldobrandini into the Borghese family. The son of Paolo, named Giovanni Battista, was the ambassador of Philip V. to the court of Rome, where he died in 1717. His son, Marco Antonio, was viceroy of Naples in 1721, and another of the same name, descended from him, became a noted collector of works of art, with which he adorned his sumptuous villa on the Pincian hill. See BORGHESE, CAMILLO PHILIP.

Borghese, Camillo Philip Louis, formerly Duke of Guastalla, Prince of France, etc.: b. 1775; d. Florence, 10 April 1832. When the French invaded Italy he entered their service, and showed great attachment to the cause of France, in particular to Gen. Bonaparte, whose sister, Marie Pauline (q.v.), he married. In 1804 he became a French prince, and grand cross of the Legion of Honor, and at the breaking out of the war against Austria in 1805, commander of a squadron of the imperial guard. After its termination his wife received the duchy of Guastalla, and he was created Duke of Guastalla. After having served in 1806 in the campaign against the Prussians and Russians, and after having been sent to Warsaw to prepare the Poles for a revolt, the emperor appointed him governor-general of the provinces beyond the Alps. He fixed his court at Turin, and became very popular among the Piedmontese. After the abdication of Napoleon he broke up all connection with the Bonaparte family, and separated from his wife. The prince sold to the French government for the sum of 8,000,000 francs 322 works of art which ornamented the palace of his ancestors, known under the name of the Villa Borghese. Among them were several masterpieces: for example, the 'Borghese Gladiator,' the 'Hermaphrodite,' the 'Silenus,' the 'Dying Seneca,' 'Amor and Psyche.' Bonaparte provided for the payment out of the national domains in Piedmont, which the king of Sardinia confiscated in 1815; at the same time, in consequence of the second invasion of France, the prince received back part of these treasures of art. In 1818 he sold Lucedio, in Savoy, for 3,000,000 livres. In the kingdom of Naples he possessed the principalities Sulmone and Rosano. He was one of the richest Italian princes.

Borghese, Marie Pauline (PRINCESS), sister of Napoleon: b. Ajaccio, 20 Oct. 1780; d. 9 June 1825. When the English occupied Corsica in 1793 she went to Marseilles, where she was on the point of marrying Fréron, a member of the Convention, and son of that critic whom

Voltaire made famous, when another lady laid claim to his hand. The beautiful Pauline was then intended for Gen. Duphot, who was afterward murdered at Rome in December 1797; but she bestowed her hand from choice on Gen. Leclerc, then at Milan, who had been in 1795 chief of the general staff of a division at Marseilles, and had there fallen in love with her. When Leclerc was sent to St. Domingo with the rank of captain-general, Napoleon ordered her to accompany her husband with her son. She embarked in December 1801, at Brest, and was called by the poets of the fleet, the Galatea of the Greeks, the Venus Marina. Her statue, in marble, as Venus, was made by Canova at Rome — a successful image of the goddess of beauty. She was no less courageous than beautiful, for when the negroes under Christophe stormed Cape François, where she resided, and Leclerc, who could no longer resist the assailants, ordered his lady and child to be carried on shipboard, she yielded only to force. After the death of her husband she married at Morfontaine, in 1803, the Prince Camillo Borghese (q.v.). Her son died at Rome soon after. With Napoleon, who loved her tenderly, she had many disputes and as many reconciliations, for she would not always follow the caprices of his policy. Yet even the proud style in which she demanded what her brothers begged made her the more attractive to her brother. Once, however, when she forgot herself toward the empress, whom she never liked, she was obliged to leave the court. She was yet in disgrace at Nice when Napoleon resigned his crown in 1814, upon which occasion she immediately acted as a tender sister. Instead of remaining at her palace in Rome, she set out for Elba to join her brother, and acted the part of mediatrix between him and the other members of his family. When Napoleon landed in France she went to Naples to see her sister Caroline, and afterward returned to Rome. Before the battle of Waterloo she placed all her diamonds, which were of great value, at the disposal of her brother. They were in his carriage, which was taken in that battle, and was shown publicly at London. He intended to have returned them to her. She lived afterward separated from her husband at Rome, where she occupied part of the palace Borghese, and where she possessed, from 1816, the Villa Sciarra. Her house, in which taste and love of the fine arts prevailed, was the centre of the most splendid society at Rome. She often saw her mother, her brothers Lucien and Louis, and her uncle Fesch. When she heard of the sickness of her brother Napoleon, she repeatedly requested permission to go to him at St. Helena. She finally obtained her request, but the news of his death arrived immediately after. At her death she left many legacies, and a donation, the interest of which was to enable two young men of Ajaccio to study medicine and surgery. The rest of her property she left to her brothers, the Count of St. Leu and the Prince of Montfort. Her whole property amounted to about $500,000.

Borghesi, Bartolommeo (Count), Italian numismatist: b. Savignano, 11 July 1781; d. 16 April 1866. His attention was devoted to elucidating, through the study of inscriptions, several obscure points in Roman history; and the books he published secured for him a great reputation among the learned. He completed, after more than 30 years' labor, a full chronological list of the Roman consuls, embracing all the modern discoveries on the subject, with disquisitions on the most important questions connected with Roman antiquities. After his death a complete collection of his writings was ordered by the Emperor Napoleon, but it was not until 1897 that the work was finished.

Borgi, Giovanni, jō-vän'nē bôr-jē, the originator of ragged schools: b. Rome, about 1736; d. about 1802. He was a mason by trade, and after his daily toil was completed, he was in the habit of attending the sick in the hospital of Santo Spirito, spending entire nights in his labor of love, and frequently falling asleep at his work during the day. In his daily walks he had noticed troops of vagrant children in the streets, fast ripening into vice and crime. He took them home to his humble lodgings, and, having clad them with the aid of alms which he collected, he apprenticed them to useful trades. This noble work was observed and admired by others, who freely lent their aid, and in due time a society was formed, which was further developed in 1784. Although Giovanni was himself entirely uneducated, he perceived the advantages of instruction, and caused the children to be taught reading, writing, and arithmetic by one Francesco Cervetti, who afterward left him and founded another refuge for orphans called the «Assumption of the Virgin,» which was consolidated with that of Giovanni in 1812. Pius VI. purchased for the institution the Palazzo Ruggi, and became the society's principal protector. Subsequently the charity was removed to different convents, and finally to the church of St. Anne of the Carpenters.

Borgia, Cesare, chā-zä'rę bôr'jä, Italian ecclesiastic and soldier: b. 1476; d. 12 March 1507. He was the natural son of Rodrigo Borgia, and a Roman lady named Vanozza. His father, who in 1492 became Pope, with the title of Alexander VI., made him a cardinal. When Charles VIII. of France made his entry into Rome, Alexander was obliged to treat with him, and delivered Cesare Borgia into his hands as a hostage, though he escaped a few days after from the camp of the king. In 1497 Alexander bestowed the duchy of Benevento, together with the counties of Terracina and Pontecorvo, on his eldest son, Giovanni, who had already received from the king of Spain the duchy of Gandia. Giovanni died shortly after his investiture, and Cesare has been accused of murdering his brother out of jealousy, but historical proof of this charge is utterly lacking. His father permitted him to abandon his ecclesiastical office and devote himself to the profession of arms, and sent him to France to carry to Louis XII. the bull for divorce and dispensation for marriage which he had long desired to obtain. Louis rewarded Borgia with the duchy of Valentinois, a body-guard of 100 men, and 20,000 livres a year, and promised to aid him in his projects of conquest. In 1499 Cesare married a daughter of King John of Navarre, and accompanied Louis XII. to Italy. He first undertook the conquest of Romagna, expelled the lawful possessors of the land, caused them to be treacherously murdered, and himself, in 1501, to be appointed by his father Duke of Romagna. In the same year he wrested the

principality of Piombino from Jacopo d'Apiano. He also endeavored, though in vain, to make himself Duke of Bologna and Florence. In 1502 he announced that he was about to attack Camerino, and demanded for that purpose soldiers and artillery from Guidobaldo of Montefeltro, Duke of Urbino. Camerino was taken by storm, and Giulio di Barona, the lord of the city, with both his sons, was strangled at the command of Borgia. Meanwhile all the petty princes had united and collected soldiery for their defense; but Cesare Borgia terrified some by means of 3,000 Swiss whom he called to Italy, and gained over others by advantageous offers. Thus he dissolved their alliance, seized their lands, and saw no further obstacle to his being made, by his father, king of Romagna, of the March, and of Umbria, when Alexander VI. died, 17 Aug. 1503. At the same time Cesare Borgia was attacked by a severe disease at a moment when his whole activity and presence of mind were needed. He found means, indeed, to get the treasures of his father into his possession, assembled his troops in Rome, and formed a closer alliance with France; but enemies rose against him on all sides, one of the most bitter of whom was the new Pope, Julius II. Borgia was arrested and carried to Spain, where he remained for two years in prison. He at length made his escape to his brother-in-law, the king of Navarre, went with him to war against Castile, and was killed by a shot before the castle of Viana.

Borgia, Francisco, frän-thēs'kō, or **St. Francis** (Duke of Gandia), Spanish ecclesiastic: b. Janda, Spain, 1510; d. Rome, October 1572. He was eminent as a soldier and statesman, and enjoyed the confidence and friendship of Charles V., who appointed him viceroy of Catalonia. While very young he married a noble Portuguese lady, Eleonora de Castro, by whom he had a large family. He was always very strict in his morality, and exact in his religious duties. After the death of his wife he entered the Society of Jesus, and was ordained priest in the 40th year of his age. At the death of Laynez, in 1565, he was elected General of the society, and remained in office until his death. Several bishoprics, and the dignity of cardinal, were repeatedly pressed upon him, but he refused them all. He was canonized by Clement X. in 1671.

Borgia, Lucrezia, loo-krād'zē-ä, daughter of Pope Alexander VI., and sister of Cesare Borgia (q.v.): b. 1480; d. Ferrara, 24 June 1519. When a mere child she was betrothed to a gentleman of Aragon, but her father, on attaining the popedom, thought the match beneath her, and broke the engagement, marrying her to Giovanni Sforza, lord of Pesaro. After she had lived with him for four years, Alexander dissolved the marriage on the ground of the husband's impotency, and gave her to Alphonso, Duke of Bisceglia, natural son of Alphonso II. of Aragon. Two years after her husband was assassinated in a quarrel with Cesare Borgia. Within the course of a year she married Alphonso d'Este, son of Ercole, Duke of Ferrara. Here she became a liberal patroness of poets, who endeavored to repay her benefactions by lauding her as the pattern of every virtue. The character of Lucrezia Borgia has been the subject of much controversy, but recent historical researches have placed her in a much fairer light and it has been shown beyond dispute, that after her marriage to Alphonso d'Este her life was a model of virtue and beneficence.

Borgia, Rodrigo. See Alexander VI.

Borgia, Stefano, stĕ-fä'nō, Italian ecclesiastic: b. Velletri, 3 Dec. 1731; d. Lyon, 23 Nov. 1804. He was brought up by his uncle, Alexander Borgia, Archbishop of Fermo, and in 1750, on becoming a member of the Etruscan Academy of Cortona, commenced at Velletri to form a museum which has since become one of the richest private collections in existence. In 1759 he was appointed by Benedict XIV. governor of Benevento, and in 1770 he became secretary to the College of Propaganda, which brought him into immediate relation with missionaries to all parts of the world, and enabled him, at comparatively little expense, to enrich his museum with manuscripts, coins, statues, idols, and all the other rarities which each country possessed. In 1789 Pius VI. made him a cardinal, and at the same time appointed him inspector-general of the foundling hospital, into which he introduced extensive reforms. In 1797 the revolutionary spirit which had broken out in France extended itself to Rome, and the Pope, as the best means of counteracting it, gave all his confidence to Borgia and installed him as dictator. The situation was extremely difficult, but he showed himself worthy of the trust, and gained such ascendency over the public mind that tranquillity and good order remained uninterrupted till 1798. By this time the French were at the gates, and the popular party, becoming dominant, established a republic. The Pope was compelled to depart, and Cardinal Borgia, at first arrested, was ordered, on obtaining his liberty, to quit the papal states. After disembarking at Leghorn he repaired to Venice and Padua, and continued regularly to discharge his functions in connection with the Propaganda as if nothing had occurred to interrupt them. He returned to Rome with the new Pope, Pius VII., who treated him with the same confidence as his predecessor. Afterward, when Pius VII. was carried off to France, Borgia was ordered to accompany him, and he accordingly set out, but had only reached Lyons when he was seized with a serious illness, and died. He was the author of several antiquarian and historical works, and deserves honorable mention for his liberal patronage of arts and artists.

Borgne, Lake, Louisiana, a body of water situated in the southeastern part of the State. Though termed a lake, it is strictly the termination of that large arm of the Mexican Gulf known as Pascagoula Sound, being united to that by a pass or strait crossed by a line of small islands and faced on the east by Grand Island. Lake Borgne is also connected with Lake Pontchartrain by the Rigolet Pass. It is about the average depth of Lake Pontchartrain, and approaches within 15 miles of New Orleans. Its greatest extent is in a northeast and southwest direction, in which its length is about 30 miles. Lake Borgne forms a part of the western boundary of the Mississippi Delta.

Borgognone, Jacopo Cortesi, yä-kō-pō kôr-tā-zē bôr-gō-nyō-nē, French painter: b. St. Hippolite, Burgundy, 1621; d. 1676. He

studied painting under his father, but enlisted in the army and remained in it for three years. On his return he resumed his art, and went to Bologna where he attracted the notice of Guido and became an inmate in his house, where he made good use of the valuable opportunities of improvement thus afforded him. After realizing an independence he visited his native place. Returning again to Italy, where he painted with much success, he resolved to become a Jesuit. He was accordingly admitted into the order at Rome in 1655, but he appears to have painted as diligently as ever. He is remarkable for freedom of design, and the vividness with which his pictures bring the subjects which they represent before the mind.

Borgu, bôr-goo′, Africa, a district in the Western Sudan, lying about lat. 10° N., and stretching from the meridian of Greenwich east to the Niger. It is hilly in parts, but much of it is well watered and extremely fertile. Among its numerous productions are rice, grain, indigo, cotton, bananas, and citrons. The inhabitants are Mohammedan. Kiama and Wawa are chief towns.

Bo′ric Acid. See Boracic Acid.

Boring, a species of circular cutting in which a cylindrical portion of a substance is gradually removed. When tubes of metal are to be formed, a cast is, in some cases, made in solid metal, and the whole of the bore is produced by the boring-machine: in others the cast is made hollow at first, and the borer is only used to give uniformity and finish to the inside of the tube. In boring cannon sometimes the tool is made to revolve while the cannon is at rest, and sometimes the cannon is made to revolve while the tool is at rest. By the latter arrangement the bore is said to be formed with more accuracy than by the other method of putting the borer in motion.

In the jewelry and small metal industries, hand drills, which consist of a spindle with steel bits, to which reciprocating rotation is given, are the implements for piercing small holes. The boring of holes in metal plates is effected by means of drills driven by machinery. The drill is inserted in the end of a vertical spindle, which revolves in a fixed frame and is driven by the bevel wheels. The metal to be bored is placed on a table or other support, below the drill; and the up and down motion, or end pressure and off action, of the drill is effected by the hand gear turning the screw; which, being coupled to the top of the spindle, presses it down or raises it, according to the way it is turned. The spindle slides vertically in the collar forming the axis of the bevel wheel, but is carried round with it by means of a pin which projects into a groove.

As applied to the earth and to rocks, boring embraces two classes of operations — boring of shot-holes for blasting, and the sinking of bores in prospecting for minerals and in forming wells for water, brine, and mineral oils. Blast-holes in rocks are made from one to two — sometimes more — inches in diameter, and may pierce to the depth of nine feet. Such holes are most simply made in hard rock by a steel-pointed drill, struck by a hammer, and turned partly round after each blow to make the hole cylindrical. The addition of a little water serves to preserve the temper of the boring tool, and makes the rock more easy to cut. In soft rock, whenever the hole is to be vertical, a jumper is used. This is a weighted drill, which acts merely by its own weight when let fall from about a foot in height. The powdered stone is removed at intervals by a scraper. But in all great engineering undertakings rock-boring machinery now supplants hand work. The machines are principally devised to imitate the percussive action of the hand drill, the boring chisel being worked and rotated by compressed air, and sometimes directly by steam. The compressed-air machines possess the great advantage of aiding in the ventilation of the working — often a most important consideration, seeing the operations are chiefly carried on in confined spaces where large volumes of poisonous gases are evolved from explosions. The earliest practical rock-boring machine was that of Sommeiller, one of the engineers of the Mont Cenis tunnel, at which undertaking the apparatus was first used. Now the forms of percussion machines are very numerous, improvements being directed toward lightness and simplicity of parts, and to the method — automatic or otherwise — of advancing the boring-tool as the work proceeds. Among the best known machines are the Barrow, Burleigh, Darlington, Ferroux, Ingersoll, and McKean rock-borers. Diamond drills working in the manner described below are also used. Brandt's rotatory borer is an apparatus similar in action to the diamond drill, but with a crown of hardened steel in place of cutting diamonds. The tool is pressed against, and rotated by water power. An apparatus similar in principle to the brace and bits of the carpenter is used with advantage in uniform rock, such as slate.

The bores for deep wells of all kinds, and for discovering the mineral contents of a region, come under one category. As a preliminary operation in mining, boring is of the utmost importance for discovering the position, thickness, and dip of mineral strata or lodes, and for ascertaining the nature of the overlying deposits. Bores are made by three classes of implement — (1) boring-rods, (2) rope borers, and (3) diamond drills.

The rod-boring instrument consists of an iron shank having a cross-bar at the top and a hollow screw at the bottom; to this all the successive boring instruments are fastened. A simple chisel is first attached to the screw, and one or two men press upon the cross-bar, and, at the same time, force it round like an auger; while another workman, by means of a lever erected overhead, with a chain descending from it to the cross-bar, gives an up-and-down motion to the instrument. When the chisel becomes clogged, from the accumulation of material which it has loosened, it is exchanged for a cylindrical auger, provided with a valve, which scoops out the separate material; and thus by alternate chopping and scooping the work is carried on. The nature of the strata is determined with considerable facility and certainty by examining the fragments brought up by the auger. As the work advances, successive lengths of rod are screwed on at the upper end. A derrick pole is erected over the bore hole for the purpose of elevating the rods, to permit the change of the tools.

The rope method of boring has been long in use among the Chinese. By it the great loss of time arising from the screwing and unscrewing

of the rods at each elevation of the chisel or auger is saved. The chisel and scooping instrument are fastened to a rope, which is alternately elevated and allowed to descend by the simple force of gravity; the instrument thus forces its way through the ground. In the softer rocks of the newer formations this method has been successfully employed in boring for artesian wells. The rope-boring machinery of Mather and Platt, of Salford, England, in which a flat hempen rope is employed, is in extensive use.

For deep well-sinking, as in the Pennsylvania oil region, where depths of 2,000 feet and more have to be reached, and for mineral prospecting, the diamond drill has of late years largely superseded all other borers. With this apparatus the earth can be pierced at any angle, which is a great advantage in investigating mineral deposits; and, moreover, the drill produces solid and continuous cores of the strata through which it passes, so that a complete section of any bore can be exposed to view. The diamond drill consists of a crown, or cylinder of steel, around one edge of which are fixed a series of black diamonds. These diamonds are so set that they project alternately a little beyond the outside and inside edge of the cylinder. This crown is screwed to lengths of iron tubing as it cuts its way by rotation into the rock, and it makes, as it descends, an annular cutting somewhat larger than the thickness of the continuous tube, which the crown and its shaft form. Thus a core of rock is cut out and held within the tube, and the pieces may be lifted out from time to time as the work proceeds. The detritus resulting from the abrasion of the ring of rock is continuously washed away by a current of water, forced down within the tubing. Diamond drills are made of many sizes, from 1¼ up to 18 inches in diameter. The prototype of the diamond drill was M. Fauvelle's hollow boring-rod with steel crown, described at the British Association meeting in 1846.

Borissoglebsk, bō-rē′sō-glĕpsk, Russia, a town in the government of Tambof, 120 miles south of the town of that name, and capital of the government. From its situation and water communications it is the centre of a very large trade. It is the seat of an annual fair, and has woolen and iron manufactures. Pop. about 25,000.

Borissov, bō-rē′sof, Russia, a town in the government of Minsk, 50 miles northeast of the town of that name, on the left bank of the Berezina. Not far from it took place the disastrous passage of the Berezina by the French in 1812. Pop. about 15,000.

Börjeson, Johan Helenus Laurentius, yō-hän ĕl-ā′nŭs lō-rĕn′shē-ŭs bĕr′yĕ-sŏn, Swedish sculptor: b. Halland, 1835. He studied at Rome and Paris, and in 1879 became professor at the Art Academy of Stockholm. His work includes both portrait-statues and ideal subjects, in which he unites fidelity to nature with love of beauty. Among his works are 'The Bowler'; 'The Fisher Boy of Capri'; 'Youth with a Tortoise'; and the statues of the poet Holberg at Bergen, of the historian Geiger at Upsala, of Axel Oxenstiern at Stockholm, and of King Charles X. Gustavus at Malmö.

Borland, Solon, American senator: b. Virginia; d. Texas, 31 Jan. 1864. He was educated in North Carolina, studied medicine and settled in Little Rock, Ark. During the Mexican war he served as major in Yell's cavalry, and was taken prisoner in January 1847. After his discharge in June 1847 he served as a volunteer aid to Gen. Worth until the end of the campaign. After serving in the United States Senate (1848–53), he was appointed minister to Central America. When returning to the United States after his resignation he was assaulted at San Juan de Nicaragua for interfering to prevent the arrest of a person charged with murder at Puntas Arenas. For this insult the sloop-of-war Cyane bombarded and destroyed the town, under instructions from the United States government, 13 July 1854. During the Civil War he was a brigadier in the Confederate service, and before his State seceded, raised troops and seized Fort Smith, by order of Gov. Rector, 24 April 1861.

Bor'lase, William, English mineralogist and antiquarian: b. Pendeen, Cornwall, 1696; d. 1772. He studied at Oxford, entered orders, and became successively rector of Ludgvan and vicar of St. Just. The richness of Cornwall in mineral products and antiquities gave a direction to his studies, and he began making collections with the view of afterward giving a description of his native county. In 1750 he was elected a Fellow of the Royal Society, to which he had communicated a valuable paper on the spars and crystals of the Cornish mines, and for many years after he continued to write in its 'Transactions.' In 1754 he published his 'Antiquities of Cornwall,' and in 1758 he completed the work by publishing his 'Natural History of Cornwall.' He kept up a correspondence with the most eminent men of his day, and was on intimate terms with Pope, whom he furnished with materials for his grotto at Twickenham. Dr. Borlase's name, formed out of crystals, is still to be seen there.

Bormann, bôr′män, **Edwin,** German poet: b. Leipsic, 14 April 1851. He was educated at the Polytechnic Institute of Dresden, and at Leipsic and Bonn. His first success was won by a series of humorous poems in the Saxon dialect which appeared in the 'Fliegende Blätter.' His other works are in High German; they include 'Seid umschlungen, Millionen,' a book of humorous songs, 'Schelmenlieder'; 'Das Büchlein von der Schwarzen Kunst,' 'Liederhort in Sang und Klang,' and 'Klinginsland, Minnelieder und Spielmannsweisen.'

Bormio, bôr′mē-o (Ger. Worms, voormz), Italy, a town in Lombardy, near the Adda; pop. about 2,000. In its vicinity are the salt baths called Bagni di Bormio. The temperature is 99° 5′. Gen. Dessolles achieved here a victory over the Austrians, 26 March 1799. The beautiful galleries of the road which leads over the Wormser Joch (an Alpine mountain), from Tyrol to Italy, were destroyed by the Italians in 1848.

Born, Bertrand de, bãr-trŏñ dė bôrn, French troubadour and warrior: b. in the Castle of Born, Périgord, 1140; d. about 1209. He dispossessed his brother of his estate, whose part was taken by Richard Cœur de Lion in revenge for De Born's satirical lays. Dante places him in the 'Inferno' on account of his verses intensifying the quarrel between Henry II. and his sons.

Börne, Ludwig, lood'vĭg ber'ne, German political writer: b. Frankfort-on-the-Main, of Jewish parents, 6 May 1786; d. Paris, 12 Feb. 1837. He founded, and for three years conducted, *Die Wage,* a journal devoted to civics, science, and art. Of his numerous satirical sketches, all full of humor and wit, these are perhaps the most brilliant: 'Monograph on the German Postal Snail,' 'The Art of Becoming an Original Author in Three Days,' 'Memorial Address to Jean Paul.' Fierce animosity toward the dynastic policies of Germany permeated whatever he wrote; even his literary and dramatic criticism was biased by this passion. His last completed work, 'Menzel, the French Devourer' ('Franzosenfresser'), is proof that to the last his voice was still for war. His 'Complete Works,' in 12 volumes, were published in 1863.

Bor'neëne. See BORNEOL.

Borneil, Giraud de, zhē-rō dė bôr-nā-ē, a Provençal troubadour of the 12th century: a native of Exideuil, Dordogne. His contemporaries bestowed on him the sobriquet "Master of Troubadours." Some 80 of his songs are extant; among them the charming song of the morning, "Alba."

Bornemann, Wilhelm, vĭl'hĕlm bôr'nemăn, German dialect poet: b. Gardelegen, 1766; d. 1851. He is one of the foremost representatives of modern Low German poetry. His works are 'Low German Poems' (1810), republished in a 10th edition in 1891; 'Pictures of Nature and the Chase' (1829); 'Humorous Hunting Songs.'

Bor'neo (corrupted by the Portuguese from Bruni or Brunei, the name of a state on its northwest coast), one of the islands of the Malay archipelago, and, next to Australia and New Guinea (but not much smaller than the latter), the largest island in the world. On the south it has the Java Sea; on the east the Strait of Macassar and the Sea of Celebes; on the north the Sulu Sea; on the west and northwest the China Sea. Its circumference is about 3,000 miles, its greatest length, 780 miles, and its greatest breadth 690 miles; area, according to recent calculation, 283,358 square miles. Its outline is but slightly indented by bays and inlets; and yet the skeleton of its mountain ranges, now well ascertained by the travels of Dalton, Low, Burns, and Schwaner, show that at not a very remote period it must have presented the same singular configuration with Celebes and Gilolo — that of a group of peninsulas. Starting from the central mountains, the Anga-anga group, and proceeding northeast, we trace a chain, terminating in Kinibaloo (11,000 feet high, the highest peak in Borneo), which forms the backbone of the peninsula. Hardly half of the island is good terra firma, habitable for man. An alluvial marshy band, varying from 30 to 50 miles in width, surrounds the island, the only avenues to the interior being its numerous rivers and streams. The mouths of 23 rivers, all navigable on an average 100 miles for vessels drawing not more than 12 feet of water, can be counted along the northwest coast, between Capes Sampanmanjo and Datoo. Berow and Coti rivers on the east, Banjar, Murong, Kahajan, and Mendawei rivers on the south, and the rivers Pontianak and Sambas on the west are large streams with tides flowing far up, and some of them navigable for 200 miles. Innumerable smaller streams flow from the great water-sheds.

In connection with the river systems there are numerous lakes in Borneo; but of true mountain lakes on a large scale there are probably few. The great lake of Kinabalu, which figured in older accounts, with 100 miles of circumference, is a pure myth, based perhaps on a misunderstood description of the great grass-covered plain of Danao.

Meteorological Conditions, Products, etc.— The climate in the low grounds is humid, hot, and unhealthful for Europeans; but in the higher parts toward the north the temperature is generally moderate, the thermometer at noon varying from 81° to 91° F. During the rainy season, from November to May, heavy storms of wind with loud thunder are experienced on the west coast. The influence of the land and sea breezes passes inland to quite remarkable distances across the level plains and up the river valleys. Vegetation is extremely luxuriant. The forests produce ironwood, bilian, teak, ebony, sandalwood, gutta-percha, dyewoods, benzoin, wax, dragon's-blood, sago, various resins, vegetable oils, and gums. The camphor of Bruneï is the best in Asia. The mohor-tree, well adapted for making native boats, attains a height of 80 feet, and the kaladang, suited for large masts, of 200 feet. Nutmegs, cloves, cinnamon, pepper, betel, ginger, rice, millet, sweet potatoes, yams, cotton in Amuntai, sugar-cane in Sambas and Montrado, indigo, tobacco, coffee in Sambas, pineapples, cocoanuts, etc., are cultivated. The mountains and forests contain many monkeys, among which is the orang-outang. Tapirs, a small kind of tiger, small Malay bears, swine, wild oxen or banteng, and various kinds of deer abound. The elephant is found only in the north and the rhinoceros in the northwest. The few domesticated animals are buffaloes, sheep, goats, dogs, and cats. A few horses are seen in Banjermassin. Among the birds are eagles, vultures, argus pheasants, peacocks, flamingoes, pigeons, parrots, and also the swifts (*Collocalia esculenta*) which construct the edible nests prized by the Chinese for making soup. The rivers, lakes, and lagoons swarm with crocodiles, and many kinds of snakes, frogs, lizards, and leeches. Fish is plentiful, and the coasts are rich in tortoises, pearl mussels, oysters, and trepang. Brilliant butterflies and moths are in great variety. Among the mineral products are coal, gold, and copper, especially in Montrado; antimony, iron, tin, platina, nickel, diamonds and other precious stones, rock crystals, porcelain clay, petroleum, and sulphur. The diamond mines are chiefly in Landak and Pontianak; Sambas produces the greatest quantity of gold; the kingdom of Bruneï, Kuteï, and Banjermassin, the largest amount of coal. The Pengaron coal field, worked by the Dutch government, is one of the most important.

Population.— The population consists of three classes, the Dyaks or Dayaks, who are the aboriginal heathen inhabitants and constitute the great bulk of the population; the Mohammedans or Malays — for this name is extended so as to include all professors of Islam, whether true Malays, Buginese, Javanese, Dyaks, or Arabs; and the Chinese. The Dyaks live chiefly in the interior, and employ themselves

with tillage and the collecting of gutta-percha, resin, gums, rattans, gold dust, and wax. They are divided into numerous tribes. The Malays (taking the name ethnographically) dwell on the coasts, are traders and bold sailors. They are more civilized than the Dyaks, cultivate the grounds around their houses, lay out gardens, keep cattle, and live partly by fishing. The Chinese, chiefly from Canton, have penetrated far into the interior. They engage in trade and mining, are unwearied in their efforts to make money, and then return to their native country. They have always endeavored to live as independent republics (*kong-si*) under chiefs chosen by themselves, and according to Chinese laws. In 1857 the Chinese living in Sarawak rebelled, and were nearly exterminated. The Dutch were also compelled to put them down by force of arms, and have imposed a poll tax. The women of Borneo, except the Dyak, weave cotton fabrics, make earthenware, baskets, and mats of beautiful designs and colors. In the district of Banjermassin are factories of weapons. The principal exports are gold, gold dust, diamonds, coal, rattans, gutta-percha, edible nests, cotton, wax, timber, dye-woods, mats, resins, sandalwood, camphor, etc.; the imports, earthenware, iron, steel, and copper work, piece-goods, yarns, woolen and silk fabrics, medicines, provisions, wines, spirits, rice, sugar, tea, tobacco, opium, trepang, gambir, gunpowder, etc.

Divisions.— Borneo has never formed a political unity, and there is no native designation for the island as a whole. The name Borneo (Burneï or Bruneï) in fact properly applies only to the Malay kingdom on the northwest coast; and Kalamantan or Kalamantin, sometimes quoted as a general appellation, is also of limited purport. Borneo originally included nearly the whole of the northwest of the island. The sultan has absolute authority. In 1847 he undertook not to surrender any of his territory to any other power without the sanction of the British government. The capital, Bruneï, 20 miles from the coast, on the river of the same name, has at the most 20,000 inhabitants; whereas it was credited by Pigafetta (16th century) with 25,000 houses. The total population of the country within its present limits may be stated at 125,000. Its area was reduced by the erection of Sarawak into a practically independent principality by Sir James Brooke (1841–68), and by the establishment of the British North Borneo Company as a recognized governing body. The company's charter, granted in 1881, transferred to them rights originally obtained by an American in 1865. This territory consists partly of a portion of the old kingdom of Bruneï, partly also of districts on the east coast, claimed by the sultan of the Sulu Islands. Against the British occupation of the Sulu territory a protest was made by Spain, which had for some time been gradually incorporating the sultan's possessions. As a matter of fact the British North Borneo Company has been successful in appropriating and developing its territory, which, with an area of 30,709 square miles, and a coast line of 900 miles, is now divided into the East Coast Residency and the provinces of Dent, Keppel, and Alcock, and has its capital at Elopura or Sandakan, the largest settlement, with 5,000 inhabitants. The population of the territory is estimated at 200,000. By far the largest part of the island is ruled directly or indirectly by the Dutch, who have divided it into the residency of the western division of Borneo, and that of the southern and eastern, the former having Pontianak as the seat of government, the latter Banjermassin. Besides a number of smaller dependencies, the western division contains the kingdom of Landak, Tayan, Mampawa, Sukadana, Simpang, Matan, Sekadow, Sintang, Sambas. Among the separate states which go to form the southern and eastern divisions are Kotaringin, Banjermassin, and Martapura. In consequence of a decree of the Sultan of Banjermassin, the district watered by the Great Dyak or Kahayan is preserved for the native tribes, who in 1879 were estimated at 18,000 souls; Chinese, Malays, etc., are forbidden to ascend the river higher than the Kanpore Pilany. The same is the case with the basins of the Kapuas, Mururg, known as the Little Dyak district. The population of the whole of the Dutch portion of the island on 31 Dec. 1881, was 959,491, of whom 799 were Europeans, 31,550 Chinese, 924,731 natives, 2,070 Arabs, and 341 miscellaneous Orientals. In the number of natives are included from 200,000 to 300,000 Malays settled along the coast, who used, formerly, to be counted among the strangers. The island of Labuan, off the coast of Brunei, has belonged to the British since 1846.

The Chinese had commercial dealings with Borneo as early as the 5th century, but they made no settlement for a long time after. The Malay kingdom of Borneo proper dates back to the 13th century. Another Malay settlement of later origin, Sambas, was at first dependent on Johore in the Malay peninsula. Sukadana was founded by Hindu Javanese from the kingdom of Majapahit (see JAVA) and spread its influence on the whole southern part of the west coast. Mampawa was a Buginese settlement, and Pontianak was founded as late as 1771 by a colony of Arabs, Malays, and Buginese. Islam began to be preached by Arabs from Palembang in the 16th century.

The Portuguese effected a settlement in 1690 at Banjermassin; from thence they were, however, soon expelled. The Dutch succeeded in concluding a treaty of commerce with the princes of Banjermassin. They erected a fort and factory in 1643, and a second in 1778 at Pontianak. The British made unsuccessful attempts in 1702 and 1774 to effect a settlement in Borneo, but, during the 19th century they acquired a preponderating influence on the northwest coast.

Bor'neol, or Borneo Camphor, a crystalline organic compound, often used as a substitute for common or laurel camphor. Borneol is obtained from a tree indigenous to Sumatra, Borneo, and Labuan, being deposited in crystals in cracks in the wood. To obtain it the tree is cut down, and the longitudinal fissures are opened, and the camphor removed. Large trees often yield only from 3 to 11 pounds; and owing to the reckless manner in which the trees have been destroyed without the planting of others, the Sumatran forests now contain few that are worth working. Borneol has the chemical formula $C_{10}H_{17}.OH$, and it may be prepared from common camphor by the action of reducing agents. It is not so volatile as common camphor, and is also harder. It is but slightly soluble in water, although it dissolves freely in alcohol and ether. When distilled with phos-

phorous pentoxide, borneol is converted into one or more terpenes, prominent among which is borneo-camphene or borneëne ($C_{10}H_{16}$). Pure borneol sinks in water, while common camphor floats.

Born'holm, a Danish island in the Baltic Sea, nearly surrounded with rocks; situated in lat. 55° 10′ N.; lon. 15° E.; about 24 miles long, and 16 broad; pop. 35,364. It is stony but fertile; yields oats and butter; has excellent pastures; and also mines of coal, marble quarries, and fisheries. The island has long been famous for its rock-crystals.

Bornier, Henri, ŏñ-rē bôr-nē-ā (Vicomte de, vē-kŏñt dė), French dramatist: b. Lunel, 25 Dec. 1825. His plays are notable for splendor of diction. Among them are 'Luther's Wedding' (1845); 'Dante and Beatrice'; 'The Daughter of Roland.' He twice won the prize of the Academy, with the lyrics, 'The Isthmus of Suez' (1861); and 'France in the Extreme East' (1863). He is the author of several successful novels and romances, and is a member of the Academy.

Bor'nite, a native sulphide of copper and iron, containing these metals in various proportions. The mineral crystallizes in the isometric system, and its crystals have the formula $3Cu_2S.Fe_2S_3$. It is reddish brown in color when freshly broken, but speedily takes an iridescent tarnish. Its hardness is 3, and its specific gravity from 4.9 to 5.4. The massive varieties contain from 50 to 70 per cent of copper, and the mineral constitutes a valuable ore of that metal. Bornite occurs abundantly in a copper-mine at Bristol, Conn. Bornite occurs in many western copper mines, as at Butte, Mont., and in Colorado, being at times highly argentiferous. It abounds in Chile, Peru, Mexico, Canada and many other countries.

Bornou', a kingdom of Central Africa, lying between lat. 10° and 15° N., and lon. 12° and 16° 30′ E.; bounded north by Kanem and the desert, east by Lake Chad, south by Mandara, and west by Sudan. From March to July the heat is extreme, the thermometer rising to 107° and rarely falling below 86° F.; during this time scorching winds from the south prevail. As in other tropical countries the seasons are divided into the dry and rainy: the latter continues from March to October, when the air becomes milder and fresher. The country is populous, containing 13 principal towns. These are generally large and well built, with walls 40 feet high, and about 20 feet thick. The houses consist of several courtyards, with apartments for slaves, habitations for the different wives, and several turrets connected by terraces, forming the apartments of the owner. The Bornou people, or Kanuri, have negro features; they are peaceable and industrious, practising agriculture and various mechanical arts. The government is an absolute monarchy, with certain constitutional forms, and the sultan or mai can, it is said, muster a well-equipped army of 25,000 or 30,000 men, partly cavalry, armed with musket, rifle, sabre, etc. Indian corn, cotton, and indigo are the most valuable productions of the soil. Fruits and vegetables are also raised. The domestic animals are asses, camels, horses, dogs, sheep, goats, and oxen. Lions, leopards, hyenas, jackals, elephants, and buffaloes roam the forests. The crocodile and hippopotamus are considered a luxury. The ostrich, pelican, crane, and guinea-fowl abound. Locusts often appear in great clouds, and are eaten by the natives. The capital is Kuka, near the shore of Lake Chad. Bornou belongs to the British sphere of influence. Estimated pop. 5,000,000.

Boro Budor, bō-rō boo-dôr (the "Great Buddha"), the ruin of a temple in Java, near the junction of the Ello and Progo, the most elaborate monument of the Buddhist style of architecture anywhere existing. Javanese chronicles ascribe the building of the temple to the beginning of the 7th century; there are no inscriptions, but it was probably finished between 1400 and 1430. Boro Budor is built on a low hill between four vast volcanoes which supplied the blocks of trachyte of which the edifice is built; its height to the cupola is 118 feet. It is a pyramid of a square form, each side at the base measuring 520 feet, and consists of seven walls, which are built like the steps of a stair, up a hill. Between the walls are narrow terraces running round the building; in each is an arched doorway leading to the next higher terrace. These walls are richly ornamented with statuary. Outside are over 400 niches topped with fantastic domes, and each occupied by a large statue of Buddha. Between each of these are bas-reliefs, including figures of the god seated, and architectural ornaments and carvings of all sorts. Below the niches, on the lower story, is an immense bas-relief running round the whole building, representing scenes from the life of Buddha, and religious subjects. The inner faces of the building are also profusely ornamented with bas-reliefs, representing battles, sea-fights, processions, and chariot races, carried to an extent unrivaled by any other building in the world. Of the large reliefs alone there are over 2,000; and most of them are as vigorously designed as they are carefully executed. Within the upper square terrace are three circular ones, the outer ornamented with 32, the next with 24, and the upper with 16 small bell-shaped shrines (*dagops*), each containing a seated statue of Buddha, which can be seen through the open works of their roofs. The whole is surmounted by a cupola, the principal and probably the most ancient part of the structure. It is now empty, a sunken chamber, 10 feet deep, representing what was, no doubt, a *dagop* intended to contain the precious relic for which this splendid temple was erected. The niches containing the cross-legged figures have been supposed to be a copy, in durable architecture, of the cells of a Buddhist monastery, each occupied by a shaven priest; the cupola is rather to be classified with the topes or stupas of Afghanistan. The structure is thus a compound of a tope with a copy, in durable architecture, of the frail cells of a vihara.

Borodin, bŏ-rō′dēn, **Alexander Porfiryevich,** pôr-fēr-yā′vĭch, Russian composer: b. St. Petersburg, 12 Nov. 1834; d. there, 27 Feb. 1887. He studied medicine and chemistry, and was made professor of chemistry at the Medico-Surgical Academy of St. Petersburg. He was at the same time an excellent musician, one of the chief representatives of the new Russian school. His chief works are two symphonies and 'In Central Asia.' His opera, 'Prince Igor,' which he had not completed at his death

was finished by Rimsky-Korsakoff and Glazounoff, and was brought out in St. Petersburg in November 1890.

Borodino, bŏ-rō-dē'nō, Russia, a village 70 miles west of Moscow; on the Kaluga, an affluent of the Moskwa. It gave name to the great battle fought between the French army under Napoleon and the Russians under Kutusoff, 7 Sept. 1812. The battle of Borodino was one of the most obstinately disputed in history, and the loss on both sides was almost equally great. Out of 257,000 men engaged, between 70,000 and 80,000 were killed and wounded. The Russians retreated on the following day, but in the most perfect order, and therefore claim this battle as a victory; but the French, who name the battle from the Moskwa, have always maintained a similar claim.

Boroglyceride, -glis'- (from "boron" and "glycerine"), an antiseptic substance, soluble in alcohol and in 40 parts of water, and containing about 25 per cent of borate of glycerine ($C_3H_5BO_3$), the remaining 75 per cent consisting of free boracic acid and glycerine in equivalent proportions. Boroglyceride is considered harmless, and is much used in the preservation of fruits and wines, and other articles of food.

Bo'ron (from "borax"), one of the non-metallic elements. In nature it is never found in the uncombined or elementary state, though it occurs abundantly in combination with other elements, especially in regions that are or have been volcanic. The principal compounds of it that are found in nature are borax and boracic acid (qq.v.). It is a constituent of numerous other minerals, but most of these have but little commercial importance. Boron was first obtained in the elementary state about the year 1808, by Gay-Lussac and Thénard in France, and by Sir Humphry Davy in England. Gay-Lussac and Thénard prepared the element by heating boracic acid very strongly until all its water was expelled, and then heating the resulting substance (now known as boric oxid) with metallic potassium. The potassium removed the oxygen from the boric oxid, setting the element boron free. When thus prepared boron is an opaque amorphous powder of a greenish-brown color. It has neither taste nor odor, but it stains the fingers strongly. Owing to its finely divided condition it is apt to take fire spontaneously; but if it is consolidated by pressure it is not affected by the air at common temperatures, though it burns with a reddish light when heated. It is not affected by water save that water will dissolve a slight amount of it when it is freshly prepared. Strong nitric acid will dissolve it in the cold, and hot sulphuric acid attacks it also. It is one of the few substances that will combine directly with nitrogen, which it does when heated in that gas. The atomic weight of boron has not been determined with satisfactory precision, but Clarke gives 10.97 as the best result obtainable from the existing data. The amorphous boron described above is soluble in melted aluminum, from which it crystallizes out on cooling. The crystals so obtained were formerly thought to consist of pure boron, but it has been shown that they always contain a definite amount of aluminum. These crystals may be obtained of such hardness that they will scratch both corundum and the ruby, the diamond being the only substance that exceeds them in this respect. The specific gravity of amorphous boron has not been satisfactorily determined, but it appears to exceed 1.84. The specific gravity of the crystals obtained as described above is said by Miller to be 2.68. The specific heat of boron varies considerably with the temperature. At 250° C. it is .37, and at 1,000° C. it is probably 0.5. Boron is a non-conductor of electricity.

Bororós, bō-rō-rōs', a tribe of South American Indians of the Tupi or Guarani stock, variously reported from a few hundred to a few thousand, living in southwestern Brazil around the headwaters of the Parana and Paraguay, the small remnants of a once powerful race, thinned by old Portuguese slave raids and disease. They live in villages and do some planting, but live mainly by hunting with long bows and bone-tipped arrows. They are exceptionally tall, averaging over five feet eight inches, and athletic, and are reported to practice both polygamy and polyandry, but little is really known of them.

Borough, in England, either an incorporated municipality with an organized government and a charter of special privileges (municipal borough), or a district represented by a member of Parliament (parliamentary borough). The *burh* (hill) was originally a hill-fort; then the settlement around it, with its own court, and head officer called a "port-reeve." Under the Norman dynasty the port-reeves were replaced by royal officers, and the boroughs gradually received special charters and were governed by their leading guilds. As their support came to be needed by the governing factions they were given representation in Parliament; and under the Tudors, especially Mary, small boroughs in great profusion were created expressly to return members in the government interest. This was stopped under Elizabeth. Besides these the older boroughs decayed till they had little or no population, but were allowed to keep their parliamentary power to strengthen the aristocratic and land-owning interest, the proprietors of the sites returning whom they chose: these were called "rotten boroughs," and the chief was "Old Sarum" (that is, Old Salisbury), with not a single inhabitant but two members of Parliament. Others had only one. Those somewhat larger, but still so small as to be at the dictation of some one person or family, were called "pocket boroughs." The Reform Bill of 1832 swept away the worst of these anomalies.

In the United States the term is now restricted to certain incorporated villages below the rank of cities in four States — Connecticut, New Jersey, Minnesota, and Pennsylvania; and is practically synonymous with "town" in most other States, and with "village" in Ohio. At the beginning of colonization the natural idea was to transplant the English borough system to America; but the conditions of settlement and government made it generally inapplicable. In Virginia the term was applied in the sense of "parliamentary borough," to districts made up of hundreds and plantations, having representation in the House of Burgesses, of which in 1619 there were 11; but the municipal borough did not take root there. Lord Baltimore and William Penn were empowered to estal[illegible]h the latter in

their colonies of Maryland and Pennsylvania; but the former did not avail himself of it at all, and the latter very little, nor his heirs after him. After the Revolution, however, the Pennsylvania legislature granted special borough charters freely, and in 1834 passed an act empowering courts of quarter sessions to grant them; in 1851 a general act for their creation and regulation was passed. In New Jersey they were created by special charters as early as the beginning of the 18th century, and in 1818 a general act was passed. In Connecticut they have always been created by the legislature, in special acts. In Minnesota and Pennsylvania the boundaries of the borough are conterminous with the township, forming one of the primary county divisions: in Connecticut and New Jersey the borough is only a village government within a town, which in all cases is a separate body including the borough; the latter being only the thickly settled portion within the range generally of the postal, fire, etc., departments, and governed by a warden and burgesses, corresponding to the mayor and single-chamber council of a city.

A still further extension was given to the term by the New York legislature in 1897, when the city of Greater New York was constituted of five "boroughs" — Manhattan, Brooklyn, Queens, The Bronx, and Richmond.

Borough-English, in law, a mode of descent in some ancient boroughs and manors, in which the owner's youngest son, or his youngest brother (if he has no issue), is the heir. It is evidently a custom of Saxon origin, and is so named to distinguish it from the Norman customs. It still holds in a few places.

Borromean (bŏ-rō-mā'an) **Islands,** four small islands in a bay of Lago Maggiore, north Italy, belonging to the Borromeo family, and named respectively Isola Bella, Isola Madre, Isola dei Pescatori, and L'Isolino. The Isola Madre lies farthest from the shore of the lake. It is laid out in seven terraces, rising one above the other, with charming walks and a mansion on the top. The Isola Bella contains a handsome and extensive palace, with private chapel and picture gallery, the fine gardens adjoining being laid out upon 10 terraces rising above each other. The island was formerly little more than a barren rock and much soil required to be brought from the mainland. The Isola dei Pescatori is mostly occupied by a fishing village. Magnificent views of the surrounding scenery are obtained from these islands.

Borromeo, bŏ-rō-mā'o, **Carlo** (Count), saint and cardinal of the Roman Catholic Church: b. Arona, Italy, 2 Oct. 1538; d. 3 Nov. 1584. He studied law at Pavia; was in 1559 made doctor, and in 1560 was successively appointed by his uncle Pius IV. apostolical prothonotary, referendary, cardinal, and archbishop of Milan. As legate over Romagna, the March of Ancona, and Bologna, he had a great share in the civil government: as protector of Portugal, of the Netherlands, of Switzerland, of the Franciscans, Carmelites, and of the Knights of Malta, he administered several important branches of the spiritual government of the Pope, who created him his grand penitentiary, and did nothing of importance without his advice. The re-opening and the results of the Council of Trent, so advantageous to the papal authority, were chiefly effected by the great influence of Borromeo. He did much for the embellishment of the papal buildings, employing even his own fortune for that purpose, and established many excellent institutions as archbishop of Milan; improved the discipline of the clergy, founded schools, seminaries, an order of secular priests (oblates), libraries, and hospitals, and was indefatigable in doing good. During the pestilence which raged in Milan in 1576 he distinguished himself by his heroic devotion to his flock. As soon as the scourge appeared in the city he hastened from a distant part of his diocese, where he was making a pastoral visitation, and spent all his energies in giving bodily aid and spiritual consolation to the plague-stricken inhabitants. All his virtues, however, could not save him from persecution and calumny: he was even severely attacked by the government, but no charge could be proved against him. Miracles were said to have been wrought at his tomb immediately after his death, and his canonization took place in 1610.

Borromeo, Federigo, fā-dā-rē'gō (Count), cardinal, and archbishop of Milan, nephew of St. Charles: b. Milan, 1564; d. 22 Sept. 1631. He founded the Ambrosian Library at Milan in 1609, and devoted to it most of his fortune. He sent emissaries to several countries to collect manuscripts for it. He added to it a printing establishment, and founded academies, schools, and charitable institutions. When Milan was desolated by a pestilence in 1630, Federigo showed the same heroism as his uncle Carlo had done during that of 1576.

Borromini, Francesco, frän-chĕs-kō bŏr-rō-mē'nē, Italian architect: b. Bissone, 1599; d. (by his own hand) 1667. He studied sculpture in Milan and architecture in Rome under Maderno, architect of St. Peters. After Maderno's death he was a pupil of Bernini, by whom he was employed on various parts of St. Peters. He built the church of San Ivo alla Sapienza, the Oratory and Cloister of San Filippo Neri, the façade of the church of Santa Agnese in the Piazza Navona, and the interior of San Giovanni in Laterano. He was one of the chief representatives of the baroque style. Borromini conceived an unreasoning hatred for his instructor Bernini and determined to surpass him in his art, but maddened by the latter's success he committed suicide.

Borrow, George, English traveler, linguist, and writer on gypsy life: b. East Dereham, Norfolk, 1803; d. Oulton Broad, Suffolk, August 1881. On his father's side he was descended from a Cornish family, and his mother was of French extraction. His father was a recruiting officer who constantly changed his residence, and thus Borrow's early years were passed in various parts of the United Kingdom. He received part of his education in Edinburgh High School, and in 1820 was articled to a Norwich solicitor. It was about this time that he laid the foundation of his linguistic knowledge under the guidance of William Taylor, a friend of Southey. After his father's death he went to London, where he earned his livelihood by literary hackwork; but, soon tiring of this, he set out on a series of journeys through England, France, Germany, Russia, and other countries, acting latterly as agent of the British and Foreign Bible Society and making gypsy life and

customs a special study. During the seven years or so prior to his engagement by the Bible Society he seems to have suffered great privations, but of his movements at that time he has told us nothing. He married in 1840, and settled on a small estate of his wife's at Oulton Broad, in the northeast of Suffolk, where he died. He maintained to the last his strong sympathy for gypsy life, and not only permitted but encouraged the gypsies to encamp on his estate. His best known work is 'The Bible in Spain' (3 vols. 1843); and his other publications include 'Targum: or, Metrical Translations from Thirty Languages and Dialects' (1835) 'The Zincali: or, an Account of the Gypsies in Spain' (1841); 'Lavengro, the Scholar, the Gypsy, the Priest' (1851), a sort of idealized autobiography; 'The Romany Rye,' a sequel to 'Lavengro' (1857); 'Wild Wales, Its People, Language, and Scenery' (1862); and 'Romano Lavo-Lil' (1874), a dictionary of the gyspy language. Borrow was a strong, manly character, delighting in the free, open-air existence of the gypsies whose life he knew so well, and despising heartily all affectation and false gentility. His later works, by their outspokenness, lost him much of the reputation earned by his 'Bible in Spain.' See the 'Life Writings, and Correspondence' by Dr. Knapp (2 vols. 1899).

Borrowing Days, the last three days of March, Old Style; the popular notion being, in Scotland and some parts of England, that they were borrowed by March from April. The fiction is of great antiquity, and probably arose in the observation of a frequent wintry relapse about the end of March.

Borrowstounness' (popularly pronounced and now often written Bo'NESS), a town in Linlithgowshire, Scotland, distant 17 miles west by north of Edinburgh. It is situated on a low peninsula, washed by the Forth, and possesses three principal streets running from west to east, one of them a continuation of the other two. The chief industrial establishments are potteries, iron-foundries, engineering shops, chemical manure works, saw-mills, timber-yards, coal and coke works, distilleries, brick-fields, etc., and in the vicinity are very extensive collieries. A new dock has recently been constructed and the old harbor improved, hydraulic hoists and other appliances being provided. The wall of Antoninus ran through Borrowstounness, and traces of it are still visible. Pop. (1901) 9,100.

Borsip'pa, a very ancient city of Babylonia, the site of which is marked by the ruins Birs Nimrud.

Bort, a rounded, translucent variety of diamond, harder than the distinctly crystallized gem variety. It is of much value as an abrasive.

Bortnyanski, Dmitri Stepanovitch, dmē'trē stĕp-än'ō-vich bort-nyän-skę, Russian composer: b. Glukhov, 1751; d. St. Petersburg, 9 Sept. 1825. He received his education at Moscow and at Venice and other Italian cities, under Galuppi. In 1779 he returned to Russia and was appointed director of the Imperial Chapel, devoting himself to the improvement and training of the choir. His compositions are almost entirely church music, including 35 sacred concertos, a liturgy for three voices, and a collection of psalms. His music, combining the spirit of both the Slavic and the Italian, is thoroughly original and made an epoch in Russian church music.

Bory de Saint Vincent, Jean Baptiste George Marie, zhŏń băp-tēst zhŏrzh mä-rē bō-rē dė săn văń-sŏń, French naturalist: b. 1780; d. 1846. About 1800–2 he visited the Canaries, Mauritius, and other African islands. He afterward served for a time in the army, and conducted scientific expeditions to Greece and to Algiers. Among his chief works are 'Annales des Sciences Physiques' (8 vols. 1819–21); 'Voyage dans les Quatre Principales Iles des Mers d'Afrique' (3 vols. 1804); 'Expedition Scientifique de Morée' (3 vols. 1832); 'L'Homme, Essai Zoologique sur le Genre Humain' (2 vols. 1836).

Borysthenes, bō-rĭs'thĕn-ēs, the ancient name of the Dnieper.

Borz'oi, or **Russian Wolfhound,** a hunting-dog of northern Europe, substantially the same as the ancient long-haired greyhound of the Arabs and Persians, whose coat has been lengthened in adaptation to a cold climate. It is a lithe, active dog, standing 28 inches high at the shoulders, and upward, and weighing from 75 to 100 pounds. Its hair is silky and loose, especially so on the tail, which, contrary to the other greyhound characteristics, is «feathered» longer than is the setter's, which it very much resembles. It has large padded feet. In color the borzois are combinations of black, white, and tan. These dogs are popular, especially as stately attendants upon ladies, and good specimens may be seen at all the principal kennel shows of the country.

Bos, Lambert, Dutch philologist: b. Workum, Friesland, 23 Nov. 1670; d. 6 Jan. 1717. He was instructed by his father in Greek and Latin. Vitringa, the distinguished Oriental scholar, was professor at Franeker, and thither young Bos went to pursue his philological studies. Not long after he was chosen Greek professor in that university. He is best known by his work entitled 'Ellipses Græcæ' (1702), though he was the author of several others, among which may be mentioned an edition of the Septuagint and 'Animadversiones ad Scriptores Græcos.'

Bosa, a seaport on the west coast of Sardinia, province of Cagliari, built partly on the side of a hill crowned by an old castle, and partly in an unhealthy plain. It has a cathedral and other churches, a theological seminary, and is the residence of a bishop, suffragan to the archbishop of Sassari. It is in a wine and oil producing region and carries on coral fishing and tanning. Pop. (1901) 6,846.

Bosanquet, bo-săn-ka, **Bernard,** English philosopher: b. 1848. He was lecturer at University College, Oxford, 1871–81, and from 1881 to 1897 was much engaged in university extension lecturing and charity organization. He has written 'Logic, or Morphology of Knowledge'; 'History of Æsthetic'; 'Knowledge and Reality'; 'Essays and Addresses'; 'Civilization of Christendom'; 'Essentials of Logic'; 'Aspects of the Social Problem'; 'Psychology of Moral Self'; 'Companion to Plato's Republic, for English Readers'; 'Education of the Young in Plato's Republic'; 'Philosophical Theory of the State.'

Bosc, Louis Augustin Guillaume, French naturalist: b. Paris, 29 Jan. 1759; d. there, 10 July 1828. Employed in various public offices until 1793, his political sympathies made him obnoxious to the terrorists, and concealing himself in the forest of Montmorency, he resumed there, under the greatest difficulties, his favorite science of botany, having already previously gained some distinction as a naturalist. On returning to Paris after the fall of Robespierre he was sent in 1796 as French consul to the United States; but, not recognized in this position by the American authorities, he explored the country for scientific purposes. In 1799 he was appointed chief of the administration of prisons, but lost this office on the 18th Brumaire. Applying himself thenceforward to literary labors, he made numerous contributions to natural science. His 'Histoire Naturelle des Coquilles' (5 vols. 2d ed. Paris 1824) and 'Historie des Vers et des Crustacées' (2 vols. 2d ed. Paris 1829), and his studies on the vines of France, are his principal achievements. He was made a member of the Academy of Sciences, of the Central Agricultural Society, and finally, after having been inspector of the gardens at Versailles, he became professor at the Jardin des Plantes at Paris. Roland, under whose administration he had served, and who perished with his wife on the guillotine, made him guardian of their daughter. Bosc published memoirs of the celebrated Madame Roland, and succeeded in obtaining for Mlle. Roland the confiscated property of her unfortunate parents.

Boscan Almogaver, Juan, Spanish poet: b. Barcelona, about 1493; d. near Perpignan, April 1542. His parents, who belonged to the most ancient nobility, gave him a careful education. He followed the court of Charles V. and in 1526 was attached to it for some time in Granada. His noble manners and character gained him the favor of the emperor, and the education of the Duke of Alva was committed to him. After his marriage Boscan lived at Barcelona, occupied in publishing his works, together with those of his deceased friend Garcilaso, in which task he was employed at the time of his death. Boscan first introduced Italian measures into Spanish, and thus became the creator of the Spanish sonnet. He published his poetical works in 1543. His poems are still esteemed, the best edition being that published at Madrid in 1875. Among his works are 'Leandro y Hero' and 'La Allegoria.'

Boscawen, Edward, British admiral: b. Cornwall, England, 19 Aug. 1711; d. near Guildford, Surrey, 10 Jan. 1761. He was a son of Viscount Falmouth. Having entered the navy he distinguished himself at Porto Bello (1740) and Cartagena (1741), where he stormed a battery at the head of a part of his crew. In 1744 he was promoted to the Dreadnought, a 60-gun ship, in which he took the French frigate Medea. Three years afterward he signalized himself under Anson, at the battle of Cape Finisterre. Toward the close of this year he was appointed commander-in-chief by sea and land in the East Indies, and was despatched thither with a squadron. He failed in attempts on Mauritius and Pondicherry, and in 1750 returned to England, where he obtained a seat at the admiralty board. In 1755 he became vice-admiral and sailed for North America, and in an action with a French squadron two ships of the line fell into his hands. It was he who signed the immediate order for the execution of Byng in 1757. In 1758 he was promoted to the rank of admiral of the blue, and in conjunction with Lord Amherst, who commanded the land forces, he was present at the capitulation of Louisburg. The year following, having then the command in the Mediterranean, he pursued the Toulon fleet, under De la Clue, through the Straits of Gibraltar, and coming up with it in Lagos Bay, completely defeated it, burning two ships and taking three. For these services he received the thanks of Parliament and $15,000 a year, with the rank of general of marines, in 1760.

Bosch, Balthazar van den, Dutch painter: b. Antwerp, 1681; d. 1715. The first work which brought him into notice was an equestrian picture of the Duke of Marlborough, executed in concert with Van Bloemen, who painted the horse. He was afterward employed on a number of works, for which he is said to have received as high prices as Teniers or Ostade; and a short time before his death was appointed director of the Academy of Antwerp.

Bosch, Ernst, German painter: b. Crefeld, 1834. He studied under Schex at Wesel and at the academy in Düsseldorf. His works show a pleasing combination of figure, animal, and landscape painting; many of his pictures excel in humor. Among his best paintings are 'The Smuggler'; 'Defense of a Block-house against Indians'; 'Gipsy Gang in the Village'; 'The Rogues' School'; 'Hermann and Dorothea at the Spring.'

Bosch, Hieronymus, Dutch painter and engraver: b. Bois le Duc, Netherlands, about 1462; d. there 1516. His fancy partook of the grotesque, Gothic character of the Middle Ages, and his pictures are ingenious representations of devils, spectres, and the torments of the lost. Some of his works, however, representing scriptural scenes, possess greater dignity. His engravings resemble his paintings, and have become very scarce.

Boschbok, the Dutch form of the English name "bush-buck," given to several South African antelopes, specifically the *Tragelaphius sylvaticus*. It is prized for its venison.

Boschvark, the bush-hog or bush-pig of South Africa (*Chœropotamus* or *Potamochœrus africanus*), one of the swine family, about five feet long, and with very large and strong tusks. The Kaffirs esteem its flesh as a luxury, and its tusks, arranged on a piece of string and tied round the neck, are considered great ornaments.

Boscobel, England, a parish in Shropshire, unimportant in itself, but remarkable historically as the hiding place of Charles II. for some days after the battle of Worcester, 3 Sept. 1651. Boscobel House belonged at the time to a stanch royalist, and as it was judged a convenient place of retreat, Charles at once proceeded in that direction, and hid himself during the day in the thickest part of the wood. After making one attempt to escape from England through Wales, he was compelled to return again to his former hiding-place, and concealed himself among the branches of a pollard oak in Boscobel Wood, where it is related that he could actually

see the men who were in pursuit of him, and hear their voices. The "royal oak" which now stands at Boscobel, is said to have grown from an acorn of this very tree. An account of Charles' adventures after the battle of Worcester was published in 1662, with the title, 'Boscobel, or the Compleat History of his Sacred Majestie's most Miraculous Preservation after the Battle of Worcester.' This history is said to have been the work of Thomas Blount.

Boscovich, Roger Joseph, Italian astronomer and physicist: b. Ragusa, Dalmatia, 18 May 1711; d. Milan, 12 Feb. 1787. He was educated among the Jesuits, and entering into their order, was appointed professor of mathematics in the Roman College, before he had entirely completed the course of his studies. He was employed by Pope Benedict XIV. in various undertakings, and in 1750 began the measurement of a degree of the meridian in the Ecclesiastical States, which operation occupied him for two years. He afterward visited the Pontine Marshes, to give advice respecting the draining of them. He was then intrusted by the Republic of Lucca with the defense of its interests, in a dispute about boundaries with the government of Tuscany. This affair obliged him to go to Vienna, and having terminated it with success, he visited Paris and London. He was elected a Fellow of the Royal Society, and dedicated to this body a Latin poem on eclipses. Returning to Italy, he was appointed mathematical professor in the University of Pavia; whence, in 1770, he removed to Milan, and there erected the celebrated observatory at the College of Brera. On the suppression of the order of Jesuits, he accepted an invitation to France from Louis XV., who gave him a pension of 8,000 livres, with the office of director of optics for the navy. This appointment induced him to pay particular attention to that part of optical science which treats of the theory of achromatic telescopes, on which subject he wrote a treatise of considerable extent. He was obliged to leave Paris in 1783, on account of ill health, when he retired to Milan. He was one of the first among continental philosophers to adopt the Newtonian theories. An edition of the works of Father Boscovich was published by himself at Bassano, in 5 volumes, 4to, 1785. His 'Theoria Philosophiæ Naturalis reducta ad Unicam Legem Virium in Natura Existentium,' first published in 1758, is a curious production containing speculations of which Dr. Priestley availed himself in his writings in favor of materialism. He wrote also 'De Maculis Solaribus.'

Bosio, Angiolina, Italian opera singer: b. Turin, 22 Aug. 1829; d. St. Petersburg, 12 April 1859. At an early age she showed so decided a taste for music, that her parents were induced to place her under the instruction of Cattaneo, at Milan. The best evidence of her progress and talent for singing, was her début in her 15th year at Milan, in Verdi's 'Due Foscari,' with decided success. Thenceforth a series of triumphs awaited her.

Bosio, François Joseph (Baron), French sculptor: b. Monaco, 19 March 1769; d. Paris, 29 July 1845. He was much employed by Napoleon I., for whom he executed busts of Josephine and Hortense, and by the successive Bourbon and Orleans dynasties. His works are well known in France and Italy.

Bosna-Seraï, or **Serajevo** (ancient Tiberiopolis), formerly capital of the province of Bosnia, now of the Austro-Hungarian district of Serajevo, situated on the Miliatzka, which is here crossed by a handsome stone bridge, 122 miles southwest of Belgrade, and 570 miles west-northwest of Constantinople. The town was founded about 1263. It is well built, and although most of the houses are of wood, has a gay and pleasant appearance from the number of towers and minarets with which it is embellished. Many improvements have been introduced since the Austrian occupation. It contains a *serai* or palace, built by Mohammed II., to which the city owes its name; many mosques, great and small; churches, monasteries, two large bazaars, schools, baths, and charitable institutions. It was formerly surrounded with walls, but these are now completely decayed; and its only remaining defense is a citadel, built on a rocky height at a short distance east from the town, mounted with cannon. Serajevo is the chief mart in the province, the centre of commercial relations between Turkey, Austria, and South Germany; and has, in consequence, a considerable trade. It has manufactures of arms and utensils of copper; ironware, woolen and worsted stuffs, morocco leather, cottons, etc. There are also several tanneries in the city, and at a short distance from it several important iron mines; and on a plain which stretches to the west the baths of Serajevesko. Pop. 26,286.

Bosnia (properly Bosna), the extreme northwestern province or eyalet of European Turkey, comprising Bosnia proper, Herzegovina, and parts of Turkish Croatia and Dalmatia, bounded north by the river Save, west by Dalmatia and the Adriatic, east by Servia, and south by Albania and Montenegro. By the terms of the Treaty of Berlin (1878), it was occupied by Austrian troops, to be administered for an undefined future period by the Austrian government. It comprehends, besides the ancient Bosnia, part of Croatia, a tract of Dalmatia, and Herzegovina, and contains from 23,000 to 24,000 square miles (of which Bosnia proper occupies 16,200). The inhabitants are mostly of Slavonian origin, and comprise Bosniaks, Servians, Morlaks, and Croats, besides Turks, Greeks, Jews, Gypsies, etc. The Bosniaks are the most numerous. They are partly Mohammedans, partly Roman and Greek Catholics. The Servians and Croats are next in point of number. The country is level toward the north; in the south mountainous and woody. Its chief rivers are the Save, the Verbas, the Bosna, Rama, and Drina. Bosnia contains fertile fields, orchards, and vineyards; the breed of cattle is excellent, and the mountains furnish good iron, of which a great part is manufactured in the country into guns and blades. The other articles manufactured are leather, morocco, and coarse woolen cloths. In the 12th and 13th centuries Bosnia belonged to Hungary. In 1339 it fell into the hands of Stephen, king of Servia. After his death it remained independent, and the Ban Twartko took the title of king in 1370. In 1401 it became tributary to the Turks, and since 1463 has been a Turkish province. It is divided into the southern and northern parts, or Upper and Lower Bosnia. The former is commonly called Herzegovina (q.v.). The capital of Bosnia is

Bosna-Seraï (q.v.); Zvornik, Banyaluka, Mostar, and Travnik are also important places. The Bosniaks are boorish in their manners and uncourteous toward strangers, but industrious and temperate. The women, like the men, are well and strongly made, and mostly good-looking. The Bosniaks are fond of hunting and fishing, and engage to some extent in agriculture and cattle-raising. Servian is the language generally spoken. Bosnia has often attempted to throw off the Turkish yoke, and after the Russo-Turkish war of 1877–8, which was led up to by an insurrection in Herzegovina and Bosnia, the provinces were with the consent of the great powers occupied by Austria. Pop. including Herzegovina (1895) 1,591,036.

Bosporus, or **Bosphorus** (that is, «Oxford»), the strait, 18 miles long, joining the Black Sea with the Sea of Marmora, called also the Strait of Constantinople. It is defended by a series of strong forts, and by agreement of the European powers no ship of war belonging to any nation shall pass the strait without the permission of Turkey. The shores of the Bosporus are elevated and the scenery picturesque. Over this channel (about 3,033 feet wide) Darius constructed a bridge of boats, on his expedition against the Scythians. The Cimmerian Bosporus was the name given by the ancients to the strait that leads from the Black Sea into the Sea of Azov, now the strait of Kaffa or Yenikale, the other Bosporus being distinguished as the Thracian Bosporus. There was anciently a Greek kingdom of the name of Bosporus, so called from the Cimmerian Bosporus, on both sides of which it was situated. The capital of this kingdom was Panticapæum (represented by the modern Kertch), in the Tauric Chersonese, the ancient name of the Crimea. This kingdom was founded about 480 B.C. Spartacus was among the first kings. Under a successor, Satyrus, the kingdom was extended to the coast of Asia, and his son Leucon farther extended it. He improved the commerce of the country (in particular by the exportation of corn to Athens, also of fish, fur, skins, bees'-wax, and slaves). From him his descendants were called Leuconidæ. Leucanor became tributary to the Scythians 290 B.C., and the tribute was finally so oppressive that Parisades, the last of the Leuconidæ, preferred to submit to Mithridates king of Pontus, who vanquished the Scythians under Scilurus 116 B. C., and made his son king of Bosporus. At the death of Mithridates the Romans gave the country, 64 B.C., to his second son, Pharnaces, who was afterward murdered. The Romans placed different princes successively upon the throne, who all pretended to be descendants of Mithridates. When this family became extinct, 259 A.D., the Sarmatians took possession of the kingdom, from whom it was taken by the Chersonesians in 344. The Tauric Chersonese then belonged to the Eastern Empire, till it was seized by the Chazars, and afterward by the Tartars, under the Mongol princes.

Bosquet, bos-kā, **Pierre François,** French soldier: b. Mont de Marsen, France, 8 Nov. 1810; d. Toulouse, 5 Feb. 1861. In 1829 he entered the Polytechnic School, and, in 1833, became a sub-lieutenant in the artillery. In 1835, he went with his regiment to Algeria, where he began to distinguish himself. Between 1836 and 1848 he had passed through the successive ranks of captain, chef-de-bataillon, lieutenant-colonel, and colonel, when, in that year, he was appointed by the Republican government general of brigade. In 1854 the Emperor Napoleon III. raised him to the rank of general of division, and enrolled him in the staff of the army of Marshal St. Arnaud. He was with the French army in the Crimea, where he greatly distinguished himself, and was wounded in the assault on the Malakoff Tower at the siege of Sebastopol. In 1856, he was made a marshal of France, and a senator. In 1859, he was appointed to a command in the war against Austria.

Boss, Lewis, American astronomer: b. Providence, R. I., 26 Oct. 1846. He was graduated at Dartmouth College, in 1870; astronomer of the Northern Boundary Survey for the determination of the line between the western part of the United States and British America; and, since the completion of that work, director of the Dudley Observatory, Albany, N. Y. He was chief of the United States party sent to Chile in 1882 to observe the transit of Venus; was elected a member of the National Academy of Science, in 1889, and an honorary foreign associate of the Royal Astronomical Society, in 1890. He is best known for his work upon star declinations, undertaken in connection with his work on the boundary survey, which is the most complete investigation of the kind ever executed, and for his 'Catalogue of 8,241 Stars' — which was a part of the 'Co-operative Catalogue' prepared by leading astronomers of Europe.

Boss, a master or overseer, a term often applied to the superintendent of a gang of workmen. In American politics, the term came into use, after the exposure of the Tweed Ring, to designate the leader of a political organization who retains his power by unscrupulous methods and the use of public offices as rewards for his supporters.

Boss, in Gothic architecture the protuberance in a vaulted ceiling formed by the junction of the ends of several ribs, and serving to bind them together; usually elaborately carved and ornamented.

Bosse, bŏs, **Abraham,** French engraver and etcher; b. Tours, 1605(?); d. there, 1678. He lived most of his life in Paris and was professor in the Royal Academy of Painting there. He prepared about 800 plates representing festivals and various scenes in the life of the people. He wrote also 'Traité des Manières de Graver en Taille Douce sur l'Airain par l'Eau Forte et les Vernis Durs et Mols.'

Bosse, bŏs-sė, **Robert,** German statesman: b. Quedlinburg, 1832. He studied law at Heidelberg, Halle, and Berlin, held different offices in Prussia, and in 1876 he entered the Prussian ministry. In October 1889 he became under-secretary of state in the imperial Department of the Interior, and in this capacity had an important part in framing the laws for the insurance of workingmen, and in defending them in the Reichstag. In 1891 he became secretary in the Department of Justice, and was president of the commission to frame the new Civil Code. In 1892 he again entered the Prussian ministry as minister of education. He was

editor of the 'Monatsschrifte für Deutsche Beamte'; and he wrote 'Commentary on the Laws of 1889 for the Insurance of Invalids and the Aged'; 'An Official Journey to the Orient' (1900) and several articles in sociological and legal periodicals.

Bossi, Enrico Marco, ĕn-rē'ko mär-kō bŏs-sē, Italian composer: b. Salò, 1861. He was educated at the Milan Conservatory, was organist in the Como cathedral and instructor in organ-playing at the Naples Conservatory. His musical compositions include an organ concerto, 'Il Cieco,' an opera, and 'Canticum Canticorum,' a sacred cantata. He has written (with Tebaldini) 'Method of Study for the Modern Organ.'

Bossi, Giuseppe Carlo Aurelio, Italian politician and poet: b. Turin, 15 Nov. 1758; d. Paris, 20 Jan. 1823. When only 18 years old he made a successful début as a dramatist. In 1792 he was sent on a diplomatic mission to Berlin, and a few months later to St. Petersburg. In 1796 King Charles Emanuel IV. appointed him his agent near Gen. Bonaparte. He acted a somewhat conspicuous part in the various changes imposed upon the Sardinian states by the directory and the consular government of France; and finally was, with Carlo Giulio and Carlo Botta, a member of the triumvirate which governed Piedmont previous to its annexation in 1802. Some two years later he entered the French civil service, and was appointed prefect of Ain. In 1810 he was made a baron of the empire, and promoted to the prefecture of Manche, which post he kept on the first restoration; but having, in March 1815, adhered to Napoleon, he was dismissed on the second return of the Bourbons. He wrote some lyrical poems, and also 'L'Indipendenza Americana,' 'La Olanda pacificata,' in two cantos, and 'Oromasia,' in 12 cantos, giving a description of the principal events in the French revolution.

Bossuet, Jacques Bénigne, Bishop of Meaux: b. Dijon, 27 Sept. 1627; d. 16 April 1704. While attending the Jesuit College at Dijon he got possession of a Latin Bible, which made an indelible impression upon him. At the age of 15 he was sent to Paris, where he entered the College of Navarre, the president of which, Nicholas Cornet, took pleasure in forming his mind. Bossuet, under the direction of this worthy teacher, studied Greek and the Holy Scriptures, read the ancient classics, and investigated the Cartesian philosophy. He was made Doctor of the Sorbonne and canon in Metz. Here he edified his hearers by his preaching and example; was commissioned by his bishop to refute the catechism of the Protestant minister Paul Ferry, and did it in such a way that even his antagonists were obliged to respect him. The queen-mother (Anne of Austria) was induced, by this work, to employ Bossuet in the conversion of the Protestants in the diocese of Metz. This business often called him to Paris, where his sermons met with great approbation. The sermon which he delivered in 1668, on the occasion of Marshal Turenne's joining the Roman Church, procured him the bishopric of Condom. In 1670 the king charged him with the education of the dauphin. In consequence of this appointment he resigned his bishopric in 1671, because he thought it inconsistent with his duty to retain it during a continual absence from his diocese. At this time he delivered his sermon at the funeral of Madame the Duchess of Orleans — a princess who, in the midst of a brilliant court, of which she was the ornament, died suddenly in the bloom of youth. His last sermon of this kind (that at the tomb of the great Condé) is considered as a masterpiece. The manly vigor which characterized his orations is seen also in the 'Discours sur l'Histoire Universelle,' designed for the instruction of his royal pupil. The care which he took of the education of this prince was rewarded in 1680 by the office of the first almoner of the dauphin; in 1681 by the bishopric of Meaux; in 1697 he obtained the dignity of a councilor of state, and a year afterward that of the first almoner of the Duchess of Burgundy. His practice and his doctrine were equally severe. All his time was divided between his studies and the execution of his official duties; he seldom allowed himself any recreation. The learned Benedictines of the Brotherhood of St. Maur published a complete edition of the works of Bossuet in 43 volumes 8vo (Versailles 1815–19). Bossuet was unrivaled as a pulpit orator, and greatly distinguished for his strength and acumen as a controversialist. Among the most celebrated of his works are his 'Oraisons Funèbres'; 'Histoire des Variations des Eglises Protestantes'; 'Politique tirée des propres Paroles de l'Ecriture Sainte.' The French Academy consider him among their most renowned members. He has described his own life at length. For his dispute with the archbishop of Cambrai, Fénélon, see FÉNÉLON and QUIETISM.

Bossut, Charles, French mathematician: b. Tartaras, in the department of the Rhône, 11 Aug. 1730; d. 14 Jan. 1814. He was educated at the Jesuit College, Lyons, and having met with the 'Eloges of Fontenelle,' was smitten with so eager a desire to imitate the distinguished individuals therein described, that he wrote to Fontenelle himself on the subject. That veteran, now 90 years of age, not only answered the letter, but expressed such an interest in the future progress of his young correspondent, that Bossut repaired to Paris, and was introduced by Fontenelle to Clairaut and D'Alembert, the latter of whom he appears to have particularly admired and studied to imitate. In 1752 he was appointed professor of mathematics to the school of Mézières, and held that office for 16 years, during which he gained several prizes offered by the Academy of Sciences. He was afterward admitted a member of that body, and was at the same time appointed examiner of candidates for the artillery and engineers. At the Revolution he was deprived of all his appointments, and afterward lived in retirement till his death. His most important works are a 'Course of Mathematics,' which was long in repute as a textbook; a 'Treatise on Hydrodynamics'; the 'Introductory Discourse to Mathematics,' and various other articles in the Encyclopédie; and a 'History of Mathematics.' He also edited the works of Pascal.

Bostanji, a class of men in Turkey, numbering about 600, originally the Sultan's gardeners, but now also employed in several ways about his person, as mounting guard at the seraglio, rowing his barge, etc., and likewise in attending the officers of the royal household.

Boston, England, a municipal and parliamentary borough and port of Lincolnshire, situated on the river Witham, about five miles from the sea, 32 southeast from Lincoln. It derived its name (a corruption of Botolph's town) from St. Botolph, who founded a monastery here about the year 650. Its chief interest for Americans lies in the fact that it was the English home of the most influential of the settlers of Boston, Mass. The port had formerly a flourishing trade, but owing to various causes, and especially the fact that in dry seasons the river became choked up with sand brought in by the tides, this trade greatly declined. In 1881 a new channel was constructed so as to bring the town within three miles of the sea by navigable water; and a new dock of seven acres area, capable of admitting vessels of 3,500 tons at the highest tides, was opened three years later. Boston contains some fine buildings, notably the parish church of St. Botolph, the Cotton chapel, and various other places of worship, a grammar-school dating from 1554, the Athenæum, the Guildhall, and the Assembly rooms, under which are arranged the butter-market, poultry-market, and the police-station. St. Botolph's Church is a very large and handsome Gothic structure, with a tower, known as Boston Stump, 282 feet high, containing a carillon of 36 bells cast at Louvain. In the upper part of the tower, octagonal in shape, lights used to be suspended for the guidance of mariners at sea and travelers crossing the fens by night. The town is now well supplied with water brought from a reservoir distant about 14 miles. The leading industries comprise iron and brass foundries, the manufacture of farm implements, sails, ropes, and bricks, and tanning, brewing, and malting. Fishing also gives occupation to many of the inhabitants, and there is steam communication with Hamburg, Hull, and London. Pop. (1901) 15,711.

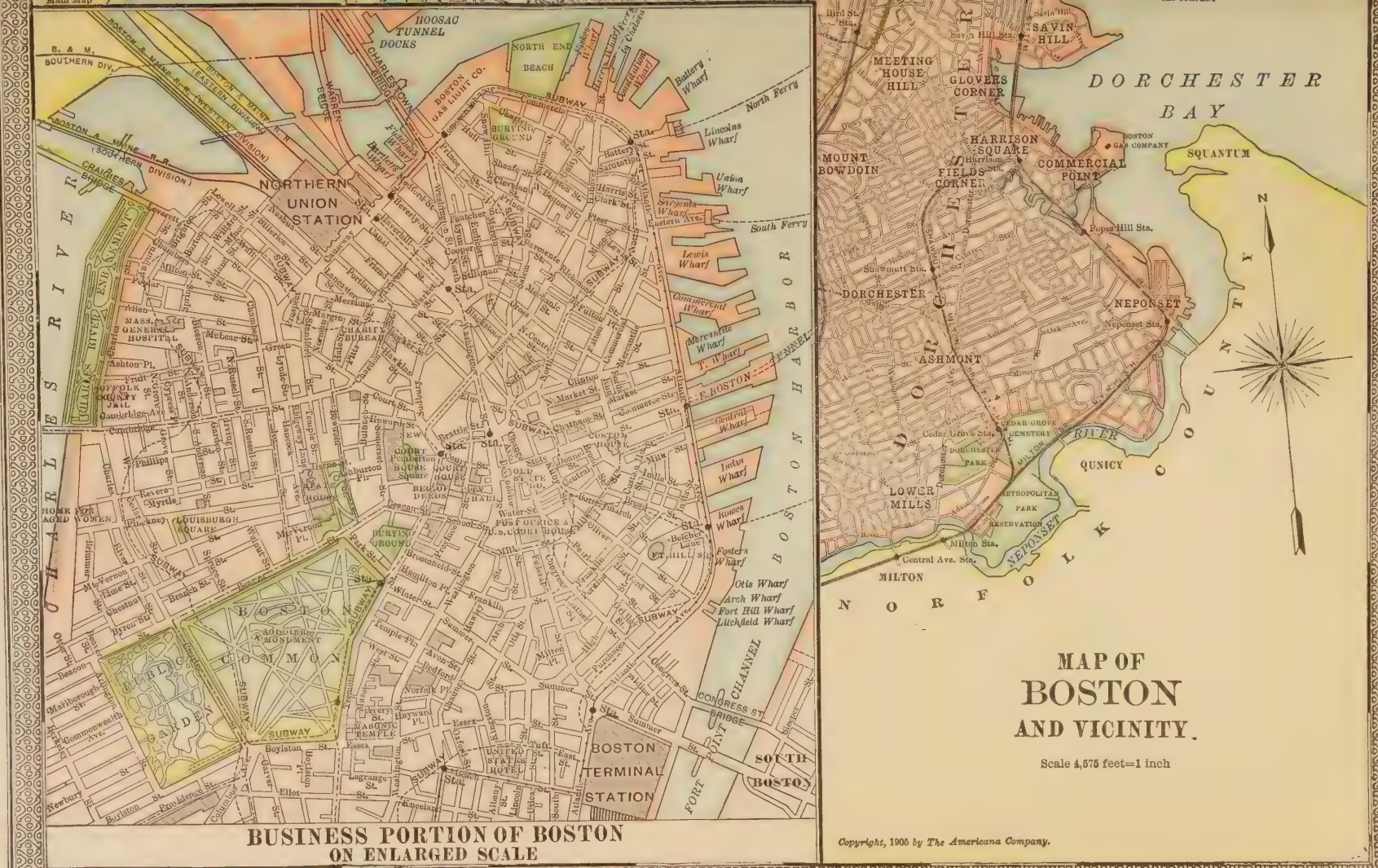
Boston, Mass., the capital of the State, and, according to the United States census of 1900, fifth city in population in the United States. It is situated on the western shore of Massachusetts Bay. The settlement from which it has grown was made in 1630 by members of the Massachusetts Bay Company, bearing with them the charter granted to this organization by Charles I. The leader of the first expedition of settlers who landed at Charlestown, 17 June 1630, was Gov. John Winthrop, a Puritan gentleman. In his fleet came others of like condition, Sir Richard Saltonstall, Isaac Johnson and his wife, the Lady Arbella, daughter of the Earl of Lincoln, together with a company of sturdy Puritans, chiefly from Lincolnshire. They landed 700 or 800 strong, a number soon increased to 1,000 and then to 2,000 by later arrivals — the most considerable settlement on the American coast. At the end of the first summer, a season of hardship, they moved across the Charles River to the promontory of Shawmut — an Indian word translated "living fountains." This headland, with ample water-supply, was called by the English settlers Trimountain, from the three-peaked hill, now Beacon Hill, which formed its highest eminence. On 17 Sept. 1630 it was voted to change its name to Boston, after the Lincolnshire town from which some of the chief settlers had come. The original settler of the land, the Rev. William Blackstone (q.v.), a scholar who had left England to avoid the "lord-bishops," sold the newcomers his land and moved on to Rhode Island, in order to escape the "lords-brethren."

From the first the power of the Puritan clergy was important. Church and State were practically one. Trained in the English universities, the ministers set a true value upon education. A free public school was established in 1633, and in 1636 the General Court provided for the beginnings of Harvard College. The government both of town and of colony was purely democratic, having for its unit the town-meeting, which in Boston itself maintained its sway, with the single interruption of British military rule at the outbreak of the Revolution, until the town became a city in 1822. Besides the training in self-government thus acquired, Boston had the advantage of virtual independence through its early years. At first the Crown was fully occupied with its own problems in England; and when Cromwell came into power, so strongly Puritan a settlement was naturally left much to its own devices. Thus the charter of the Bay Company, and the liberties enjoyed under it, became very dear to the people of Boston. When Charles II. came to the throne there were grave fears that these liberties would be seriously curtailed. In 1664 four royal commissioners came from England to adjust difficulties in several colonies. Their mission to Boston was a failure, and for some years to come the town was secure under its original system of government.

Under James II. came the dreaded change. Complaints of the Boston spirit of independence and religious intolerance were borne more frequently to the English court, and before the death of Charles II. the Court of Chancery voted the Massachusetts Bay charter vacated. In the summer of 1686 the original government of the colony came to an end. Before the close of this year, Sir Edmund Andros, the new governor appointed by the king, the first chief magistrate in Massachusetts not chosen by popular election, arrived in Boston. Probably nobody in his peculiar place could have satisfied the people at this time. Within less than three years from his arrival a bloodless revolution in Boston, a well-organized uprising of the people, removed him from office. Early in 1690 he was sent back to England, where Increase Mather, the leading minister of Boston, had already been for nearly two years, trying to have the old charter restored, or to get the best possible substitute for it. This he succeeded in doing, after the accession of William and Mary, and had the further satisfaction of choosing the first governor under the new instrument making Massachusetts a royal province. With this governor, Sir William Phipps, Mather returned to Boston in the spring of 1692.

By this time Boston had grown to importance as the leading seaport, and in many respects the foremost town in America. Before the end of the 17th century its population was approximately 7,000. In another half century this number was more than doubled. A good idea of certain aspects of the town in this period is given by an Englishman, Daniel Neal, who wrote in 1719:

SOMERVILLE
CHARLESTOWN
CHELSEA
BREED'S I.
MYSTIC RIVER
CHELSEA CREEK
EAST BOSTON
CAMBRIDGE
Fresh Pond
KINGSLEY PARK
MT. AUBURN CEMETERY
CAMBRIDGE CEMETERY
SOLDIERS FIELD
HARVARD UNIVERSITY
CHARLES RIVER
BARRY'S CORNER
ALLSTON
BRIGHTON
UNION SQ.
BROOKLINE
ABERDEEN
NORTHERN UNION STATION
BOSTON HARBOR
BOSTON COMMON
PUBLIC GARDENS
BOSTON TERMINAL STATION
TERMINAL GROUNDS
CHARLES RIVER EMBANKMENT
PROPOSED CHARLES RIVER EMBANKMENT
BACK BAY
SOUTH BAY
SOUTH BOSTON
CASTLE ISLAND
INDEPENDENCE SQUARE
ANDREW SQUARE
ROXBURY
OLD HARBOR
BUNKER HILL MONUMENT
STATE PRISON
United States Navy Yard
Mystic River Bridge
Chelsea Bridge
Warren Bridge
Charlestown Bridge
Harvard Bridge
Longfellow Bridge
Craigie Bridge
Washington Bridge
Broadway Bridge
Prospect Bridge
Cambridge Bridge
Western Bridge
Boston Bridge
Millers River
Hoosac Tunnel Docks
East Boston Tunnel
Wood Island Park
Belle Isle Inlet
Chelsea Creek
Boston Harbor
Fitchburg Division
Boston & Maine Railroad
Boston & Albany Railroad
Old Colony Railroad
Boston & Providence Railroad
Boston & Lowell Railroad
Boston & Worcester Railroad
Boston & Northern Railroad
Eastern Railroad
Fitchburg Railroad
Union Freight Railroad
Grand Junction Railroad
Cambridge Branch
Lechmere Point
North Ferry
South Ferry
B. R. B. & L. R. R. Ferry
Winnisimmet Ferry
Chelsea Ferry
Nat League Baseball Ground
Columbus A. C. Playground
City Hall
Public Library
Boston College of Athletic Grounds
Highland Park
Prospect Hill
Powder Horn Hill
Corey Hill
Mount Pleasant
Ward Hill
Eagle Hill
Bunker Hill
Breed's Hill
Monument Square
Somerville Centre Sta.
Winter Hill Sta.
North Cambridge Sta.
Union Sq. Sta.
Mt. Auburn Sta.
Brighton Sta.
Brookline Sta.
Roxbury Sta.
Huntington Sta.
Back Bay Sta.
Trinity Sta.
Boston Sta.



BUSINESS PORTION OF BOSTON
ON ENLARGED SCALE

MAP OF BOSTON AND VICINITY.

Scale 4,575 feet=1 inch

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"The bay of Boston is spacious enough to contain in a manner the navy of England. The masts of ships here, and at proper seasons of the year, make a kind of wood of trees like that we see upon the river of Thames about Wapping and Limehouse, which may easily be imagined when we consider that by computation given into the collectors of his Majesty's customs to the governor upon the building of the light-house, it appeared that there was 24,000 ton of shipping cleared annually.

"At the bottom of the bay is a noble pier 1,800 or 2,000 foot long, with a row of warehouses on the north side for the use of merchants. The pier runs so far into the bay that ships of the greatest burthen may unlade without the help of boats or lighters. From the head of the pier you go up the chief street of the town [now State Street], at the upper end of which is the town house or Exchange, a fine piece of building, containing, besides the walk for the merchants, the Council-Chamber, the House of Commons, and another spacious room for the sessions of the courts of justice. The Exchange is surrounded by booksellers' shops, which have a good trade. There are five printing presses in Boston, which are generally full of work, by which it appears that humanity and the knowledge of letters flourish more here than in all the other English Plantations put together; for in the city of New York there is but one bookseller's shop, and in the Plantations of Virginia, Maryland, Carolina, Barbadoes, and the Islands, none at all."

As in the 17th so in the 18th century, the clergy and ecclesiastical affairs loomed large upon the local horizon. The prominence in Boston records of what is known as the "Mather dynasty" — of which Increase and his son, Cotton Mather, were the chief figures — bears witness to this condition. The younger of these Puritan priests is remembered largely for his connection with the witchcraft delusion, which had its worst effects in Salem, but in temporal matters and humanitarian work he impressed himself no less forcibly on the life of his time. Of the devout laity, educated at Harvard College, giving themselves to public service, living private lives of dignity and piety, Samuel Sewall, whose diary preserves the true flavor of ancient Boston, stands as an admirable type. In contrast with the background of lives like his, the society of which royal governors were the central figures presents a less austere picture. About the governors, established from 1716 onward in a sort of vice-regal state in the Province House, gathered the more worldly element of the place — prosperous merchants, officials of the Crown, members of the King's Chapel congregation and the two other Anglican churches established before the middle of the century. Under the Province charter religious liberty was increasing, and churches of various denominations — including even the Quakers, whose first representatives in Boston were hanged on the Common — had come into being. Meanwhile the constant friction between the governors and the General Court, always meeting in Boston, kept the spirit of political independence wide awake. A fruitful source of trouble was the annual grant voted by the court to the governor. A salary the people steadily refused to pay to an official not of their own choice; and the amount of the grant varied according to the personal popularity of the chief magistrate. Through all these years, moreover, the town-meeting was educating the people in self-rule, so that when the time was ripe for active opposition from American colonists to the colonial government of England, the men of Boston were ready to take a leading part in the struggle.

In 1761 James Otis, advocate-general of the province, resigned his position under the Crown in order to contest the Writs of Assistance, which permitted customs officials to enter any house, search for smuggled goods, and on suspicion seize what they might find. The argument against these writs was the first of many conspicuous acts of resistance to royal authority. In 1765 the Stamp Act, taxing many articles of daily use in the colonies, was passed by Parliament. Its principle was bitterly resented in Boston, where riotous outbreaks soon took place. A mob completely destroyed the house of Thomas Hutchinson, chief justice of the Province, and was properly denounced by respectable citizens. In the next year the repeal of the act was joyfully celebrated by all classes. In 1770 occurred the "Boston Massacre" (q.v.), the result of friction between the inhabitants and the British troops stationed in the town. In the use of "a word which historians apply to such events as Cawnpore or the Sicilian Vespers" — the word "massacre" to describe "the careless shooting of half a dozen townsmen" — John Fiske finds "all the mildness of New England civilization brought most strikingly before us." The town-meeting was even more typical of this civilization, and from its training Samuel Adams, at about this time, stepped into virtual leadership of the revolutionary cause in Boston. The Committee of Correspondence was formed upon his motion, and out of it grew by degrees the union not only of towns, but of colonies, in their opposition to the throne. On 16 Dec. 1773, occurred the "Tea Party," a cleverly planned and executed plot for throwing into Boston harbor, by men disguised as Mohawk Indians, the cargoes of three vessels bearing tea upon which the people of Boston would not pay the hated tax. Parliament retaliated by passing the Boston Port Bill, which closed the harbor and brought the chief industry of the town, its maritime trade, to a standstill. A military governor, Gen. Gage, took the place of Hutchinson, who had been acting as the chief civil magistrate, and open hostilities were at hand.

The events of 19 April 1775 — the warning ride of Paul Revere, the escape of John Hancock and Samuel Adams, the fights at Concord, Lexington, and along the road between the two towns — are the commonplaces of American history. They belong to Boston in so far as the Boston revolutionary leaders were concerned in them, and as the British troops set forth from the town and returned to it defeated. The battle of Bunker Hill in Charlestown, 17 June 1775, bears much the same relation to Boston history. On 3 July Washington arrived in Cambridge and took command of the American army, which from that time until the following March kept the British closely within the lines of the siege of Boston. Many of the inhabitants were permitted early to depart. Those who remained suffered hardships and privations, besides witnessing the destruction of much American property, and such scenes of desecration as the use of the Old South meeting-house as a riding-school. On the night of 4 March 1776 Washington made his memorable seizure of Dorchester Heights (now South Boston), and on the 17th Howe with all his army and a large following of American Tories sailed for Halifax. Thereupon Washington entered the city, and even before the signing of the Declaration of Independence Boston ceased to be a scene of active warfare in the long conflict. Yet John Adams, Hancock, and other Boston men bore

an important part in the counsels of the young nation, in whose army and navy the town was fully represented.

The recovery from the effects of the siege was slow. To take the place of the departed Tories, and to occupy their spacious houses, there was in the remaining years of the 18th century a gradual immigration from the neighboring country (where Tories were few) of families possessing wealth, energy, and qualities of leadership. Local government by town-meeting was resumed. In 1780 a State government for Massachusetts was formed, and John Hancock was chosen the first governor. In the general readjustment maritime affairs took their previous place of importance. Cut off by British legislation from the West India trade, the Boston merchants looked farther abroad. The prospects of the fur trade on the northwest coast of America became known through Capt. Cook's journals, published in 1784. In 1787 two small vessels, the Columbia and the Washington, sailed from Boston to attempt this trade. Before her return in 1790 the Columbia had circumnavigated the globe — first of American vessels to accomplish this feat. The furs collected in the Northwest had been sold in China, and the example thus set led the way to an important trade with the East in which Boston long maintained the American supremacy. In such a seaport as Boston, Jefferson's Embargo and the War of 1812 were naturally unpopular. The Federalist party, moreover, had much of its best strength in Boston. The powerful mercantile class saw its best interests in a strongly centralized government and conditions of general stability. The opinions of this class colored the influential feeling of the community to an extent which laid Boston open to charges of something very near disloyalty to the national government. The crippling of commerce, however, had the good effect of turning capital and energy toward manufacturing. In 1814 Francis C. Lowell, of Boston, made the first American use of the power-loom in his mill at Waltham at almost the same time with its introduction into England. The growth of the great cotton industry at Lowell followed rapidly upon this invention. With the spread of manufactures Boston itself was growing. In 1820 its population was over 43,000. The old form of town government had become unwieldy. For some years efforts had been making toward the adoption of a city charter. In 1822 this was finally achieved.

From the time of this change in local government to the present, the outward growth of the city, as figures can speak for it, has been unbroken. In matters not computed in this way, the development has been in several important respects unique. With Boston, for example, the Unitarian movement in America is especially associated. Before the town became a city there were divisions among the clergy of Congregationalism — practically the established order in New England — on various doctrinal points, notably that of the Trinity. Under the leadership of William Ellery Channing the "liberal" clergy and most of the older and more influential religious societies turned from Calvinism to the new theology. Especially between 1820 and 1830, an acute controversy took place. Between 1840 and 1850 the Unitarian body itself was disturbed by differences between the more conservative element and the radicals, of whom Theodore Parker was a type. The result of the successive controversies has been a liberalizing of religious beliefs not only in what came to be Unitarian Boston, but in the many Protestant bodies which now acknowledge an important debt to Unitarianism. Another far-reaching movement which had its headquarters in Boston was that of anti-slavery. Here in 1831 William Lloyd Garrison established his journal, the *Liberator*. A year later the first anti-slavery society in America was established in Boston. The agitation of the Abolitionists was for a long time opposed by the conservative class, which resorted even to mob violence in the hope of suppressing the reformers. But to Garrison and his associates it was due, as Mr. J. F. Rhodes has said, "that slavery became a topic of discussion at every northern fireside." When the Civil War broke out, the cause of the union, perhaps even more than that of abolition, enlisted the enthusiastic support of the Boston community; yet, as if in fulfilment of the work which Garrison began, it was from Boston that Gov. Andrew sent forth the first regiment of colored troops raised in the North.

With Boston and its immediate vicinity, moreover, are associated the names which stand for the most important contribution of the 19th century to American literature. Prescott, Ticknor, Bancroft, Motley, and Parkman; Emerson, Hawthorne, Lowell, Longfellow, Holmes, and Whittier,— these and their associates, bound together by many ties of sympathy and friendship, constituted a group of writers which gave the place a unique distinction in letters. The 'Atlantic Monthly,' founded in 1857, became the vehicle for much of their most characteristic utterance. The influences of Transcendentalism (largely a local movement, culminating in the forties), of anti-slavery feeling, of creative expression, combined to give to this utterance as a whole something of the distinction which the individual writers won each for himself.

During the 19th century two important changes in the Boston landscape affected the future of the city, in the regions both of residence and of business. The first of these was the filling in of the Back Bay, an arm of the Charles River which spread between the Common and the hills of Brookline, running south and east as far as the Neck or narrow strip of land connecting Boston and Roxbury. From the early years of the century changes in the shore line of Boston had been wrought by cutting down the principal hills and filling out the irregularities of the harbor front. The first step in the series of events which led to the conversion of the Back Bay from water into land was the granting of a charter in 1814 to the Roxbury Mill Corporation, permitting the building of dams across the Back Bay and confining its water for mill purposes. To these rights the Boston Water Power Company succeeded in 1832. At about the same time the Boston & Providence and Boston and Worcester railroads invaded the Back Bay with their bridges. Moreover the waters became unsanitary through drainage, and to solve the entire problem, hygienic and legal, a State commission was appointed, and made a full report in 1852. Its recommendations to create the whole tract of land now known as the Back Bay did not at once satisfy the various conflicting interests,

COPLEY SQUARE, BOSTON.

MUSEUM OF FINE ARTS, BOSTON.

but in 1858 the actual work of filling up the waters was begun. The result was a large enrichment of the State treasury, and the addition to the city of the whole district occupied by the residences, clubs, churches, hotels, and other institutions connected with the most prosperous life of the city. The original peninsula of Boston contained 783 acres. Through its encroachments upon water, largely in the Back Bay, it has grown to 1,829 acres. With the accessions of outlying districts, the total area of the city is now 23,707 acres.

The second great change in the outward aspect of Boston resulted from the great fire of 9 and 10 Nov. 1872. From the beginning of its history Boston had been afflicted by serious fires. This greatest of them all destroyed 776 buildings, all but 67 of which were of brick and stone. It devastated Summer Street (both sides), Washington Street from Summer to Milk, Milk Street to the post-office, Devonshire Street, Water (both sides), Congress, Lindall and Oliver streets to the harbor. From the corner of Washington and Franklin streets the shipping at the wharves was in clear view. Nearly 2,000,000 feet of land were burned over. The total loss was estimated at more than $75,000,000. Yet by private enterprise and State aid the recovery was immediate. The opportunity to widen and straighten streets in the business district was seized. Statelier buildings rose in the place of those destroyed, and a new business region, corresponding to the new district of residences, was created.

The census of 1900 gave the population of Boston as 560,192. The metropolitan district, including the 38 cities and towns of which Boston is the centre, has by the same census a population of 1,162,197. The territory within 50 miles of Boston has 2,849,686 inhabitants — a population second in America only to that in the corresponding area about New York. The assessed valuation of all taxable property in Boston itself is $1,191,308,100 — a figure surpassed in the United States only by the corresponding figures for New York and Philadelphia.

The city government is conducted by a mayor, elected for two years, salary $10,000; a board of 13 aldermen, elected annually; and a common council of 75 members, three for each ward, elected annually. The fire department is controlled by one commissioner, the police and health departments by three each. The school committee consists of 24 members, of whom 8 are elected annually for a term of three years. In the 807 public schools under their charge there were, according to the 'Boston Municipal Register for 1902,' 1,939 teachers and 84,778 pupils.

The park system of Boston is under the joint control of the Metropolitan Park Commission (appointed by the governor of Massachusetts) and the Board of Park Commissioners (appointed by the mayor of Boston). These commissioners serve without pay. In the Metropolitan system are included the Blue Hills Reservation (4,232 acres), the Middlesex Fells and Mystic Lakes (3,002 acres) and smaller reservations, including 66 acres at Revere Beach, where the State bath-house of 1,000 rooms provides the best facilities for sea-bathing. To the Board of Park Commissioners falls the management of the Marine Park at South Boston, Franklin Park at West Roxbury, Arnold Arboretum at Forest Hills, boulevards, fens, playgrounds, and open-air gymnasia. The Common (48⅗ acres) and the adjoining Public Garden (24¼ acres), both in the heart of the city, are in charge of the Public Ground Department of the city of Boston. The State commission acts in consultation with local boards, including that of Boston, and serves the people of 12 cities and 25 towns within a radius of 25 miles from the State House. The general park system thus provided is remarkable for its beauty, accessibility, and actual benefit to the community. The work of the city bath department is a characteristic example of municipal service to the people. The five trustees of this department maintain seven beach baths, one river bath, two swimming-pools, nine floating baths, five gymnasia, and the Dover Street bath-house, a model building with free baths for men and women throughout the year. Metropolitan commissions of water and sewerage corresponding to the Park Commission, serve the city and surrounding towns. The water-supply is drawn from lakes and rivers in eastern Massachusetts, — the Sudbury River, Mystic Lake, Lake Cochituate, and watersheds of wide area. A city water department does its separate work in connection with the Metropolitan Commission.

The churches of Boston, according to the 'City Directory' of 1902, are 309 in number. Of these 50 are Roman Catholic (including Polish, German, Italian, French, Portuguese, and Syrian parishes), 38 are Baptist, 37 Congregational-Trinitarian, 34 Methodist-Episcopal, 32 Protestant Episcopal, 25 Congregational-Unitarian, 13 Lutheran, and 10 Universalist, with others in smaller numbers. The First Church of Christ (Scientist) is the «mother church» of «Christian Science» throughout the country and the world. Charitable organizations, both municipal and private, abound, and enlist the unpaid services of a large class in the community. An admirable organization of Associated Charities gives direction to the proper sources or seeks to obtain therefrom for the sick and needy adequate and suitable relief. The principal hospitals are the Boston City Hospital, a city institution, the Massachusetts General, supported by private endowment, the Carney, in charge of Roman Catholic Sisters of Charity, and the Massachusetts Homœopathic. These are open to persons of all races and creeds. In the Massachusetts General Hospital in 1846 the properties of ether as an anæsthetic were first demonstrated. From the discovery then made the progress of modern surgery took its first great step. There are, besides the institutions mentioned, many smaller hospitals for special classes, children, women, etc. The provisions for industrial training and the education of defectives are ample. The Perkins Institution and Massachusetts School for the Blind (incorporated 1829) typifies the good work they have done and are doing. Here Dr. Samuel G. Howe did his memorable pioneer work in the case of Laura Bridgman.

As a centre of higher education in many branches Boston attracts and maintains a large population of students. The Public Library, housed in one of the most beautiful buildings in the country, and distributing its more than 800,000 volumes through 10 branch libraries and 21 delivery stations throughout the city, puts the

materials of scholarship within the reach of all. Harvard University is close at hand. Its Medical School is in Boston itself. Here also are the Massachusetts Institute of Technology, Boston University, the Boston Museum of Fine Arts, with its School of Drawing and Painting, and the New England Conservatory of Music, supplemented by the concerts of the Boston Symphony Orchestra. The courses of free lectures provided by the Lowell Institute, established in 1838, with an original endowment of $237,000, have made a constant contribution to the cause of general education. If the suggestion to co-ordinate these and the many other educational institutions of Boston into a general university is ever carried out, the place may well become one of the foremost centres of organized learning in the world.

In 1894 the Union Station at the North End of the city brought together the terminal facilities of all the railroads connecting Boston with northern New England, with Canada, and, through Fitchburg, with the West. On 1 Jan. 1899 the first train entered the South Station, the largest railway terminal in the world. Here the railroads connecting Boston with southern New England, New York, the South, and the West, by way of Albany, meet under one roof. The North and South Stations are connected both by surface and by elevated electric cars — a part of the system of the Boston Elevated Railway. This company has succeeded to the rights of the several street railways formerly holding franchises, and by surface cars, elevated lines, and subways, upon which the underground systems of other cities have been modeled, gives the city, with the attractive and accessible suburbs for which Boston has always been noted, a rapid-transit service of unusual comfort and effectiveness. The subway system will be still further extended, first of all by the completion of the tunnel now building under the harbor to connect Boston and East Boston.

In the Rivers and Harbors Bill passed by the United States Congress in June 1902 an appropriation of $3,600,000 was made for the improvement of Boston Harbor. Its expenditure in making a broader and deeper channel from Charlestown and Chelsea bridges to the sea is expected to forward the progress made in recent years by Boston as a seaport. Its ample harbor, well protected from the sea by islands, has always played an important part in the life of Boston. In foreign commerce for the government fiscal year ending 30 June 1902, Boston stood second in the United States only to New York, with imports and exports valued at $172,325,740. For peculiar temporary causes this was smaller by more than $40,000,000 than the volume of trade for the year before. Fourteen transatlantic steamship lines run from Boston. The coastwise commerce of the port is valued, in merchandise, in sums ranging annually between $85,000,000 and $131,000,000. As a wool market Boston stands second in the world only to London. In the single week of 1901, in which Boston made its greatest record in the sales of wool, it sold more than the total clip of any State in the Union, excepting Montana and Idaho, for that year. In the business of shoes, leather, and hides, Boston is the chief distributing centre of the United States. The trade in salt and fresh fish — as befits the capital of the State with a cod for its emblem — is larger than in any other city of the country. The cotton industry of Massachusetts looks to Boston for much of its capital and control. Miscellaneous trades and manufactures, added to the branches of business enumerated, give Boston a high place among the commercial and industrial cities of the country.

In the growth from an ancient to a modern city many historic buildings have inevitably disappeared. But Boston is fortunate in a few of those that remain. Chief among these are Christ Church (1723), the Old South Meeting-house (1729), Faneuil Hall (1742, enlarged in 1806), the Old State House (1748), King's Chapel (1749, built around the previous wooden church erected in 1688), the front portion of the present State House (1795–8), and Park Street Church (1809).

'The Memorial History of Boston' (Boston 1881) in four volumes, edited by Justin Winsor, completely covers the local history from 1630 to 1880. Its chapters are written by persons with special knowledge of the themes assigned them. 'Boston,' by Henry Cabot Lodge in the series of "Historic Towns" (New York 1892) is an excellent shorter history.

M. A. DeWolfe Howe,
Author of 'Boston: The Place and the People.'

Boston Case, in the history of slavery, a case where a Georgia slave hid or was hidden on the ship Boston returning from Georgia to Maine, and on arrival escaped to Canada. The governor of Georgia issued a requisition to the governor of Maine for the surrender of the captain to the Georgia authorities, as a slave-stealer and fugitive from justice; and on his refusal, the Georgia legislature demanded that Congress pass a law obligating the governor of Maine and all others in similar cases to comply with the requisitions. The resolution was warmly advocated by the Georgia senators, referred to the judiciary committee, and never reported on. In his next message, the governor of Georgia recommended that "all citizens of Maine who should thereafter come within the jurisdiction of Georgia on vessels, either as owners, officers, or mariners, should be considered to have done so with intent to commit the crime of seducing negro slaves from their owners, and be dealt with accordingly by the officers of justice."

Boston College, an educational institution in Boston, Mass.; founded in 1864; under the auspices of the Roman Catholic Church. Professors and instructors, 20; students in all departments, 477; scholarships, 15; volumes in the library, 34,109; value of grounds and buildings, $537,000; income, $17,000; and benefactions, $3,000. The course is four years leading to the usual academic degrees.

Boston Massacre, a riot in Boston, 5 March 1770, provoked by the presence of the British regiments quartered there since 1 Oct. 1768. On Friday the 2d, some ropemakers started a war of insults with passing soldiers, and on being challenged to a boxing match, used sticks instead, to which the soldiers retorted with cutlasses; several persons were hurt when the fray was stopped by outsiders, but it was reported that it would be resumed Monday. Early Monday evening the soldiers passing to their posts from the main guard, at the head of King (State) Street, were met by a crowd

PUBLIC GARDENS AND EQUESTRIAN STATUE OF GEORGE WASHINGTON, BOSTON.

armed with canes and sticks, who refused to make way, and shouted insults; the soldiers were about to force a passage when an officer came up and ordered them into the yard; but the alarm-bell had called out the citizens, the hot-heads wished to assault the main guard, and apparently they and the boys set to harrying the sentinel in front of the custom-house opposite the main guard, who about 9 o'clock hit a specially annoying boy with the butt of his musket. The boy ran off and brought a crowd to the spot, headed by one Crispus Attucks (q.v., apparently a half-breed Indian), and pointed out the sentinel, at which they shouted «Kill him! Knock him down!» The sentinel retreated up the steps and loaded his gun amid a shower of snowballs and other missiles; told Henry Knox who was passing, and counseled him not to fire; that he would if they touched him; leveled the gun and warned off the crowd, and called for help from the main guard across the street. A sergeant and seven men were sent to his help, and he came down and took his place in line; soon afterward Col. Thomas Preston joined them, making 10 in arms. They loaded; the crowd jeered, hooted, taunted them as cowards, dared them to fire, and closed about them; the soldiers drove them back with clubs and bayonets; Preston, in turn warned by Knox, rushed among his men, and either with or without his orders they fired, killing Attucks and two others and mortally wounding two more. The crowd fell back, and Preston prevented the men firing again and rejoined the main guard. The drums beat to arms, and the vicinity was soon thronged with divisions of soldiers and masses of enraged citizens. Lieut.-Gov. Hutchinson quieted the tempest by having Preston bound over for trial, placing the implicated soldiers under arrest, and inducing the officers to order the companies back to barracks; but the next day a town-meeting forced Hutchinson to have the regiments removed to the Castle in the harbor. Preston was tried in October and the soldiers in November before the Superior Court, and defended by Robert Auchmuty, assisted by John Adams and Josiah Quincy, who took their futures in their hands from professional duty; Preston was acquitted, six soldiers were brought in not guilty, and two found guilty of manslaughter, branded in the hand, and discharged.

Boston Mountains, a range in western Arkansas, extending into the Indian Territory; highest summits, 3,000 feet above the sea.

Boston News Letter, 1704–76; the first real newspaper issued in America. A periodical called 'Publick Occurrences,' to be issued monthly, or oftener if «a glut of occurrences» made it advisable, had been essayed in Boston by Richard Pierce, 25 Sept. 1690; but it was instantly suppressed by the authorities as containing «reflections of a very high nature,» and the first number was the last. The next venture was by John Campbell (q.v.), a Scotch bookseller and postmaster of Boston, who had been actively writing and sending «news letters» of European occurrences to New England governors for a year or more, and thought it would save trouble to print them for all. With official permission he issued on 24 April 1704 the first number of a weekly consisting of a single leaf, 8 x 12, printed on both sides, and dated «From Monday April 17. to Monday April 24. 1704.» It was printed by Bartholomew Green, for many years one of the best printers of Boston, who in 1722 became its editor. Dying in 1732, he was succeeded by his son-in-law, John Draper, who conducted it till his death in 1762, and made it a representative of the best interests of the province; he was a journalist of the highest character. His son Richard Draper, considered the best news compiler of his day, though in feeble health, edited the paper till his death in 1774, when his widow succeeded him and carried it to the end. Draper had been an ardent loyalist, and firmly supported the mother country in the stormy times of the previous decade; his widow naturally shared his feeling, and when the young man Robert Boyle whom she installed as editor showed sympathy with the Revolution, she replaced him by John Howe, who conducted it till the British evacuated Boston, 17 March 1776, when he and Mrs. Draper left with them and the paper ceased to exist. The British government gave her a life pension. There are only three copies of the first number extant: in the Massachusetts Historical Society at Boston, the American Antiquarian Society at Worcester, Mass., and the New York Historical Society at New York. A facsimile of the first page is given in the 'Memorial History of Boston,' Vol. II., page 389. See NEWSPAPERS, AMERICAN.

Boston Port Bill, of 31 March 1774, was Great Britain's retort to the destruction of the tea in Boston harbor, 16 Dec. 1773. (See BOSTON TEA PARTY.) The maintenance of English authority by force, or abdication in favor of a party which would maintain it, were the only alternatives left to the government. The King's Speech of 7 March 1774 charged the colonists with attempting to injure British commerce and subvert the constitution; and on the 18th Lord North brought in the Port Bill, providing that there should be no further «landing or discharging, lading or shipping of goods, wares, and merchandise at the town and within the harbor of Boston» till the town paid for the tea and promised submission to the laws; that the colony's seat of government should be removed to Salem, and Marblehead made a port of entry; the act to take effect 1 June. Even some of the best friends of America in Parliament at first approved it as moderate and reasonable, as the town could end the punishment at any moment by paying for legitimate merchandise destroyed by riot, and allowing law and order to have their course; but the Whig opposition soon collected itself, and the bill was fought in its various stages by Burke, Barre, Pownall, and others. In spite of them it became a law 31 March, without a division in the Commons, and by unanimous vote in the Lords. The fleet and army were of course to join in enforcing the blockade; Boston was filled with troops, and Gage made commander-in-chief. The immediate results were: a flood of contributions from the other New England towns, of grain and provisions, so great that the Boston leaders boasted that it would become the chief grain port of America if the act were not repealed; and, in connection with the regulating acts for changing the government of the province passed soon after, a speedy union of the colonies for joint defense.

Boston Symphony Orchestra, a large orchestra organized in Boston in 1881, having about 80 members in 1903. It gives a series of concerts in Boston annually, and in 1900 inaugurated a series of Wednesday afternoon concerts in New York. Daily rehearsals are the rule throughout the season, and the orchestra plays only at concert performances. The conductors are now appointed for five years; the conductor in 1903 was William Gericke; others who have held the position are, George Henschel, the first, Arthur Nikisch, and Emil Paur.

Boston Tea Party, 16 Dec. 1773. Till shortly before the Revolution, imported teas paid a shilling a pound duty at English ports; but the merchants received a drawback of three fifths on exports to the colonies, who were charged the remaining 4⅘d. in the selling price. As they obtained it more cheaply by smuggling from Holland, there was no English tea trade. In 1767, as part of a series of duties to raise revenue for paying the colonial executives and judiciary, to make them independent of popular control, this duty was reduced to 3d., but to be collected at American ports. This was done with the threefold object of aiding the straitened East India Company to market its tea; substituting a small collectible duty for a larger uncollectible one; and helping to break up the illicit free-trade which was the life of the colonies. The political purposes made Americans invincibly hostile to it. Associations were formed to abstain from the tea, merchants who handled it lost custom, and the Dutch smuggling went on. In 1770 the other new duties were repealed, but that on tea remained. In 1773 the East India Company, with 17,000,000 pounds of unsalable tea stored in London warehouses because of this non-importation, and in imminent danger of a failure most disastrous to English financial and political interests, asked Parliament for a colonial drawback of the entire shilling, to undersell the Dutch. This was granted 10 May, tea ships were sent to Boston, New York, Philadelphia, and Charleston, and consignees or "tea commissioners" appointed in each place. But the colonies were now resolved that no taxes, external or internal, should be paid except under their own control, and set themselves to prevent the collection of the duty. In the other cities than Boston this was done by forcing the consignees to resign, and in New York and Philadelphia the ships were sent back without unloading. In Charleston the duty was left unpaid for 20 days, when by law the customs officers seized it and offered it for sale to pay the charges, but as no one dared buy it, it spoiled unused. In Boston the tax was defeated by the refusal of the consignees — two sons of Gov. Hutchinson and three loyalist friends of his, to resign. On Sunday, 28 November, the Dartmouth, under Capt. Hall and owned by the Quaker Francis Rotch, arrived with 114 chests of tea, and was moored at Griffin's wharf. The committee of correspondence which really governed the province, induced Rotch to defer its entry until Tuesday, and on Monday morning called a great mass meeting at the Old South Church, which resolved that Rotch would enter the tea at his peril. The captain was cautioned to let none be landed, and a watch of 25 men was stationed at the wharf. The consignees, asked to send the tea back, replied that it was not in their power, but they would store it till they could hear from their constituents. Tuesday afternoon, however, Rotch and Hall agreed to return it without its touching land or paying duty; and the owners of two other ships which arrived shortly after, the Eleanor and Beaver, made the same promise. These ships were moored at the same wharf, so that one guard might serve for all. But by law the ships could not be cleared till the cargo was discharged, and Hutchinson refused to give the owners permits to pass the Castle; had the guns loaded, and Admiral Montagu guarded the mouth of the harbor with two war-ships, though curiously neither of them put a guard on the tea ships. At midnight on the 16th, the Dartmouth's 20 days would expire, and the American victory be practically won by the seizure of the tea for unpaid duty, since none of it would come on the market. But the object of the Boston leaders was not merely to prevent the English exchequer profiting, but to commit the colony to open disobedience of English orders, and have some issue to unite upon with the other colonies. On the 14th Rotch was again ordered by a meeting at the Old South to apply for a clearance, and several leading patriots escorted him to the custom-house to see that he did so. The collector refused to give an answer till the next day, when, upon a final visit from Rotch and his volunteer bodyguard, he definitely refused unless the teas were discharged. At 10 the next morning Rotch appeared before another huge meeting at the Old South and reported the refusal. He was directed to protest against it at once, and apply to Gov. Hutchinson for a permit to pass the Castle. Hutchinson was at his house on Milton Hill, some eight miles out; and it was 6 P.M. before Rotch returned with the news that the governor also refused. Meantime some 7,000 people had gathered in and about the Old South, probably half of them from neighboring towns; addresses were made by Samuel Adams, Josiah Quincy, and several other leaders, and it was unanimously resolved that the tea should not be permitted to land. Hutchinson's refusal had been discounted, and 40 or 50 men disguised as Indians, with paint and gear, had gathered in the back room of a printing office near by, waiting for an agreed signal, and the meeting continued in session till long after dark, waiting Rotch's report. On receiving it, Samuel Adams gave the appointed signal, "This meeting can do nothing more to save the country," and a shout from the porch was answered by a war-whoop from the "Mohawks"; who at once rushed to the wharf followed by a thousand or so of others, and with perhaps a hundred of them boarded the ships, and for three hours worked steadily with hatchets, breaking open the chests and throwing the tea into the harbor. The entire 342 chests on the three ships, valued at about £18,000, were destroyed, without a sound from the mob, which then dispersed. Meantime a fourth tea ship was wrecked off Cape Cod. The immediate result of this was the Boston Port Bill (q.v.); but as the Bostonians had expected, the whole country rallied to their support.

Boston Terrier, a breed of dogs, resembling bull-dogs without their eccentricities, which originated in Boston about 1870, and

soon became popular for its admirable qualities as a companion. This terrier has a shapely bull-dog-like head, and the straight legs and active manners of the old bull-terrier. Those truly bred always have a white muzzle, a white blaze on the face and on the chest and feet, with a fine coat, short and bright, and a deep broad chest. Light-class ones weigh from 15 to 23 pounds, and the heavy from 23 to 30 pounds. This breed arose from a cross between Robert C. Hooper's "Judge" (a dog three quarters English bull and one quarter white terrier, which was a rich dark brindle with a white flare on his face), and Burnett's "Gyp," a pure white bitch low on the legs and stockily built, not unlike the old-fashioned bull-terrier. The product was Wells' "Eph." He was born in Boston about 1870 and was bred to Tobin's "Kate," an old-fashioned bull-terrier, and the result, Barnard's "Tom," may be said to be the first of the real new breed, for he developed the typical screw tail of the present Boston terrier. This dog has a most affectionate disposition, is well knit in build, and is stylish.

Boston University, a co-educational institution of Boston, Mass., organized in 1869. The work is divided into two main departments, the Schools requiring previous college training, and the Colleges requiring no such qualification. The schools are those of theology, law, medicine, and all sciences (for post-graduate work in language, philosophy, history, and science); the colleges are those of Liberal Arts and of Agriculture, the latter allied with the Massachusetts Agricultural College at Amherst. In 1905 the number of students was 1,324, and the number of professors and instructors 148; volumes in the library, 30,000.

Boston, a game of cards played by four persons, with two packs of cards. The cards are never shuffled; one of the packs is dealt, and the other cut alternately to determine the trump, which governs the game. The dealer deals five cards to each player twice, and three the last time around. If the first player can make five tricks, he says, "I go to Boston"; and his competitors may overbid him by saying, "I go 6, 7, 8, 9, 10, 11, 12, or 13," as the hand of each may warrant. Should either of them fail to make the number of tricks he "bids" for, he must pay to each competitor a forfeit regulated by a card of prices, which must be prepared beforehand. Without such a card Boston cannot be played. It is one of the most complicated of games. It is said to have been introduced into France by Dr. Franklin, who gave it the name of his native city.

Boston and Albany Railroad.— The Boston and Albany Railroad as it now exists was formed 28 Dec. 1870, by the consolidation of four railroad companies whose histories respectively are as follows:

The Boston and Worcester Railroad Company, chartered 23 June 1831, built a line between Boston and Worcester, a distance of 44.63 miles, the road being opened to the public 4 July 1835. This company prospered and at the end of eleven years the track between the two cities was paralleled. Branch roads were built to Milbury and Saxonville, to Lower Falls, Milford and Brookline, and to Framington Center, and were opened respectively in 1846, 1847 and 1849.

Meantime, on 15 Feb. 1833, the Western Railroad Company was chartered to build a line from the terminus of the Boston and Worcester road to Springfield, Mass., and thence to some point on the western border of the State. This road was opened to the public in 1841.

The Albany and West Stockbridge Railroad Company was chartered 5 May 1836, to build a line from Albany, N. Y., to the terminus of the Western Railroad Company on the Massachusetts State line, a distance of 39 miles, the company being financed by the Western Railroad Company. The construction of the road was begun two years after the date of its charter and in December, 1840, a section of the road from Albany to Chatham Four Corners was opened. In November, 1841, the Albany and West Stockbridge Railroad Company was leased to the Western Railroad Company for a term of 50 years from April, 1840. Work was now resumed on the remainder of the road, which was completed in September, 1842.

In 1854 interests allied to the Western Railroad Company purchased the Hudson and Boston Railroad, whose line extended from Hudson to the Massachusetts State line, a route parallel to that of the Albany and West Stockbridge Railroad. On account of this latter fact that part of the Hudson and Boston's line lying between Chatham Four Corners and the Massachusetts State line was abandoned.

In September, 1867, the Boston and Albany Railroad was formed by the consolidation of the Boston and Worcester and the Western Railroad Companies. In December, 1870, the new corporation absorbed the leased Albany and West Stockbridge, and consolidated with the Hudson and Boston road, forming the present Boston and Albany Railroad.

In 1866, by purchase of the Grand Junction Railroad the line was extended to East Boston; in 1880 the Springfield and Northern Railroad was purchased and put into operation as the Athol Branch; in 1889 the company bought the Spencer Railway.

The Boston and Albany Railroad is now leased to the New York Central and Hudson River Railroad Company (q.v.), the lease holding good for ninety-nine years from date, 1 July 1900. For this lease the lessee pays an annual rental of two million dollars, equivalent to eight per cent on the capital stock of the leased road.

In addition to this the lessee pays the organization expenses, a sum which at present amounts to $10,000 per annum; the taxes; the interest on bonds of the leased road; and the rentals which the leased road pays for its leased lines. These lines, leased by the Boston and Albany, comprise the North Brookfield Railroad, the Pittsfield and North Adams Railroad, and the Ware River Railroad.

Boston & Maine Railroad. The Boston & Maine system, as it stands to-day, is one of the most remarkable examples of railroad evolution and consolidation to be found in the world. Including the constituent roads owned, leased, controlled, and operated, it represents fully 125 distinct units, ranging from a four or five-mile line, like the Troy & Bennington, to a great 400-mile "system," like the Fitchburg division. Some of its branches were incorporated as far back as the early thirties, while others are creations of the last 15 or 20 years.

To bring together all of these different and sometimes conflicting transportation units under a single management represents a feat of financiering probably unique on this continent. Of the 2,290 miles now operated by the Boston & Maine Railroad no less than 1,665 miles represent roads leased by the parent company. One of these, the Troy & Bennington, is leased in perpetuity, and the lease having the longest term to run is that of the Vermont & Massachusetts road, which expires in 2873. The Massawippi Valley road lease expires in 2869, the Fitchburg road lease in 1999, and the one to first expire will be that of the Suncook Valley road, in 1912.

To give a clearer idea of the full extent of the Boston & Maine Railroad system the following table, showing the leased roads, with the dates of their incorporation, the beginning and expiration of leases, and mileage has been prepared under the direction of Fourth Vice-President William J. Hobbs:

NAME OF ROAD.	DATE OF INCORPORATION.	DATE OF LEASE.	DATE OF EXPIRATION.	MILES OF ROAD.
Danvers	March 15, 1852	May 30, 1853	May 30, 1953	9.26
Newburyport, Danvers & Georgetown	May 7, 1851	Feb. 21, 1860	Feb. 21, 1960	26.98
Newburyport	March 11, 1846			
Lowell & Andover	Feb. 5, 1873	Oct. 18, 1875	Dec. 1, 1973	8.85
Kennebunk & Kennebunkport	Aug. 16, 1882	June 18, 1883	May 15, 1982	4.50
Worcester, Nashua & Rochester, Worcester & Nashua	March 5, 1845	Oct. 30, 1885	Jan. 1, 1936	94.48
Nashua & Rochester	July 5, 1867			
Manchester & Lawrence	June 30, 1847	June 1, 1887	Sept. 1, 1937	22.39
Boston & Lowell	June 8, 1830	June 22, 1887	April 1, 1986	111.75
Nashua & Lowell	April 16, 1836	Nov. 10, 1880	Oct. 1, 1979	14.50
Stony Brook	March 26, 1845	Sept. 30, 1884	Jan. 1, 1989	13.16
Wilton	Dec. 28, 1844	Feb. 1, 1884	Oct. 1, 1982	15.50
Peterboro	July 7, 1866	April 1, 1893	April 1, 1986	10.50
Northern	Dec. 27, 1844	Dec. 30, 1889	Jan. 1, 1989	172.32
Connecticut & Passumpsic	Nov. 10, 1835	June 1, 1887	Jan. 1, 1986	110.30
Massawippi Valley	1862	Dec. 7, 1871	July 1, 2869	35.46
Connecticut River, Northampton & Springfield	March 1, 1842	Jan. 1, 1893	Jan. 1, 1992	79.85
Greenfield & Northampton	Jan. 25, 1845			
Concord & Montreal, Concord railroad	June 27, 1835	June 29, 1895	April 1, 1986	387.10
Boston, Concord & Montreal	Dec. 27, 1844			
Concord & Portsmouth	1845	May 26, 1862	Jan. 1, 1961	39.87
Suncook Valley	July 1, 1863	March 11, 1870	Jan. 1, 1912	17.41
Pemigewasset Valley	July 9, 1874	March 31, 1883	Feb. 1, 1982	22.93
New Boston	Feb. 19, 1891	June 21, 1893	June 19, 1992	5.19
Franklin & Tilton	Aug. 4, 1887	Oct. 8, 1895	April 1, 1986	4.95
Fitchburg	March 3, 1842	June 30, 1900	July 1, 1999	394.14
Vermont & Massachusetts	March 15, 1844	Jan. 1, 1874	Jan. 1, 2873	58.58
Troy & Bennington	March 27, 1851	Oct. 12, 1872	Perpetuity	5.04
Total mileage	.....	.....	.....	1,665.01

While it is impossible to give anything like a complete history of such a complicated system as that of the Boston & Maine Railroad in such a brief sketch as this must be, it is important to note some of the events in its history which stand out most conspicuously. For example, it is certainly worthy of record that the original railroad — the acorn from which the present great Boston & Maine system has sprung — was first conceived in the brain of its founder, Hobart Clark, of Andover, Mass., in the fall of 1832.

Mr. Clark, after traveling over the Albany & Schenectady Railroad, then the only line west of the Hudson river, saw the utility of a branch railroad to Andover, tapping the Boston & Lowell road (then under construction) at Wilmington.

The road was, in 1833, granted a charter under the name of the Andover & Wilmington Railroad, the first directors being Hobart Clark, Abraham Marland, Amos Abbott, John Smith, and Merrill Pettingill, all residents of Andover. The capital stock was $100,000.

Hobart Clark was elected president, and the road was surveyed under the direction of Col. Loammi Baldwin, of Charlestown, Mass., the well-known civil engineer.

Work was commenced in the spring of 1835, and the first section of the road was opened to Andover 6 Aug. 1836. By the fall of 1837 it had been opened to the Merrimac river, at Bradford; by 1840 to Exeter; by 1841 to Dover, and by 1843 to South Berwick Junction.

In 1835, a second charter had been obtained allowing the extension of the road to Haverhill, and the name was changed to the Andover & Haverhill Railroad; and a little later in the same year a charter was obtained from the New Hampshire Legislature for a road from the Massachusetts line through New Hampshire to the Maine State line, under the name of the Boston & Maine Railroad.

In the following year the Maine Legislature granted a charter extending the line to Portland, and thus was finally organized the original Boston & Maine Railroad, which to-day serves a very large section, annually transports 40,000,000 passengers and nearly 20,000,000 tons of freight, earns $35,000,000 a year, owns 17,000 freight cars and 1,200 passenger cars, carries a veritable army upon its payrolls, and operates in five States and one Canadian province.

In addition, the Boston & Maine, through ownership of a majority of the capital stock, also controls the Maine Central Railroad, although that is separately operated.

The system had its beginning in the day of small things, and to-day it exists in an era of great ones, as far as railroad policies are concerned.

The slow but certain process of amalgama-

tion which has resulted in the present vast transportation system under one management has been an exceedingly interesting one, but its history would require too much space to be given even in outline here.

It has been attended by many exciting episodes, legislative and financial, particularly with reference to the leasing of the Connecticut River road in 1893, the Concord & Montreal in 1895, and the Fitchburg in 1900.

These leases were hotly contested by minority stockholders or opposing interests, but most of the leased lines were absorbed without much show of opposition.

It has for some time been the policy of the company to purchase outright its leased lines, whenever that has been practicable.

In view of the present highly-organized condition of railroad operation it is noteworthy that when the original Boston & Maine road was first built and operated the telegraph had not been invented and double tracks were essential for the safe operation of trains.

Moreover, civil engineering was then in its infancy and surveying instruments were clumsy and primitive, the transit not even having been produced at that time.

Few of those who were engaged in building the road had ever had any experience in such work, for railroads themselves were very new then, and there is a tradition that fully 75 per cent of the surveying for the line was done without instruments and by purely visual work. There were no time fuses to aid in blasting, and not even friction matches had come into existence.

Aside from the relocation of a part of the Central Massachusetts division, made necessary by the construction of the great Wachusett reservoir, the only considerable piece of railroad in the territory now controlled by the Boston & Maine which has ever been actually abandoned was part of the original Portsmouth & Concord road. This line once ran between Suncook and Candia, and that portion of it was afterward given up for a more favorable location.

According to the latest financial report issued by the company — that for the year ending 30 June 1905 — the total earnings of the road during the previous 12 months were $36,213,245. Deducting operating expenses, $26,619,740, left the net earnings, $9,593,505, an amount that was further increased to $10,181,093, by the addition of $587,588, which represented the road's income from other sources.

EDWARD O. WOODWARD,
Conveyancer, B. & M. R. R.

Bostonians, The, a novel of American life, by Henry James, published in 1886. Written in a satirical vein, it presents with unpleasant fidelity a strong-minded Boston woman possessed by a «mission,» «who takes life hard,» is never so happy as when struggling, striving, suffering in a cause which throughout the novel is the emancipation of women.

Boswell, James, English writer: b. 29 Oct. 1740; d. 19 May 1795. He was the son of a Scotch judge, Lord Auchinleck, who took this title from the name of his estate. He was educated at Edinburgh and at Glasgow, and early displayed literary tastes. In 1763, when on a visit to London, he was introduced to Johnson, and though this first meeting was not very hopeful for the future, a warm friendship soon sprung up between them. During a year spent on the Continent, he made the acquaintance of Voltaire, Rosseau, and other prominent men of the day. Returning in 1766 he was admitted an advocate, but the practice of his profession was little to his taste. In 1768 he published a history of Corsica, with a lively account of his own experiences in the island. The same year he again met Johnson in London, and his intercourse with him was kept up by many subsequent visits to the metropolis; while Johnson himself came to Scotland in 1773, when the pair made their famous journey to the Hebrides. This year also Boswell became a member of the famous Literary Club, with various members of which, such as Burke and Reynolds, he was on terms of intimacy. In 1769 he had married, but he continued mainly dependent on his father till the latter's death in 1782, when he succeeded to the estate. In 1784 he met Johnson for the last time at a dinner at Sir Joshua Reynolds'. Two years after (1786) came out his 'Journal of a Tour to the Hebrides with Samuel Johnson, LL.D.' (Johnson's own account of the tour had appeared in 1775). Having latterly been admitted to the English bar, he went on circuit and held for a year or two the recordership of Carlisle; and from 1788 onward he mostly resided in London. In 1791 appeared his 'Life of Johnson,' a work which he had been long preparing, and which at once gave readers the same delight as it has ever since inspired. A second and enlarged edition came out in 1793. By this time Boswell's health had greatly suffered from his too convivial habits, and he died in London having been a widower since 1790. Boswell was a singular compound of sense and folly, of genuine ability and foible bordering on craziness. His good nature was universally admitted; his vanity and want of self-respect and self-control were his most evident faults. His weaknesses were easily seen, but the man who enjoyed the sincere affection of Dr. Johnson and the enduring friendship of Burke and Reynolds had better stuff in him than appeared to the superficial observer. His life of Johnson is such a masterly performance as only a genius for life-portraiture could have produced. Among editions of the Life may be mentioned that of Croker (10 vols.) and those of Rev. A. Napier (Bohn's Standard Library, 6 vols.), and Dr. Birkbeck Hill (Clarendon Press, 6 vols.), all containing the Tour. See Macaulay's essay, and the much more humane and penetrating essay by Carlyle. Boswell left two sons. The elder, ALEXANDER, born in 1775, succeeded to the family estate, sat for a year or two in Parliament, and was created a baronet in 1821. He wrote several well-known Scottish songs and various other things in verse and prose, and also set up a private press from which issued reprints of rare old works in the Auchinleck library. In 1822 he met his death in a duel with a Mr. Stuart, against whom he had made some severe attacks in a political journal. JAMES, the second son, born in 1779, died in 1822, was the editor of an improved edition of Malone's Shakspere, generally known as the 'Variorum Shakspere' (21 vols. 1821).

Bosworth, Francke Huntington, physician: b. Marietta, Ohio, 25 Jan. 1843. He was educated at Yale and Bellevue Hospital Medical

colleges. He is professor of diseases of the throat in Bellevue, consulting physician to the Presbyterian and St. Vincent's hospitals, and an authority on diseases of the nose and throat. Publications: 'Manual of Diseases of the Throat and Nose' (1881); 'A Study of Nasal Catarrh' (1882); 'Growths in the Nasal Passages'; 'The Three Tonsils'; 'Treatise on the Diseases of the Nose and Throat'; 'Malignant Disease of the Upper Air Tract'; 'Taking Cold'; 'Text-Book of Diseases of the Nose and Throat.'

Bosworth, Joseph, English philologist: b. Derbyshire, 1789; d. 27 May 1876. He was educated at Repton, Aberdeen, and Trinity College, and was ordained deacon in 1814, and after filling several livings in England was British chaplain at Amsterdam and Rotterdam for 12 years. He devoted much time to researches in Anglo-Saxon and its cognate dialects, the result of his studies appearing from time to time. His chief works are his 'Anglo-Saxon Grammar; Dictionary of the Anglo-Saxon Language; and Compendious Anglo-Saxon and English Dictionary.' In 1857 he was presented to the rectory of Water Shelford, Buckingham, and next year was appointed Rawlinson professor of Anglo-Saxon at Oxford, a post which he held till his death. He was M.A. and LL.D. of Aberdeen; Ph.D. of Leyden, and D.D. of Cambridge. In 1867 he gave $50,000 to establish a professorship of Anglo-Saxon at Cambridge. He left a certain amount of materials that he had accumulated for a new edition of his larger Anglo-Saxon Dictionary, and these have been utilized and greatly added to by Prof. Toller of Manchester in the copious Dictionary which has been published under his editorship by the Clarendon Press.

Bosworth, or **Market-Bosworth,** England, a small town in the county of Leicester, about three miles from which is Bosworth Field, where was fought, in 1485, the memorable battle between Richard III. and the Earl of Richmond, afterward Henry VII. This battle, in which Richard lost his life, put a period to the long and bloody Wars of the Roses, between the houses of York and Lancaster.

Bot-fly. In these flies, so interesting in their habits, the body is stout, hairy, like the humblebees, and they are easily recognized by having the opening of the mouth very small, with rudimentary oral organs. The middle part of the face is exceedingly narrow, and the minute antennæ are inserted in rounded pits. The eggs hatch very soon after laying, and Riley thought, from the testimony of three independent witnesses, that the sheep bot-fly is viviparous, the larvæ hatching within the body of the parent, who deposits in the nostrils of the sheep the perfectly formed and living grub.

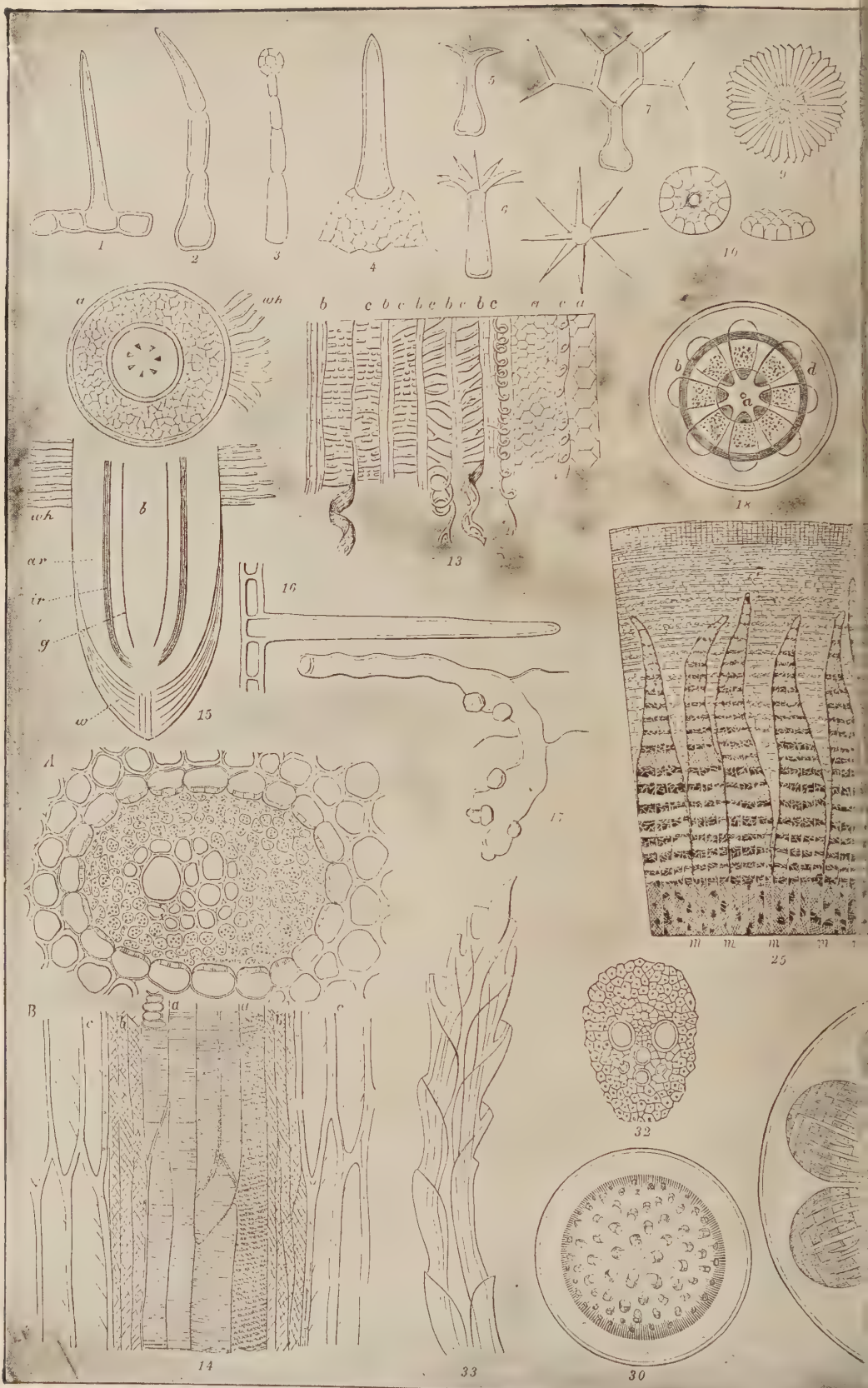
The larvæ are, in general, thick, fleshy, footless grubs, consisting of 11 segments exclusive of the head, which are spined and tuberculated, the former in rows, which enable them to move about readily when living under the skin or in the frontal sinus, and thus greatly irritate the animals on which they live. The stigmata are placed in a scaly plate on the thickened posterior end of the body. The mouth of the cutaneous larvæ consists simply of fleshy tubercles, while in those species that live in the stomach and frontal sinuses of their hosts, it is provided with horny hooks. While in this state they moult twice, and then attain their full size. They feed on the purulent matter originating from the irritation produced by the movements of their bodies. Just before assuming the pupa state, the larva leaves its peculiar habitat, descends into the ground, and there becomes a coarctate pupa (see PUPA).

Besides the horse bot-fly (q.v.), the ox bot-fly (q.v.) and the sheep bot-fly (q.v.), there is included in the genus *Dermatobia* the "ver macaque" of Cayenne and Mexico, which is found beneath the skin of man in tropical America. It is disputed whether it be a true indigenous "*Œstrus hominis,*" or one that originally attacks the monkey, dog, or other mammal. In Cayenne the species attacking man is called the "ver macaque"; in Eastern Brazil (Para) "ura"; in Costa Rica, "torcel"; in Colombia, "gusano peludo," or "muche." The "ver moyocuil" (*D. noxialis*) lives on the dog, sheep, cattle, and man; and is found in Mexico and New Granada. The larvæ are long, cylindrical, S-shaped, differing greatly in form from others of this family. The flies are closely allied to those of the preceding genus.

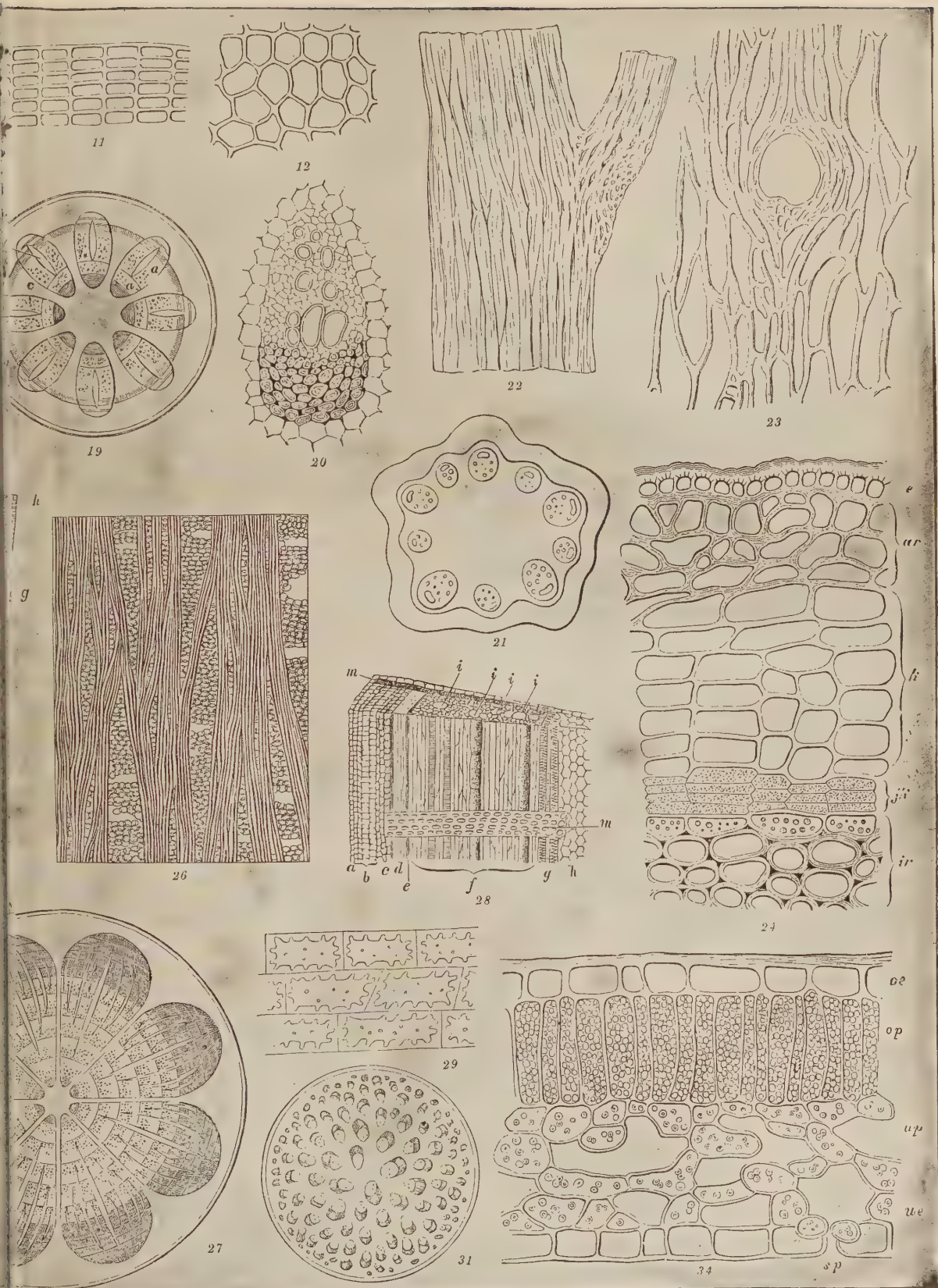
Leidy states that several specimens of the larva of a bot-fly were obtained in Honduras (by Le Conte). They were usually found beneath the skin of various parts of the body, and the eggs were suspected to have been introduced while the persons were bathing. The men were not aware of the circumstance, and the presence of the larva gave them comparatively little uneasiness. According to Krefft, a species of *Batrachomyia* is parasitic upon four species of Australian frogs. The larvæ are found between the skin and the flesh behind the tympanum. When they quit the frog the latter dies. The change to the pupa state is usually effected on the lower surface of a piece of rock in some damp locality. The perfect insect emerges in 32 days. Consult: Packard, 'Guide to Study of Insects' (1889); Brauer, 'Monographie der Oestriden' (Vienna 1863); Osborn, 'Insects Affecting Domestic Animals' (1896).

Botallack, a mine on the west coast of Cornwall, England, eight miles north of Land's End. The works are on the edge of the cliff; part of the underground workings (abandoned in 1875) extended 2,448 feet beneath the sea. The mine has been wrought for both tin and copper.

Botanical Gardens. The term botanical garden is used to designate a limited area of ground on which is grown a collection of plants including a large number of species brought together to subserve scientific, educational, æsthetic, or economic purposes. In the broadest sense, it is a museum of plants, and one of its chief ends is to represent, by means of living specimens so far as possible, the principal types of vegetation of the earth. It is impossible to cultivate more than a few thousand species on any given area under the natural conditions of soil and climate, and the open-air plantations are generally supplemented by collections grown under shelter, in glass houses, and in specially prepared soils. It has been found practicable to grow in this manner as many as 12,000 or 15,000 species of the higher plants in the botanical gardens at St. Louis and New York, at Kew, England, and at Berlin, Germany. A



Figs. 1–10 Epidermal Appendages.
Dicotyledonous stem.
in Lime-tree.
11, 12 Outer Bark of Birch.
13 Longitudinal section of vascular bundle in the Balsam
20 Cross section of a vascular bundle in do.
21 Cross section of stem of Clematis.
27 Ideal section of a Dicotyledonous stem.
28 Ideal structure of Exogenous stem.
33 Longitudinal section of Ro



ross and longitudinal sections of vascular tissue in a Fern. [13] Do. of young Alder root. [16, 17] Root-hairs. [18, 19] Ideal cross section of a vork of Vessels from stem of Sow-thistle. [24] Cross section of Black Currant Bark. [25, 26] Cross and longitudinal sections of liber ary ray of Oak. [30, 31] Ideal cross section of Endogenous stem. [32] Cross section of a Monocotyledonous vascular bundle. of Iris. [34] Vertical section of Beech leaf.

proper selection of this number may be made to represent somewhat fairly the principal forms of plants, which include about 250,000 species. That is to say, it is possible to grow in one place about one species out of every 17 in existence.

Living plants cultivated in the open air are most suitably arranged in plantations according to their general habit, and in such manner as to show their general relationships. Then special groups are often made of certain families, such as the conifers, the willows and poplars, the grasses, ferns, or mosses. The most common arrangement of plantations includes the herbaceous grounds, the aquatic plants, alpinum, viticetum, fruticetum, arboretum, and economic plantations. Some institutions bring together collections for the purpose of illustrating the local flora, or the flora of any given geographical district.

The herbaceous plantations are intended to include the representatives of small soft-bodied plants which die down to the soil during the winter or resting season, and which may or may not have a perennial underground stem-formation of some kind. Many of the species are annuals and must be grown from seeds every year.

The pools for aquatic plants are arranged to afford suitable means for the culture of forms which float or root in ponds and streams of fresh water, and include a wide variety, such as the water-lily, pondweeds, *Philotria,* water-hyacinth, etc.

An alpinum is a special plantation generally arranged to afford means of cultivation of species from cold climates on mountain-tops or in higher latitudes. Plantations of this kind are often termed rockeries, and are in the form of a ridge or hill covered with boulders. In such plantations precautions must be taken to give lime-loving plants a place among limestone rocks, and with the necessary low temperatures.

The viticetum is a plantation devoted to the cultivation of climbing and trailing vines, and may take almost any form demanded by the exigencies of practical gardening. Among the necessary features are trellises or supports for twining and tendril climbing forms.

The fruticetum includes all woody perennial plants which do not form a central trunk six feet in height, and which are therefore not trees. These are most effectively grouped when the individuals of the separate species are placed in the ground separately in a scheme of general arrangement by which every plant may be inspected from all sides and is unshaded by its neighbors.

The arboretum includes trees, and these may be variously arranged, singly or in groups, always with respect to their mutual relationships. On account of their great size and comparatively slow growth and greater permanency, the placing of trees in any given landscape scheme in a garden is attended to with the greatest care.

The economic plantations may include useful plants arranged according to their relationships, and grouped according to the use or nature of the derivative. Thus a division may be made in which only species used for medicine, foods, or clothing are included, or a division may be made to include plants which yield starches, oils, gums, and resins.

Special plantations of selected families must depend for their constituency upon the location of the garden. Thus it would be possible to form a collection of palms in a tropical garden, and one of pines or willows in a temperate climate. Geographical plantations may take any given district by variously arranged plantations.

Still another group of plantations is being made in some gardens to illustrate types of habit and structure. Some of the principal groups to be illustrated in this manner are parasites, which draw nourishment from the living bodies of other organs; saprophytes, which live on decaying organic matter; xerophytes, plants adapted to living under the driest conditions; plants with structures serving as a protection against animals. Forms of propagation and reproduction, methods of dissemination of spores and seeds, etc., also serve as subjects to be illustrated by separate groups.

The collections grown under shelter and in conservatories are generally grouped in such manner that species are partly assembled with regard to their climatic requirements, and partly according to their relationships. Thus a house may be devoted to tropical plants, or to temperate plants, or may contain only orchids, palms, ferns, cacti or succulents, or other special groups.

The part of the vegetable kingdom which may not be cultivated may be represented in a museum by dried specimens, material in preserving-fluids, and dissections of various kinds. Here again the arrangement may be upon the basis of natural relationship, or upon the basis of economic usefulness. The species which formed the vegetation of the previous geological periods are represented by fossil specimens, completing the history of the plant-world so far as it is known, and yielding suggestions as to the descent of the present types.

Two general educational purposes are served by an institution of this character. Its collections are arranged to present information on the form, relationship, mode of life, habit, and general biological character of the principal types of vegetation, in such manner as to be capable of comprehension by persons unacquainted with the technical aspects of the subject. Further interpretation of such facts may be made by means of books, journals, lectures, etc., devoted to this branch of work and study.

The material accumulated for the exploitation of popular knowledge of plants also affords an excellent basis for the induction of students into the more strictly scientific aspects of botany; and when such material is supplemented by laboratories furnished with apparatus, microscopes, and other instruments of precision, the activities of these students may be carried beyond the frontiers of the subject into the investigation and discovery of new facts and phenomena. This extension of the boundaries of knowledge concerning the plant-world may be carried on to advantage only when a library is at hand containing all of the more important literature bearing upon the subject.

Botanical gardens owe their origin to the needs of medical science, in accordance with which species showing valuable medical properties were grown in convenient places.

The first authentic record of the introduction of medicinal plants into cultivated plots of ground dates no farther back than the time of

the elder Pliny (23–79 A. D.), who writes of the garden Antonius Castor, at Rome, in which were grown a large number of medicinal plants. This step, however, may have been taken much earlier by the Greeks, Chinese, or Mexicans. Later the Benedictine monks of northern Italy paid great attention to the growing of remedial herbs, and devoted an important proportion of the monastery gardens to this purpose. This practice was also carried beyond the Alps, and in 1020 a garden was in existence at the monastery of St. Gall, in Switzerland, not far from Lake Constance, which contained 16 plots occupied by medicinal plants. A garden of this character was founded 1309 at Salerno, and another at Venice 1330.

The 16th and 17th centuries witnessed the foundation of many gardens in England, France, Germany, Holland, and Sweden, some of which have had a continuous existence to this day. The garden of Bologna was founded 1568; Leyden, 1577; Leipsic, 1579; Montpellier, 1596; Paris, 1597. The last-named was organized for the determination of «what variations were possible in the style of bouquets worn at the royal courts.» Then followed the establishment of the gardens at Giessen, 1605; Strasburg, 1620; Jena, 1629; Oxford, 1632; Upsala, 1667; Chelsea, 1680.

The number of these institutions at the present time is nearly 300, only a few of which, however, are devoted to the more important purposes named above. Many botanical gardens are merely municipal parks in which some attempt is made to exhibit special groups of plants, and are devoted chiefly to floriculture. Others are almost entirely experiment stations for the exhibition and testing of economic species, while still others find their chief usefulness as an aid in teaching botany in schools and colleges.

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Director of Laboratories,
New York Botanical Garden.

Botanical Geography. See Distribution of Plants.

Botany is that branch of biology, or the science of living organisms, which deals with plants, and is thus distinguished from zoology, which deals with animals. An individual plant, considered as a living or once living organism, may be studied in two ways — with reference to its structure or with reference to its functions. These represent the two great subdivisions of pure botanical science — anatomy and physiology respectively. All other phases of botanical science are special developments of one of these two, either alone or in combination with the other, or in relation additionally to some other branch of knowledge. Anatomy and physiology are thus the primary elements, as it were, of botany, which in varying combinations with each other and with the elements of other sciences constitute the branches of botanical science actually in existence, such as taxonomy, ecology, cytology, and pathology. The term plant anatomy is restricted frequently in actual use to gross anatomy and is often called structural botany. In this sense is covered about as much of the whole of anatomy as can be studied by the unaided eye or with a lens. Minute anatomy, or histology, covers the minute structure of plants, the principal instrument in its study being the compound microscope. A study of the relationships of plants on the basis of anatomical resemblances constitutes comparative anatomy, or morphology. The classification of plants, known as taxonomy or systematic botany, is in the main a specialized branch of morphology, for the principal means by which plants may be grouped so as to indicate their genetic relationship is a comparison of their structural differences and resemblances. In its actual study plant physiology is closely associated with plant histology because most of the functions of the plant are intimately connected with the structure of plant cells, and the physiologist must of necessity understand these structures. A special branch of botanical research which has to do with the complex structure and activities of the plant cell is known as plant cytology. The study of the diseases of plants, whether they are due to fungi or other plant organisms, or are purely physiological, is plant pathology, sometimes called vegetable pathology.

History.— Among the ancients, Aristotle the Greek philosopher (384 to 322 B.C.), Theophrastus his pupil (about 372 to 287 B.C.), the Roman naturalist Pliny the Elder (23 to 79 A.D.), and the Greek physician Dioscorides (of the 1st or 2d century A.D.) left botanical records of historical interest, but botany as a modern science has developed in the last four centuries, dating from the Reformation. The writing, particularly by the Germans, of herbals, or treatises on economic and medicinal plants, and the founding of botanical gardens, occupied most of the 16th century, but in the year 1583 Cesalpino, an Italian physician, published the first formal and comprehensive classification of plants. This, though artificial, formed the basis of all generally recognized classification to and including the time of Linnæus in the latter part of the 18th century. The 17th century was chiefly notable for advances not in the classification of plants, but in their structure and vital processes. Malpighi, an Italian, and Grew, an Englishman, almost simultaneously published their researches on the gross anatomy and the cellular structure of plants, the first of which were presented in 1671. To the work of these men in plant anatomy little of importance was added in more than a hundred years. The other important discovery of the century was the demonstration by Camerarius in 1691, through direct experiment, of the sexuality of plants. The 18th century was marked especially by advances in classification. In the year 1700 Tournefort published his 'Institutiones,' in which for the first time genera were systematically named and described. During this century Linnæus, the great botanical compiler and systematizer, brought out his successive works, culminating in the 'Species Plantarum,' in 1753. It was later in the same century, too, that botanical exploration came to be recognized as an important department of the voyages of geographic and scientific discovery in which the nations of Europe became engaged. In 1789 A. L. de Jussieu published his 'Genera Plantarum,' in which was first systematically formulated a comprehensive classification of plants according to their natural relationship, as opposed to the artificial systems followed by Cesalpino and Linnæus. In the last two decades of this century were laid the foundations of our present know-

An Alaskan Valley, Covered with Arctic Vegetation (upper).
Spruce Forest of Interior Alaska, Representing the Boreal Zone (lower).

ledge of the important part played by the air in the nutrition of plants, a proper conception of which was possible only in the light of the new developments which took place at that time in chemistry. The 19th century witnessed enormous strides in plant anatomy and plant physiology, the latter largely contributed to by workers in chemistry and physics, and the former rendered possible by improvements of the compound microscope and accessory instruments, especially those which came into general use about 1840. From this movement has been derived most of our knowledge of the life history and relationship of the lower groups of plants, the fungi, algæ, and lichens, and the assignment of the pines and their relatives to their true position next above the ferns. The whole realm of botanical research was profoundly affected by the work of Darwin, beginning with the publication of his 'Descent of Man,' in 1858, which gave a new point of view for all subsequent work. In systematic botany the principle of the development of species from a common ancestor was substituted for the old view of the constancy of species. The remarkable adaptations for cross fertilization in the coloration, odor, and structure of flowers was given its true and significant explanation as a means for originating and perpetuating species. Darwin's work gave a new philosophical basis for the interpretation of observed phenomena and facts.

Progress in the United States.— At the beginning of the 19th century the advancement of botany in North America was largely in the hands of physicians, through their requirement of a knowledge of plants as materia medica. Professors of botany were unknown. Linnæus and other great botanists in Europe had had American correspondents, and geographic expeditions accompanied by European botanical collectors had touched the margins of the continent. Some botanical exploration, chiefly by European visitors, had been effected east of the Alleghany Mountains. The centre of botanical activity was at Philadelphia, among the members of the American Philosophical Society. With Lewis and Clark's expedition across the continent to the mouth of the Columbia, in 1803–6, began a series of American explorations of the great interior, directed first to the Louisiana Purchase, then to Oregon, and finally to California. These were supplemented on the north by the British expeditions of Sir John Franklin and others in quest of a Northwest Passage. In the fifties began the Pacific Railroad surveys and these were followed by the geological surveys. All these contributed materials for the discovery, description, and orderly arrangement of the North American flora, the collections going largely into the hands of Thomas Nuttall at Harvard University, John Torrey at Columbia, Asa Gray, who was Nuttall's successor, and George Engelmann, a physician of St. Louis. Meanwhile appeared a new factor which was destined to play an important part in the development of botanical science in America, the establishment of agricultural colleges in the late sixties. These institutions created a demand for a class of botanists who did not exist in the United States or anywhere else, botanists who had brought a critical scientific training to bear on the hard problems of agriculture. For the succeeding two decades the universities of the country, including some of the agricultural colleges themselves, were busily engaged in educating the required men, a movement which resulted in the preparation of many who were competent not only to act as teachers of botany in the agricultural colleges but, a still more important matter, to act as investigators in agricultural experiment stations, one of which was established in each of the States and Territories in the late eighties. The branch of botany which received its greatest impulse was pathology, the science of the diseases of plants. Plant pathology has already been carried to a point of high scientific development and practical application attained in no other country. Systematic, or, as it is now more commonly known, taxonomic, botany has made rapid strides forward in the past two decades, largely through the application of methods developed and perfected by American ornithologists. These methods differ from others chiefly in a full consideration of the geographic relationships of plants and the examination of very large series of specimens. A new revision of the whole North American flora along these lines and accompanied by systematic botanical exploration is now under way. For the future two lines of inquiry are likely to be conspicuous in American botany, first, the principles of heredity in plants and the applied phase of the subject, plant breeding on a scientific basis; and second, the correlation of plant functions with plant structures, a work which will have far-reaching importance in broadening our understanding of the processes of nature. The geographic location of American botanical research has undergone a profound change as a result of the Spanish-American war. The area to which up to that time the energies of American botanists had been chiefly directed was the north temperate belt of one hemisphere, but they now must deal in addition with botanical problems in the tropics of both the New World and the Old World.

Classification.— The plant kingdom is divisible into five great groups, the *Myxophyta,* or slime molds; the *Thallophyta,* including the bacteria, algæ, fungi, and lichens; the *Bryophyta,* including the liverworts and mosses; the *Pteridophyta,* including the ferns and their allies; and the *Spermatophyta,* or flowering plants. The first four of these are often jointly designated as the *Cryptogamæ,* or cryptogams, in contradistinction to the *Phanerogamæ,* an older name for the flowering plants.

The *Myxophyta,* or slime molds, known also as the *Myxomycetes, Mycetozoa,* and *Myxothallophyta,* are organisms which though usually treated as belonging to the vegetable rather than the animal kingdom, have no cellulose walls covering the cells of which they are composed; pass a part of their life as plasmodia, or masses of naked creeping protoplasm similar to the animals known as amœbæ; and are reproduced without even the simplest method of sexual regeneration. Most of them resemble fungi in that they grow upon decayed animal or vegetable matter. The *Thallophyta* include a wide variety of plants, associated with each other by exclusion, on the one hand, from the animal-like *Myxophyta,* and, on the other, from the *Bryophyta* and higher plants. The plant body is commonly not differentiated into stem and leaf, and may even be unicellular; a cell wall is usually present; chlorophyll is often wanting; and frequently sexual reproduction does not ex-

ist. Among the important groups belonging to the *Thallophyta* are the *Schizomycetes,* or bacteria; the *Schizophyceæ,* or bluegreen algæ; the *Euphyceæ,* or true algæ, including the diatoms, desmids, green algæ, stoneworts, brown algæ, and red algæ; the *Eumycetes,* or true fungi; and the *Lichenes,* or lichens. The *Bryophyta,* or liverworts and mosses, are small plants, having in their life cycle a sexual generation in which the sexual organs are borne on a plant body usually differentiated into stem and leaves, followed by a non-sexual generation, which consists of a stalked or sometimes sessile spore-bearing capsule remaining attached to the plant body of the preceding generation. The female organ of reproduction consists of an oosphere in a sac called an archegonium, the walls of which are made up of many cells, much more complex structurally than the female organ of the *Thallophyta.* The male organ consists of motile antherozoids produced from an antheridium. The group consists of the *Hepaticæ,* or liverworts, some of which have a flat scale-like body called a thallus, and of the *Musci,* or mosses. The *Pteridophyta,* represented by the ferns, resemble the *Bryophyta* in their sexual organs, but differ in the possession of what is known as vascular, as opposed to merely cellular, tissues, and also in that the asexual generation becomes a large plant and maintains a separate existence independent of the earlier generation. The group includes, besides the true ferns, the grapeferns, jointrushes, clubmosses, quillworts, and a few others. The *Spermatophyta,* or flowering plants, also known as *Anthophyta* or *Phanerogamæ,* find their essential difference from the *Pteridophyta,* not in the production of flowers, but in the relationship of the sexual and the asexual generations and in the character of the sexual organs and their embryonic product. In an ordinary fern the sexual generation is a small flat green organism, resembling a thallose liverwort, growing on the ground or other substratum and deriving its nourishment from it, but in the *Spermatophyta* the sexual generation is reduced to almost microscopic dimensions, and leads no independent existence but is enclosed within the body of the non-sexual generation, the male portion consisting of the pollen grain and the tube that grows out of it when the pollen grain germinates, the female portion consisting of a minute cellular structure within the embryo sac of the ovule. It is to be noted that no motile bodies are produced, as in the two preceding groups, and that the fertilization of the ovule results in the development of an embryonic plant called a seed, which is produced by none of the lower groups of plants. The *Spermatophyta* are divided into two groups, of which the lower is the *Gymnospermæ,* including the cycads, the cone-bearing trees, and a few related families. In these the ovules are borne not in ovaries but naked among the floral bracts, and the sexual generation of the female is still comparatively complex before fertilization and bears considerable resemblance to that of some *Pteridophyta.* In the other group, the *Angiospermæ,* the ovules are borne in ovaries, and only the simplest remnant of a sexual generation persists. In this group are the *Monocotyledones,* including the grasses, palms, lilies, orchids and their relatives, and the *Dicotyledones,* including the great majority of flowering plants. The dicotyledonous and the gymnospermous plants were at one time classed as a group *Exogenæ,* in contradistinction to the group *Endogenæ,* which consisted of the monocotyledonous plants. This grouping of the flowering plants into exogens and endogens, however, is no longer maintained, it having been shown from embryological studies that the gymnosperms should stand next above the ferns. The old division of dicotyledonous plants into *Apetalæ, Gamopetalæ,* and *Polypetalæ* is also now discarded, the families included under *Apetalæ* appearing not to constitute a real group. They have therefore been interpolated among the families of the remaining two groups, most of them going with the *Polypetalæ.* All three of the old names have been abandoned, the name *Archichlamydeæ* being now used for the apetalous and polypetalous plants jointly, and the name *Sympetalæ* for the gamopetalous plants. The known species of plants as based on recent standard and conservative enumerations of the various large groups are approximately as follows:

Myxophyta	400
Thallophyta	59,000
Bryophyta	8,000
Pteridophyta	3,500
Spermatophyta	120,000
	190,900

Plants in Relation to Geology.— Plants play an important part in the configuration of the earth's surface by the prevention or retardation of erosion. This is accomplished by the direct binding action of roots on the soil, by obstructing the run-off of water as it filters through a layer of decaying vegetable matter, and by hindering the melting of snow under the shade of a forest cover. Wind erosion of sand or dust soils both on beaches and in arid regions is prevented chiefly by vegetation. In the building up of peat deposits, such as the sphagnum bogs of the Northern States, or the Dismal Swamp, Okefinokee Swamp, or the Everglades, plants are the principal factors. Deposits of coal and petroleum are of vegetable origin. The disintegration of rocks is hastened by the presence of living mosses and other plants. The fertility of soils is largely dependent on the admixture of decayed vegetable matter, or humus; and the so-called nitrifying organisms of the soil, which change nitrates, which can not be taken up as food by plants, to nitrites, which are readily absorbed, belong to a group of microscopic plants known as bacteria. A very important role in soil fertilization is played by a certain group of plants, the *Leguminosæ,* including the clovers, beans, and peas. One of the essentials of plant food is nitrogen. Ordinary plants have not the power to take free nitrogen from the air, where it exists in almost unlimited quantities, but absorb their nitrogen from certain nitrogenous substances in the soil. This element of soil fertility is soon exhausted. Leguminous plants, however, produce on their roots small tubercles containing bacteria which have the power to take free nitrogen from the air in the soil and put it into a form suitable for plant food. By the death and rotting of the plant the nitrogen thus absorbed from the air is incorporated in the soil and is available as food

1. Samuela, and Vegetation of Western Texas.
2. Yellow Pine Forest of Oregon.
3. Agave, and Vegetation of Western Texas.
4. Tree Fern, and Vegetation of the Tropical Zone.

for all sorts of vegetation. In this way the leguminous plants are almost indispensable for the rehabilitation of soils worn out by excessive cropping.

Plants in Relation to Geography.—Most of the land surface of the earth is covered by a green mantle of vegetation, which varies in its makeup at different points in accordance with several factors, the most general of which in its variation is temperature. Certain areas of the north polar and south polar regions, permanently or almost permanently covered with snow or ice, and various similarly cold areas on mountains of higher and higher elevation in lower latitudes, are devoid of vegetation. Next to this is an area of sufficient warmth in summer to produce a vegetation of herbaceous plants and shrubs but devoid of trees — the arctic, antarctic, and alpine vegetation. Then come the temperate areas of the earth, characterized by a vegetative covering able to withstand freezing during a portion of the year, yet sufficiently warm to permit an abundant growth of trees. Next follows the tropical area, with a vegetation not subjected to frost and characterized especially by forests made up in part of palms. A factor of probably even greater importance, but more broken and restricted in its distribution, is moisture. The four great temperature categories outlined above are cross-hatched by moisture lines parallel with the lines of equal precipitation. With too little moisture forests can not exist, and we have plains and deserts of grass or brush. Neither do forests exist in a soil too persistently moist and poorly drained, and thus we have moors, bogs, natural meadows, and savannas. The extreme of moisture is reached in the plants called aquatics, growing either in fresh water or in the ocean, often wholly submerged.

Each of the other factors in plant growth, light, air, food, and the complex mechanical relations of the plant, varies greatly from one locality to another, and in their various combinations with different degrees of heat and moisture they furnish an almost endless variety of environments. Each of these combinations of conditions has its characteristic association of plants, which, adapted to the conditions, and to each other, form a community. The study of plants in their detailed relation to these local surroundings forms a branch of geographic botany known as plant ecology. North America furnishes a good series of geographic areas with sufficient climatic differences to necessitate different floras. The vegetation of the continent is divided by Merriam into the following zones: Arctic, Boreal, Transition, Upper Austral, Lower Austral, Tropical. The Arctic zone extends from northern Labrador northwestward across the northern edge of the continent to Bering Strait, dipping southward along the shores of Bering Sea to Bristol Bay, Alaska. The vegetation of this zone consists of herbaceous or of depressed woody plants, trees being absent. Over large areas, known as tundra, the ground is permanently frozen underneath, a few inches of the surface thawing each summer and permitting the growth, in a cold, wet soil, of an often luxuriant but low vegetation. The Arctic zone is represented southward as far as southern California and northern Arizona by certain alpine plants on the summits of mountains high enough to have a timber line, approximately 12,000 feet in that latitude. The Boreal zone, sometimes subdivided into a northern, or Hudsonian, belt and a more southerly, or Canadian, belt, extends from the Arctic zone southward to a line traversing the northern part of New England, Ontario, Michigan, and Minnesota, jumping to the higher elevations of the Adirondack and Appalachian Mountain systems, then continuing westward across North Dakota and Assiniboia to British Columbia, dipping south in the higher elevations of the Rocky Mountains nearly to Mexico, in the Cascades and Sierra Nevada to southern California, and along the shores of the Pacific to northern California. The most characteristic feature of this zone is forests of spruce or balsam fir. The Transition zone covers most of New England, New York, Michigan, Minnesota, North Dakota, about half of South Dakota, and the southern part of Assiniboia, thence extending southward through the Plateau and Great Basin to Arizona, New Mexico, and California, in the southern parts of those States reaching down to an elevation of about 6,000 feet. The most characteristic tree of the eastern, humid part of this zone is the white pine; of the western, arid part, the yellow pine. The Upper Austral zone, as represented in the eastern United States by the so-called Carolinian flora, covers the lower Hudson valley, southern New Jersey, Delaware, eastern Maryland, the Piedmont section of the south Atlantic States, middle Tennessee and Kentucky, and most of Ohio, Indiana, Illinois, Iowa, and Missouri, northwestern Arkansas, southeastern South Dakota, and eastern Nebraska and Kansas. It is especially characterized by its forests of certain species of oak and hickory. The flora of the western part of this zone, known as the Upper Sonoran, covers the principal part of the arid western plains, from Washington and Montana southward through the Mexican plateau. The flora is devoid of trees and is commonly characterized by sagebrush or bunchgrass. The Lower Austral zone is divided, like the last, into an eastern humid and a western arid part. The eastern, containing the Austroriparian flora, covers the coastal plain from Chesapeake Bay to middle Texas, extending northward in the Mississippi valley to extreme southern Illinois and Indiana. One of the most characteristic wild plants is the cane, while cotton is the most conspicuous cultivated plant. In the arid region of western Texas, the great valleys of New Mexico, and the deserts of southwestern Arizona, southern Nevada, and southeastern California, lies the western part of the Lower Austral zone, containing the flora known as the Lower Sonoran, characterized especially by the creosote bush and the mesquite. This flora has large extensions into northern Mexico. The Tropical zone covers the lower third of the Florida peninsula, enters the extreme southern point of Texas, and on the Pacific coast reaches north on the east side of the Gulf of California to the lower Colorado and Gila rivers. From these northern extremes the tropical flora extends southward through Mexico, Central America, and the West Indies. Various genera and species of palms form the most conspicuous and characteristic features of this flora.

Plants in Their Economic Relation to Man.—Every savage race is intimately associated with the flora of its region. Having no means by which to supply the ordinary necessaries of life through foreign trade, as do many civilized

races, the savage has learned from necessity to know the precise qualities of the plants about him as foods, textiles, poisons, dyes, tans, fuels, etc. In connection with the making of a single aboriginal instrument, such as a bow or a fire-drill and block, there is required on the part of the savage a knowledge of the strength, elasticity, texture, and other qualities of all the kinds of wood occurring in the range of his travels, such as is not possessed by one person in a thousand among highly civilized races. The economic value of a correct and discriminating record of the uses of plants among aboriginal peoples is evident. The influence of a familiar flora in attracting a savage race to a wider geographic range or that of a strange flora in limiting migration in any direction is a natural outcome of the savage's exact knowledge of the plants of his native region. The practice of some of the migratory races of prehistoric man to transport their cultivated plants with them has resulted in the wide extension of these plants from the regions they naturally occupied. From this association it turns out that a critical study of the origin and distribution of the plants cultivated by aboriginal races throws important light on their prehistoric migrations. Some of these botanical facts appear to be of very great antiquity, perhaps even antedating those furnished by aboriginal arts or by language. This study of the relation of primitive man to his plant environment is called ethnobotany, or aboriginal botany. Some of the processes of plant life are important to man as being fundamental to his existence. The plant is an engine which through the energy furnished by sunlight is capable of transforming inorganic substances into organic compounds, without which animal life could not exist. The ordinary economic relations of plants to civilized man are many, and enter as important factors into such arts and industries as agriculture, horticulture, medicine, manufacture, and commerce. The production and elaboration of plant products and their transportation from those parts of the world in which they can be and are produced to other parts in which they are needed occupies probably the largest part of the energies of the human race.

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Botany Bay, New South Wales, Australia, so called by Capt. Cook on account of the many strange plants found growing here. Cook landed in Botany Bay on his first voyage in 1770, and took possession of the country in the name of his sovereign. The penal settlement, founded in 1788, and popularly known by the name of Botany Bay, was established on Port Jackson, where the city of Sydney now stands.

Botany Bay Gum, a gum resin produced by the *Xanthorrhœa hastilis,* or *resinifera,* of Australia.

Botargo, a relish made of the salted roe of the mullet or tunny, used on the Mediterranean coasts.

Botetourt, Norborne Berkeley, a conspicuous actor in American colonial history: b. England, 1734 (?); d. Williamsburg, Va., 15 Oct. 1770. He was the descendant of John Berkeley, the cavalier, who was ennobled by Charles II. in 1660. He was sent to Virginia as royal governor in 1768, just eight years before the Declaration of Independence. He had full instructions from the Crown and directions to assume more dignity than had been the wont of colonial governors, and accordingly he paraded the streets of Williamsburg with guards, a coach, and other requisites of vice-regal pomp. Conflicting duties to the king and the people made his situation most unpleasant. In 1769 the assembly took into consideration the incipient troubles with England, and on 16 May passed firm but respectful resolutions remonstrating against parliamentary taxation and the right claimed to send them to England for trial. So firm were they that Lord Botetourt summoned the speaker and burgesses before him and dissolved them. The result was that a convention met in a private house and took the incipient steps for the revolution. The convention did not attempt to legislate, but simply remonstrated with Parliament, sending its resolutions to the other colonies and to England. Under the influence of these resolutions Lord Hillsborough wrote a letter to Lord Botetourt, assuring him that it was not the intention of government to tax the colonies, and that the obnoxious imposts would be withdrawn, which letter Lord Botetourt communicated to the assembly. All these anticipations, however, were destroyed by the policy of Lord North, who succeeded Charles Townsend, and the promise was not fulfilled in full, the duty on tea being retained. Botetourt was deeply mortified, and soon died of disease aggravated by mental suffering. He was deplored by men of all classes in the colony, and the legislature erected a marble statue to his memory, which is still standing in the college of William and Mary.

Both, John and **Andrew,** two Flemish painters, were born at Utrecht about the year 1610, Andrew being the younger. They were the sons of a glass painter, who instructed them in the rudiments of drawing. They afterward made further progress in the school of Abraham Bloemaart, and went at an early age together to France and Italy. John, attracted by the works of Claude Lorraine, chose him for his model; Andrew preferred the painting of the human figure, and imitated the style of Bamboccio. But although their inclinations led them in different directions, their fraternal affection often united their talents in the same works. Thus Andrew painted the figures in the landscapes of his brother; and their labors harmonized so well, that their pictures could not be suspected of coming from different hands. The ease and fine coloring in the beautiful figures of John cannot be overlooked in spite of the excess of yellow sometimes found in them. Andrew was drowned at Venice in 1650. John, inconsolable for his loss, abandoned Italy, and returned to Utrecht, where he died shortly after.

Botha, Christian, Boer commander: b. the Transvaal; d. Kokstad, Griqualand West, 8

Oct. 1902. At the opening of the Boer war in 1899 he led a commando into Natal and was active in the siege of Ladysmith and at the defense of the Tugela crossing. After the relief of Ladysmith, he retreated to Laing's Neck, where he was left by his brother, Louis Botha, in command of the Boer forces. By opening negotiations with Gen. Buller he delayed that general's advance for several days, and after the fall of Pretoria he was placed in command of all the Boer forces in the southeastern Transvaal. His frequent raids into Zululand effected the diversion that allowed Gens. Louis Botha and De Wet to continue the war.

Botha, Louis, Boer soldier: b. Greytown, Natal, about 1864. He began life as a farmer, and, as a young man, had a share in the establishment of the Transvaal Republic. Later he fought in the Kaffir campaign. He was elected to the Volksraad at Pretoria. Upon the outbreak of the Boer war with England in 1899 he was given a subordinate command, and upon the death of Gen. Joubert in March 1900 he became commander-in-chief of the Boer forces, gaining victories at Spion Kop and Colenso. In 1906 he became Prime Minister of Pretoria.

Bothie (Gael. *bothag,* a cot), a house, usually of one room, for the accommodation of a number of work people engaged in the same employment; especially, a house of this kind in parts of Scotland, in which a number of unmarried male or female farm servants or laborers are lodged in connection with a farm. Bothies are most common in the northeast of Scotland, and are chiefly for the accommodation of unmarried male farm servants engaged on the larger farms, who as a rule have to do their cooking and keep the bothie in order for themselves. The bothie system has often been condemned.

Bothnia, the name formerly given to a country of northern Europe, extending along the east and west shores of the Gulf of Bothnia, the east portion now being comprised in Finland, and the west in Sweden.

Bothnia, Gulf of, the northern part of the Baltic Sea, which separates Sweden from Finland. It commences at the island of Aland, lat. 60° N., and extends to 66°; its length is about 450 miles, its breadth from 90 to 130, and its depth usually from 20 to 50 fathoms. As its water contains little salt, it freezes over in the winter, so as to be passed by sledges and carriages. It abounds in salmon and other fish, and also in seals.

Bothriocephalus, a genus of cestoid worms which is found very abundantly in the intestines of predaceous fishes, and one species of which is sometimes found in the intestinal canal of man. It belongs to the same family as the tapeworm (*Tænia solium*), but it is distinguished from it by having its segments broader than they are long; by wanting the four disks which surround the head of the tapeworm, and having in their place two lateral longitudinal openings; and thirdly, by having the sexual organs on one of the flat surfaces of each segment instead of at the edges of the segments. The two longitudinal openings (whence the worm receives its name, from *bothrion,* a little pit, and *kephalē,* the head) do not seem to be organs of nutrition, but merely a kind of suckers by which the worm is enabled to attach itself to the intestines of the animal which it infests, while it is nourished by absorption throughout its whole length. Although, as already stated, this worm generally infests the bodies of predaceous fishes, it is capable of being transmitted to all vertebrate animals, and especially it is found in those birds which live upon fish. The only species which is found in the intestines of man is the *Bothriocephalus latus,* and it is rare to find even this species except among the inhabitants of two distinct parts of Europe, the north and the centre. It is found, on the one hand, in Russia, in Norway, and in Sweden, and on the other hand, in Switzerland, the north of Italy, some provinces of Germany, and some departments of France, but rarely elsewhere. It has been remarked that this worm is common where the Tænia or true tapeworm is rare, and *vice versa.* It is rare in the United States, but with the increase of emigration from the regions of Europe, where it abounds, its appearance may be looked for.

Bothwell, James Hepburn, Earl of, is known in Scottish history by his marriage to Queen Mary. He was the only son of the third earl: b. about 1536; d. 1578. He succeeded his father in 1556, thus obtaining important offices and estates, and by 1566 he had attained to high favor with the queen. The plot by which Darnley lost his life in 1567 was of his contrivance, and the queen was suspected of conniving at it. Bothwell was charged with the crime and underwent a mock trial, being of course acquitted. After the death of Darnley he seized the queen near Edinburgh, and carrying her a prisoner to Dunbar Castle, prevailed upon her to marry him. Before this he had divorced his own wife, Jean Gordon, sister of the Earl of Huntly. Though seemingly secure in the possession of power, and though created Duke of Orkney by the unfortunate queen, he soon found that his conduct had roused the indignation of the kingdom. A confederacy was formed against him by the barons, the queen was liberated from his power, and he escaped to the Orkneys, and afterward to Norway. The Danish authorities kept him imprisoned for some time at Malmö, latterly at Drangholm in Zeeland, where he died insane. See the various histories of Scotland, and the 'Life of Bothwell' by Prof. Schiern (English translation 1880).

Bothwell, Scotland, a village of Lanarkshire, on the north bank of the Clyde. It is situated eight miles east of Glasgow, and about one mile beyond it stands Bothwell bridge, where a decisive battle was fought in 1679 between the Scottish Covenanters, commanded principally by their clergy, and the royal forces, commanded by the Duke of Monmouth, in which the former were totally routed. Near the village are the fine ruins of Bothwell Castle, once a stronghold of the Douglases.

Botocdos, or **Aymores,** a Brazilian race of Indians. They live 70 to 90 miles from the Atlantic, in the virgin forests of the coast range (Serra do Mar or Serra dos Aymores), on the borders of the forests of Minas-Geraes and Espirito-Santo, especially on the Rio Doce. They receive their name from the custom which they have of cutting a slit in their under lip and in the lobes of their ears, and inserting in these, by way of ornament, pieces of wood shaped like

the bung of a barrel (Portuguese *botoque*). They have oblique eyes and projecting cheek-bones. Their color is a dirty brown. They go quite naked, and paint their bodies, and a Botocudo warrior with his lip and ear plugs, his body painted black and red, and his face bright red, strongly reminds one of a denizen of the infernal regions. They are very skilful with the bow and arrow, and live chiefly by hunting. They now number only a few thousands, and are decreasing.

Botrychium, a genus of fern (adder's-tongue), of the sub-order *Osmundeæ* and tribe *Ophioglosseæ,* characterized by its distinct *thecæ* in a compound spike attached to a pinnate or bipinnate frond. The common American species are: *B. lunaria,* common moonwort, which grows on elevated lands and pastures where other ferns are seldom found. It was once supposed to possess great virtues, both magical and medicinal, and was carefully gathered by the light of the moon. *B. virginicum,* the largest of the species, is known by the name of rattlesnake fern, from growing in places frequented by that dangerous reptile.

Botrytis, a genus of fungi belonging to the section Hypomycetes, and familiar by name to cultivators from its connection with the potato disease. The genus contains a number of those minute plants known as molds and mildews, and of these some have the peculiar habit of growing in the tissues of living vegetables. The threads of which their growth consists creep among the loose cells of the under side of leaves, and send up their fertile shoots through the stomata. Many kinds of *Botrytis* are extremely destructive to various plants. Whole crops of onions are soon destroyed by one species; legumes suffer from another, but in a less degree; and a third species is sometimes injurious to turnips. The decay of the leaves and stem in the potato disease is now charged against *Phytophththora infestens,* but old writers attributed the trouble to *B. infestens.* Though extremely injurious to the farmer these molds are sometimes very serviceable by destroying weeds. Various agricultural pests may often be seen looking yellow and unhealthy, when an examination of the under side of the leaves will show that this is owing to the ravages of these minute parasites.

Botta, Anne Charlotte Lynch, American author: b. Bennington, Vt., 1820; d. 28 March 1891. She was educated in Albany, N. Y.; began her literary career in Providence, R. I., and, removing to New York, married Prof. Vincenzo Botta, in 1855. From the time of her marriage to her death, her house was a favorite centre of literary and art circles. Her publications included a collection of poems, many essays, reviews and criticisms, and 'A Handbook of Universal Literature.' She was a sculptor of much merit, and was influential in promoting the establishment of Barnard College for Women.

Botta, Carlo Giuseppe Guglielmo, Italian statesman, historian, and poet: b. San Giorgio del Canavese in Piedmont, 6 Nov. 1766; d. Paris, 10 Aug. 1837. During the time of the French Revolution he was a student of medicine at Turin, and adopting revolutionary opinions with enthusiasm, he suffered for his zeal by two years' imprisonment (1792–4). After passing as a physician he entered the French service, and accompanied the expedition which Napoleon sent to Corfu, and he was soon after elected as a member of the provisional government of Piedmont. When this territory was, in 1803, annexed to the French empire, Botta was elected a member of the Corps Législatif, where his behavior was characterized by a bold opposition to the emperor. During the «Hundred Days» he was rector of the academy at Nancy, and after the second return of the Bourbons he went in a like capacity to Rouen. The greater part of the remainder of his life was passed by him as a private gentleman at Paris. His chief works belong to the department of history. Among these are: 'Storia della Guerra dell' independenza degli Stati Uniti d'America'; 'Storia d'Italia dal 1789 al 1814' (10 vols.). He also furnished a continuation to Guicciardini's Italian History from 1490–1534, bringing it down to 1789.

Botta, Paul Emile, French traveler and archæologist: b. about the beginning of the 19th century; d. Poissy, April 1870. He was a son of Carlo Giuseppe Botta (q.v.). While still very young he made a voyage round the world, traversed the western portion of America, and took part as physician to Mehemed Ali in an expedition which set out from Egypt to Sennaar, of which he took advantage to make a considerable zoological collection. At a later period he was appointed French consul at Alexandria, and from this place he undertook a journey to Arabia in 1837, the scientific results of which he communicated to the world in his 'Relation d'un Voyage dans l'Yémen.' His chief service to science consists in his having discovered the ruins of ancient Nineveh, a discovery made by him in 1843 in the course of excavations in the neighborhood of Mosul, which he conducted with great energy and ability while acting as consular agent for the French government at that town. As the result of investigations made upon the spot he published two important works, one on the cuneiform writing of the Assyrians, 'Mémoire de l'Ecriture Cunéiforme Assyrienne,' and the other upon the monuments of Nineveh, 'Monuments de Ninive' (5 vols. folio, with drawings by Flandin, Paris). The latter is a work of great splendor, and marks an era in Assyrian antiquities. From 1847 to 1857 Botta lived as French consul-general in Jerusalem, and from 1857 to the end of his life in the same capacity at Tripoli.

Botta, Vincenzo, Italian scholar: b. in Piedmont, 11 Nov. 1818; d. 5 Oct. 1894. He was elected to the Sardinian parliament in 1849. In 1853 he settled in the United States and was appointed professor of the Italian language and literature in the University of New York. He published 'Dante,' 'Modern Philosophy in Italy,' and other studies.

Bottari, Giovanni Gaetano, Roman Catholic prelate: b. Florence, 1689; d. 1775. After completing his studies he was admitted a member of the Academy della Crusca, and entrusted with the preparation of the celebrated dictionary of that body. He labored for six years on this work, which was published in 6 volumes folio. The ability which he displayed in it induced the Duke of Tuscany to give him the management of the grand-ducal printing office. He left Florence in 1730 and settled in Rome, where

BOTTICELLI.

Nymph and Centaur.

Pope Clement XII. appointed him professor of ecclesiastical history and polemics in the Collegio della Sapienza; the same year he was appointed palatine prelate. Shortly after he was employed with the geometer Manfredi in examining the course of the Tiber from Perugia to the mouth of the Nova, with the view of rendering it navigable, and providing a remedy against its devastating inundations. The excellent report on the subject, though signed by Manfredi, is said to have been drawn up by Bottari. As a compensation for the performance of this task, the Pope appointed him keeper of the Vatican library. After living under several Popes, all of whom treated him with favor, he died at the age of 86. His works, in addition to those already mentioned, are partly original and partly corrected editions of celebrated writings previously published. Among the former are 'Lectures on Boccaccio, Livy, and Dante'; among the latter is a splendid edition of Virgil, with a learned preface and notes, and a corrected edition of Vasari's 'Lives of the Painters.'

Bottesini, Giovanni, Italian musician: b. Crema, Italy, 24 Dec. 1822; d. 7 July 1889. He was taught the double-bass in Milan, by Luigi Rossi, according to the method of Andreoli and Dragonetti, and soon became a first rate performer; meanwhile studying musical composition under several distinguished masters. When scarcely 23, he was engaged as contrabassist for the Italian opera in Havana, where in a few seasons he rose to the post of *maestro* and musical director of the company. Here he produced in 1846 his first opera, 'Cristoforo Colombo.' During the five years of his stay in Havana, he paid occasional visits to the United States, where he secured considerable fame by his wonderful performances in the concert room. His masterly handling of the huge instrument took everybody by surprise, while his style, at once elegant and impressive, won the admiration of all critics and amateurs. His success on his return to Europe in 1851 was not less complete; the concerts he gave in London and Paris established his reputation as the first living contrabassist. In 1853 he returned to the United States with M. Jullien, and afterward accompanied Madame Sontag to Mexico. Subsequently he became director of the orchestra at the Italian opera in Paris, where his opera 'L'Assedio di Firenza' was successfully performed during the spring of 1856. Other works are: 'Ali Baba' (1871); 'Ero e Leandro' (1879); 'Garden of Olivet' (1887), an oratorio. He also published numerous overtures, symphonies, and quartettes.

Böttger, or **Böttcher,** also written **Böttiger, Johann Friedrich:** b. Schleitz about 1681; d. Dresden 13 March 1719. He was a Saxon alchemist whose pretended discovery of the philosopher's stone resulted in the useful invention of Saxon porcelain. After various vicissitudes he handed over to King Augustus II. an account of his discovery, which is still preserved in the archives of Saxony. The king, however, not availing himself of his suggestions, they were put in application by Count Tschirnhausen, who established a manufactory at Weissen in 1705, employing Böttger, who succeeded in producing of the reddish-brown clay which abounds in the vicinity of Weissen a porcelain of remarkable beauty and solidity.

Botticelli, Alessandro Filipepi, ä-lĕs-sän'-drō fĭl-ĭ-pā'pē bŏt-tē-chĕl'lē, Italian painter of distinction commonly called Sandro Botticelli: b. Florence 1447; d. there, 17 May 1510 or 1515. His name is derived from that of Botticello, his first master, a goldsmith, from whom he acquired his knowledge of gold afterward made useful by his employment of it in foliage, hair, and embroidered tissues. He subsequently became one of the most distinguished pupils of Filippo Lippi, the Carmelite, and is reckoned the richest and most fanciful colorist of the Florentine school. He excelled both in devotional and mythological subjects and was an admirable painter of flowers. He was employed by the most influential art patrons of his time, including Lorenzo de Medici. About 1481 he was commissioned by Sixtus IV. to paint the walls of the Sistine Chapel; three of the frescoes there are his work: 'The Life of Moses'; 'The Temptation of Christ'; 'The Punishment of Korah, Dathan, and Abiram,' and several of the portraits of the Popes. He became an ardent follower of Savonarola, and is said latterly to have neglected his art and suffered many privations. He is said to be one of the engravers of a celebrated series of illustrations executed by Florentine artists toward the close of the 15th century, notably a set of designs for the 'Divina Commedia' of Dante, of which 686 are in the Berlin Museum. His works are to be found in various European galleries, his Madonnas being especially characteristic of his style. In these the Virgin appears peculiarly slender and with a melancholy expression as if oppressed by forebodings. He was greatly esteemed by his contemporaries, but subsequently fell into disfavor. Although opinions as to his merits differ widely, Botticelli is to-day very popular and forms the theme of much art discussion. See Ulmann, 'Sandro Botticelli' (1893); Pater, 'Studies in the History of the Renaissance' (1873); Phillimore, 'Botticelli' (1894); Berenson, 'Florentine Painters of the Renaissance' (1898); Supino, 'Sandro Botticelli' (1900); Steinman, 'Botticelli' (English translation 1901).

Böttiger, Karl August, German writer, particularly distinguished as an archæologist: b. Reichenbach, Saxony, 8 June 1760; d. Dresden, 17 Nov. 1835. After a philological course at Leipsic, he became in the first place a private tutor at Dresden, and then successively headmaster of a school at Guben, and another at Bautzen. In 1791, through the influence of Herder, he became director of the gymnasium at Weimar, and it was here that, while he enjoyed the society of Goethe, Schiller, Wieland, and other distinguished men, he began his fruitful literary career. In 1804 he removed to Dresden, where he devoted himself exclusively to archæology. Ten years later he was appointed chief inspector of the Museum of Antiquities in that city, where he continued to reside to the end of his life. In 1832 he became a member of the French Institute. Among his most important works are: 'Sabina, or Morning Scenes of a Wealthy Roman Lady'; 'Griechische Vasengemälde' ('Paintings on Greek Vases'); 'Thoughts on the Archæology of Painting'; 'Mythology of Art'; 'Lectures and Essays on Archæology'; 'Amalthea' (3 vols.).

Bottle, a vessel designed to hold liquids, constructed of various materials and in various forms according to the necessities of local manufacture and the demands of the kind of liquid to be enclosed. It is now understood to mean a vessel made of glass, with a more or less narrow neck and mouth. In ancient times, however, the bottle was nothing more than a skin of some animal. Thus the Biblical aphorism concerning the putting of new wine into old bottles as an illustration of folly means that it would not be wise to trust a new wine, while yet active with fermentation, to the chance of bursting a leathern vessel necessarily weakened by use and age. In Spain, Turkey, India, and some parts of South America to this day, various skins, and especially that of the goat, are used for containing wine and water. The hide is stripped from the animal as entire as possible, and the various natural openings having been sewed up, with the exception of that of one of the legs, which is retained as a nozzle, the vessel is ready, after a certain preliminary curing of the skin, for the reception of the wine. The peculiar taste of Amontillado sherry is supposed to be owing to the fact of its being kept in leather. The ordinary bottle is, however, of glass. The various bottles used for different well-known purposes are generally distinguished by peculiar shapes and sizes, as, for example, the English wine, beer, ale, and soda bottles, the French champagne, Burgundy, and claret, and the Rhenish wine bottles. Port wine is occasionally put into very large bottles, called magnums, and acids in still larger ones termed carboys.

Bottle Charts, maps of the terminal points of the voyages of sealed bottles thrown into the sea, and either drifting to land or picked up afloat. These bottles had long been used by the victims of ship-wreck to convey messages or record their fate, or by travelers or seamen for joke or experiment; but the first serious note taken of them was by Lieut. Becher of the British navy, who in 1843 published in the 'Nautical Magazine' a Mercator chart of the Atlantic coast from lat. 6° S. to 63° N., or say from Cape St. Roque, in Brazil, to Hudson Strait, with straight lines from start to finish of a number of bottle voyages he had noted, the length of these lines, time elapsed since set afloat, etc. Of course some bottles leak and founder and others are crushed; but he was able to collect 119 bottles, one of which had traveled 3,900 miles in a straight line, and of course far more in fact, and 4 over 2,000, while the time of voyage varied from 3 days to 16 years. This chart has been repeatedly freshened up with new facts, re-engraved, and republished in the 'Nautical Magazine.' Later, several government departments, of which the United States Hydrographic Office is far the chief, have used this method systematically for the study of ocean currents. The office furnishes shipmasters with papers for inclusion in bottles, containing requests in several different languages for their delivery, with date and circumstances of finding, to the nearest United States consul, who will forward them to Washington. By this means three or four hundred new bottle voyages have been registered, with curious results. In general, their track is remarkably uniform, given the same local conditions. Of two bottles thrown out from the Blonde within five days in 1826 (one of Becher's list), one was picked up 14 and the other 16 years after at the same spot on the French coast. Yet the effect of local winds is so great that of two set afloat simultaneously at the same spot, one was picked up on the Shetlands, the other on the west coast of France. Just north of the Azores, the surface conditions are so variable that of five bottles thrown out in one summer within 100 square miles, one drifted to the coast of Norway, two to the west coast of Ireland, one to France, and one to Spain. The longest recorded voyage was about 8,500 miles, from the Allertons, south of the Falkland Islands, to the shore of the great Australian Bight, in a little less than three years. See CHART; MAP.

Bottle-gourd. See CALABASH.

Bottle-tree, a medium-sized Australian tree (*Sterculia rupestris*) of the natural order *Sterculiaceæ.* From the top of the globular stem, as from the mouth of a bottle, the branches extend. They bear lanceolate leaves two to four inches long, and axillary panicles of inconspicuous flowers followed by leathery six-seeded follicles. The soft brittle wood is of little economic value, but the stems are said to contain much water, which is frequently obtained by the natives and by travelers. Some other allied species, also called bottle-tree, furnish edible mucilaginous roots which are largely used by the aborigines.

Bottlenose, or **Bottlehead,** a small Arctic and North Atlantic whale (*Hyperoödon rostratus*) closely allied to the sperm whale, and so called from the dolphin-like shape of its head or snout, where the two pointed teeth are in the lower jaw. Placed farther back than ordinarily, and in smaller proportion, is a dorsal fin; the skin is smooth, and glossy, lead-colored on the back, graduating into white on the belly. These whales travel in small bands, generally keeping just south of the Arctic ice, and moving northward during the breeding season. They feed mainly on deep-water squids, for which they dive to great depths. Their chief value lies in the amount of oil and spermaceti that they yield.

Bottling, the process of enclosing liquids in bottles; including the operation of stopping or corking. The use of bottles for retaining liquids involves three requisites: that they shall be clean enough not to injure the purity, taste, or looks of the contents, or the looks of the bottle, or to cause chemical action which will do so; shall be strong enough to resist the probable pressure; and shall have stoppers which will not be disintegrated or corroded, and will be tight enough not to let air in or volatile substances out, the degree of such precaution varying with the liquid. For scientific preparations, which includes chemical analysis in criminal cases, an indispensable condition is that the bottle shall contain no impurities which would cast doubt on the result; hence chemists in such cases use only new bottles, cleanse them thoroughly with some preparation to remove external substances, and expose them to a red heat before using. For common household use, as there is no bottling under pressure, the kind or weight of glass is of no importance. For cleaning, it is best to shake up with warm water and caustic soda and clean with a bottle-

brush; to clean out gummy residues like paraffine from naphtha and gasoline bottles, shake up with sulphuric acid.

The material of the stopper is of the first importance. For scientific use, only glass is possible; as also to retain corrosive acids, and perfumes that would pass through the pores of a cork, in which latter case also nice taste as well as security is a desideratum. In general family use, for volatile fluids like gasoline and naphtha, and ammonia which might soak up and disintegrate the cork and let its gas escape, rubber is the usual stopper. In commercial bottling on a large scale, of beer, wine, mineral waters, and carbonated beverages generally, the only stoppers used are cork and rubber, except in the case of siphons with valves. For wine, the old-fashioned long cork, driven deep in and pulled with a corkscrew, still holds the field. The common stopper for "soft" drinks, and in part for beer, is a "terraced" rubber one fastened to the under side of an iron cap, and attached to the neck of the bottle by a wire loop whose leverage forces the rubber tightly into the mouth of it, and can be easily thrown off and the stopper removed. But in the United States, for beer even the rubber stopper is rapidly being displaced by a patent cork made in Baltimore, consisting of a crimped metal cap lined with cork, which a machine tightens around the neck of the bottle. It is easily lifted off by an iron ring, thrown over the neck and pulled up by a short handle; is much cheaper than the permanent rubber, and nearly as handy; and is cleaner, as good houses use only new ones. Indeed the use of old corks recleaned belongs to a low grade of goods. For milk bottles and others of which the corks are to last but a few hours, and need no strength, pasteboard or wood-pulp are much used.

Old bottles, however, are used over and over; and here thorough cleanliness is a prime requisite, both for salability and because dregs of old liquor might ferment and ruin the new. If any corks have been driven in, they are extracted by machinery; for the rest, in the large establishments, the bottles are placed in rows of pockets on the surface of a large drum, which their weight, as the upper rows are added and the emerging ones taken off, causes to revolve slowly through a vat of hot solution of caustic soda, which enters the open mouths and eats out the sticky remnants of the last filling. They are then taken out and placed by sets, inverted, in a frame over revolving brushes, now consisting almost entirely of two or three rubber prongs held apart by strings or centrifugal force,— the old bristle brushes being disused because they wear out and leave bristles in the bottles,— at a speed of from 2,500 to 3,000 times a minute; then rinsed in frames of from two to four dozen vertical sprinkling tubes, over which the bottles are set, and jets of hot water forced into them. The filling is done by siphonage, or air or gas pressure. A simple form for small breweries is an open trough filled from a barrel, and supplying several siphon tubes which the operator starts by sucking them, shifting the bottles as fast as filled; the siphon is tilted up by the weight of the bottle enough to give a flow, and the liquid in the trough is kept at a constant level by a float. But in the larger ones, a row of barrels or hogsheads is drawn upon by a set of rubber pipes with stop-cocks, to which the bottles are held and filled by means of air or gas pressure, one pipe having several branches. With carbonated beverages there is danger of the bottles bursting, and they are filled in iron cages open only at the top, to protect the workmen; with heavily charged waters in siphons, the latter are of tougher glass and are tested beforehand, and the men sometimes wear rubber coverings for face, hands, or body. With flavored or sweetened drinks, the sirup is fed into the bottle from one spout while the carbonated water comes from another; in small works, however, the sirup is put in first and the bottle filled right-side up.

The recrimping of patent corks has been described; the old-fashioned long corks are shaped by a compressor and driven into the bottles by a plunger, operated either by hand or foot, or a self-feeder which can do 2,000 an hour. The corks are previously thrown into a hollow revolving drum for several hours, to rub against and batter each other, which knocks off the loose chips and shakes out the dust; then soaked and rinsed. There are wiring machines for either the small wires over the long corks, or the hinged wires with the rubber stoppers. The bottles when filled and corked are labeled by a machine, usually the bottles being laid in a crib with expansible sides, and a plunger forcing them down against the label, which at the same time is picked up and moved under the bottle across a paste roll; sometimes the label is pressed against the bottle. The speed of this process is practically limited only by the ability of the workman to feed bottles to the machine. A special label is sometimes fitted over the cork, for security against refilling the bottles of a reputed firm with inferior liquors. Sometimes the corks have a stamp or brand burnt into them with a hot die pressed down by a machine. Finally, the corks are often covered with tinfoil or caps of some kind; the former is done by hand.

Much capital is invested in this business, and there is a national association composed of manufacturers. Returns are made by nearly all these firms and companies to the association, from which it appears that this industry employs nearly 30,000 persons; it serves 4,489,038 customers, owns 22,940 horses, employs a capital of nearly $51,000,000, and owns bottles to the value of $12,747,633. Its loss of bottles annually is $3,522,804. In this line are consumed annually, besides bottles, corks in great number, wire, patented arrangements for closing bottles, paper boxes for holding bottles, sealing wax, and labels. The cost of these materials is given at $7,937,001. The capacity of corking-machines reaches 2,000 bottles per hour; that of labelling-machines 12,000 bottles daily.

Bot'tomry is the hypothecation or pledge of a vessel for the payment of a debt. The creditor has no right to take possession of the ship until the expiration of the time for which the loan is made, and then (under a bottomry contract in the usual form) only by the intervention of an admiralty court. If the loan is not repaid at the stipulated time, the lender applies to an admiralty court, which (the truth of the claim being established) decrees a sale of the ship to satisfy the debt. The conditions of such a contract usually are that, if the ship is not lost or destroyed by those risks which the

lender agrees to run, the debt is to become absolute. The risks assumed by the lender are usually the same as are enumerated in a common policy of insurance. If the ship is wholly lost in consequence of these risks, the lender loses his loan. In case of a partial damage, the bottomry bond usually provides that this damage shall be borne by the lender in the proportion of the amount loaned to the value of the ship. If this amount is equal to half the value of the ship, the lender is to bear half the amount of such loss, etc. As the lender thus assumes a certain risk he is justly entitled to a greater interest than if he did not thus take the hazard of the loss of the whole loan; and this is called "marine interest." He is entitled to the usual rate of interest on his loan, in addition to the usual premium of insurance for the same voyage or period. The stipulation for such a rate of marine interest is not a violation of the laws against usury, for it is not merely a compensation for the use of the money lent, but also for the risk assumed. The ship-owner may borrow money on bottomry whether his vessel be in port or at sea. But the captain of the ship, as such, cannot so borrow when in the port where the owner resides, or near enough to consult him on any emergency. In any other port he may pledge the ship on bottomry for the purpose of raising money necessary for repairing, supplying, and navigating her, if he can obtain it in no other way. If he borrow thus without necessity the bond is void, and the lender can look only to the personal responsibility of the captain.

Botts, John Minor, American legislator: b. Dumfries, Va., 16 Sept. 1802; d. Culpeper, Va., 7 Jan. 1869. He studied law and in 1833 entered the Virginia legislature. He was elected to Congress in 1839 and was frequently re-elected. Upon the outbreak of the Civil War he asserted his devotion to the Union, and in 1862 he suffered imprisonment on that account. After the war he published 'The Great Rebellion, Its Secret History, Rise, Progress, and Disastrous Failure'; was one of Jefferson Davis' bondsmen; and attended the Convention of Southern Loyalists in Philadelphia.

Botulism, bŏt'ū-lĭsm, a form of poisoning due to the eating of tainted sausages, ham, headcheese, or other impure meats. As a rule a certain stage of decomposition has taken place in the meat. Bacteria are abundant and generate toxins, some of which are responsible for the symptoms, which are those of acute gastro-intestinal irritation. There is usually a period of from 12 to 24 hours (even 48 hours) after the eating of the meat before symptoms develop. The symptoms are various; there may be intense muscular weakness, with sudden nausea and vomiting; chills, small rapid pulse, cold extremities, headache, and pain are also present. Following the chilly sensations the temperature may rise, even to 103° or 104° F. Cramps, delirium, hallucinations, diarrhœa, and intense prostration may also be present. In some sudden and severe cases death has resulted with cholera-like symptoms. Recovery is very protracted. Many of the cases resemble internal hemorrhage, and great difficulty sometimes exists in the diagnosis. There are, however, more intestinal symptoms as a rule in meat poisoning (ptomaine poisoning). Abstaining from all tainted meats is the sole preventive. See Poisons.

Boturini Benaduci, bŏt-ū-rē'nē bā-nä-doo'-chē, **Lorenzo,** Italian antiquarian: b., Milan about 1702; d. Madrid about 1750. In 1736 he went to Mexico and traveled there among the Indians, collecting a large number of their writings and valuable Spanish records; these finally came into the possession of the Mexican government and have been mostly lost or destroyed. He afterward lived in Spain, where he held the office of historiographer for the Indies. He wrote 'Idea de Una Nueva Historia de America.'

Bot'zen, or **Bolzano,** bŏl-tzä'nō, Austria, a town in the Tyrol, 54 miles south of Innsbruck, at the confluence of the Talfer with the Eisack. It is a well-built, flourishing town, surrounded by a wall two miles in length, built to protect it from a mountain torrent close by. The parish church is a Gothic building of the 14th century, with an elegant spire; adjoining it is the new cemetery. The other objects worthy of notice are: the church of St. Nicholas, a gymnasium, custom-house, two monasteries, a normal school, and a nunnery. It has some silk and woolen manufactures, tanneries, dye-works, etc. Botzen has an important transit trade, and has four annual fairs, resorted to by commercial travelers from all parts of Italy and Germany. In the environs wine and fruits are produced. Pop. about 12,000.

Bouch, bowch, **Sir Thomas,** English civil engineer: b. Thursley, Cumberland, 22 Feb. 1822; d. Moffat, 30 May 1880. He was early attracted to engineering studies, and in 1839 began his apprenticeship to a civil engineer in the north of England. He was a resident engineer on the Stockton & D. Ry. for a period of four years, and in 1849 went to Scotland as manager and engineer of the Edinburgh & Northern Ry. While in the service of this company he devised a sort of floating railway for carrying goods trains across such estuaries as those of the Forth and Tay. After this he was for a time engaged in railway construction in England. He was engineer of the first railway bridge across the Tay, which was completed in September 1877, and opened in May of the following year. For this he received the freedom of Dundee, and in 1879 the honor of knighthood. On 28 December of that year the bridge gave way during a stormy night, while a train with some 70 passengers was crossing. All were drowned, and the accident caused such severe mental distress to Sir Thomas Bouch that it undoubtedly hastened his death.

Bouchardon, Edmé, ĕd-mā boosh-är-dŏn', French sculptor: b. Chaumont-en-Bassigny, 1698; d. Paris, 27 July 1762. In order to devote himself to statuary he went to Paris and entered the school of the younger Coustou. He soon gained the highest prize, and was made royal pensioner at Rome. The Duke d'Antin recalled him to Paris and gave him a studio at the Louvre. He assisted in repairing the fountain of Neptune at Versailles, and executed 10 statues which adorn the church of St. Sulpice. The fountain in the Rue de Grenelle, which the city of Paris ordered to be constructed in 1739, was made by him, and is considered his masterpiece. The execution of the greatest monument of that period, the equestrian statue of Louis

XV., which was erected by order of the city of Paris, was committed to him. He labored 12 years on this with inconceivable perseverance, and has left in the horse a model which may be ranked with any work of antiquity. His pieces bear the character of simple grandeur, but, in general, more fire is to be desired in his sculpture. Latterly he adopted a more polished, delicate manner, to suit the taste of the age. Caylus has written his life.

Boucher, boo-shā, **Alfred,** French sculptor: b. Bouy-sur-Orvin, 1850. He studied under Dumont and Paul Dubois. His statues include 'Venus Astarte' and 'At the End,' both bought by the French government for the Luxembourg Gardens; 'Eve After the Fall'; 'The Earth'; and 'A Sleeping Woman.'

Boucher, François, frän-swä, French painter: b. Paris, 29 Sept. 1703; d. 30 May 1770. While a pupil of the celebrated Lemoyne he gained at the age of 19 the first prize of the Academy. He produced with remarkable facility, and his sketches alone amounted to more than 10,000. He also etched some plates, and many of his paintings have been engraved. Some of his more important works are: 'L'Aurore et Céphale'; 'Diane Sortant du Bain'; 'Femme Couchée'; 'Le But'; 'Le Repos en Egypte'; etc. He was a director of the Academy of Painters.

Boucher, bow'-chėr, **Jonathan,** English clergyman: b. Cumberland, 12 March 1738; d. Epsom, 27 April 1804. He came to Virginia about 1754; officiated first as private teacher, and, after receiving episcopal ordination in England, as rector in Virginia and Maryland until 1775, when he returned to his native country, his anti-revolutionary sentiments having given umbrage to his American congregation. From 1784 to the time of his death he officiated as vicar of Epsom, Surrey. He is the author of a glossary of provincial and archæological words, which was intended by him as a supplement to Dr. Johnson's dictionary. In 1799 he published 2 assize sermons, and 15 sermons which he had delivered during his ministry in America, and which treated of the American Revolution. These he dedicated to Washington; they are interesting from the political anecdotes which they contain.

Boucher, Pierre, pē-ār boo-shā, French pioneer in America: b. Perche, France, 1622; d. Boucherville, Canada, 20 April 1717. He came to Canada in 1635, took part in an Indian war, and was sent to France in 1660 as a deputy for the colony of New France. He was later made governor of Three Rivers. He wrote 'A True History of the Customs and Products of New France.'

Boucher de Crèvecœur de Perthes, Jacques, zhāk boo-shā dė krāv-kėr-dė pārt, French anthropologist: b. Réthel, 10 Sept. 1788; d. Abbeville, 5 Aug. 1868. Through his father, an active botanist, he came under the notice of Napoleon, and was employed in numerous missions to Italy, Germany, Austria, and Hungary. After the Restoration he lived at Abbeville. He wrote travels, poems, and an early apology for free trade; but only his works on the archæology of man are of consequence now. The first, 'On the Creation' (5 vols. 1839–41), already brought him some reputation, but his long investigations on stone weapons and other remains of early human civilization in the Tertiary and older Quaternary Diluvial strata made him famous. His most striking discovery was that of a fossil human jawbone in the quarries of Moulin-Quignon, near Abbeville, in 1863. Other works of great value are 'Celtic and Antediluvian Antiquities' (3 vols. 1846–65); and 'Antediluvian Man and His Works' (1860).

Bouches - du - Rhone, boosh dü rōn, ("Mouths of the Rhone"), a department in the south of France, in the ancient government of Provence, bounded north by Vaucluse, west by Gard, east by Var, and south by the Mediterranean. Chief town, Marseilles. Area, 1,971 square miles, of which about half is under cultivation, the remainder being occupied by forests, heaths, wastes, water, etc. Between the Rhone and the lagoon of Berre is the great plain of La Crau. Its borders are tolerably well cultivated and support a number of cattle; but the centre is little better than a desert of stones and pebbles, affording, however, winter pasture for sheep. The Rhone is the principal river; near Arles it divides into two branches which enclose an island called La Camargue. Several canals facilitate transport and are especially useful for irrigation. The climate is generally very warm, with little rain during the summer. A cold and generally violent wind, called mistral, always blows from the Cevennes after rain. It lasts from 3 to 9, sometimes, though rarely, even 12 days, and dries up the ground with astonishing rapidity. The soil of the department is for the most part arid and unproductive without irrigation. Vines, however, thrive, and almonds, figs, capers, nuts, and particularly olives, are extensively cultivated. The minerals are of little commercial importance. Salt is extensively manufactured from the lagoons, and the salt-works of Berre are celebrated both for the quality and quantity of their produce. The articles manufactured, besides salt, are principally soap, brandy, olive oil (the best in France), soda, chemicals, vinegar, scents, leather, glass, etc. The fisheries are productive. The department includes the three arrondissements of Marseilles, Aix, and Arles. Pop. (1896) 673,820.

Boucicault, Dion, dī'on boo'sē-kō, Irish dramatic author and actor: b. Dublin, 26 Dec. 1822; d. New York, 18 Sept. 1890. He was educated at London University and wrote his first play, 'London Assurance,' when he was only 19 years old. This was produced at the Covent Garden Theatre in London and won immediate success. He made his first appearance as an actor in 1852 in his own play, 'The Vampire'; in 1853–60 he was in the United States, where his success on the stage was as great as it had been in England. He founded a theatre in Washington and reconstructed the Metropolitan Theatre in New York, but was not very successful as a manager. Returning to London in 1860 he brought out 'The Colleen Bawn,' one of his best-known plays, and was at one time joint manager of the Adelphi and manager of a new theatre, the Westminster. The latter venture was unsuccessful, but he shortly afterward brought out a number of very popular plays. In 1876 he came to New York, where he lived until his death. He continued his work as both actor and playwright, and also opened the New Park Theatre on Broadway.

Boucicault wrote about 400 plays, many of which were adaptations; among the best not already mentioned are: 'Old Heads and Young Hearts'; 'Love in a Maze'; 'Used Up'; 'Corsican Brothers'; 'The Octoroon,' dealing with the condition of the slaves in the United States; 'The Streets of London'; 'The Shaughraun'; 'Daddy O'Dowd'; and 'Foul Play,' a dramatization of Charles Reade's novel of the same name. In 'The Colleen Bawn' he created one of his favorite types, the Irish hero that appears in many of his plays. He also rewrote and adapted 'Rip Van Winkle' especially for Joseph Jefferson's use. While writing his numerous plays he found time to engage in a political controversy with Lord Beaconsfield over the rights and liberties of the Irish people. He introduced many improvements in the staging of plays, being the first to use carpets on the stage and moving scenery.

Boucicault, Mrs. **Dion,** English actress. Before her marriage to Boucicault she had won success as Agnes Robertson in 'Our Clerks' and other plays. After her marriage she came with her husband to the United States, but returned with him to London in 1860 and took important parts in several of his plays. She again came to the United States and was later separated from her husband.

Boudin, Eugéne, ė-zhān boo-dăń, French painter: b. Honfleur, 12 July 1824; d. 8 Aug. 1898. He lived in Paris for most of his life, traveling somewhat in Brittany and Holland. He was devoted to the painting of seaports and river scenes, the gray expanses of French skys and waters, the picturesque confusion of ships in harbors. Among his works are: 'Fishing'; 'The Meuse at Rotterdam'; 'Low Tide'; 'High Tide'; 'Getting Under Sail'; 'A Dutch Bark at Antwerp'; and 'Bordeaux Harbor.'

Boudinot, boo-dĭ-not, **Elias,** American philanthropist: b. Philadelphia, 21 April 1740; d. Burlington, N. J., 24 Oct. 1821. He studied law at Princeton with Richard Stockton, and in 1760 commenced practice at Elizabethtown, N. J. He early became a devoted advocate of the patriot cause, and in 1774 was a member of the Provincial Convention which took the control of New Jersey out of Gov. Franklin's hands. Congress appointed him commissary-general of prisoners, 15 May 1777; he was elected to Congress in 1777, 1780, 1781, and 1782, and was chosen its president 4 Nov. 1782, and as such signed the treaty of peace with Great Britain. He was director of the mint at Philadelphia 1795–1805, being appointed by Washington, whose trusted friend and counsellor he was throughout the Revolution and afterward. From 1772 to 1805 a trustee of the College of New Jersey (Princeton), he founded its cabinet of natural history with a liberal contribution. He was active in the organization of the American Bible Society, becoming in 1816 its first president. By his will he left the bulk of his large estate to various institutions and charities. He wrote: 'The Age of Revelation' (1790), to counteract Paine's 'Age of Reason'; 'Oration 4 July 1793,' before the New Jersey Society of the Cincinnati; 'Second Advent of the Messiah' (1815); 'The Star of the West' (1816), an attempt to identify the North American Indians with the descendants of the lost tribes of Israel.

Boudinot, Elias, Cherokee Indian: d. 10 June 1839. He was one of three Cherokee youth brought before Elias Boudinot (1740–1821) in 1818, and he received that philanthropist's permission to assume his name. He was educated at the mission school at Cornwall, Conn., and married a white lady of that place. He became a man of considerable talent and ability, and of influence among his people. In December 1835, he, with others of his nation, was persuaded to make a treaty with the United States. He was thereupon accused of having betrayed his country and was murdered by the John Ross party west of the Mississippi, 10 June 1839. He published 'An Address to the Whites' (1826), delivered at Philadelphia, 25 May 1825, and edited the *Cherokee Phœnix,* 1828–34.

Boufflers, Louis François, loo-ē fräń-swā boo-flār (Duc de, dük dė), French soldier: b. 10 Jan. 1644; d. Fontainebleau, 20 Aug. 1711. He saw active service under Condé, Turenne, Crequi, Luxembourg, and Catinat, and was created a marshal of France in 1693. His defense of Namur in 1695, and of Lille in 1708, are famous. The siege of the former place was conducted by King William in person, and cost the allies more than 20,000 men. The latter was conducted by Prince Eugène. An order was sent from Louis XIV., signed by his own hand, commanding Boufflers to surrender; but he kept it secret until all means of defense were exhausted. The retreat of the French after their defeat at Malplaquet, under the direction of Boufflers, was more like a triumph than a defeat.

Boufflers, Stanislaus, Chevalier de, shĕ-vä-lē-ā dė stăn'ĭs-low, French soldier and author (son of the Marchioness of Boufflers, mistress of Stanislaus, king of Poland): b. Luniville, 31 May 1738; d. Paris, 18 Jan. 1815. He entered the army, was soon appointed governor of Senegal, and while in this office made many useful regulations. After his return he devoted himself to that light kind of literature which distinguished the age of Louis XV. His reputation gave him a seat in the States-General, where he was esteemed for his moderation and his good intentions. After 10 Aug. 1792 he left France and met with a friendly reception at Reinsberg from Prince Henry of Prussia, and Frederick William II. A large grant was made to him in Poland for establishing a colony of French emigrants. In 1800 he returned to Paris, where he devoted himself to literary pursuits which in 1804 procured him a seat in the French Institute. He lies buried near the Abbé Delille, and on his tomb is this inscription, written by himself and characteristic of his lively disposition: «Mes amis, croyez que je dors.» His works were published in 8 12mo volumes in 1815.

Bougainville, Louis Antoine de, loo-ē ăn-twăn dė boo-găń-vēl, French soldier and statesman: b. Paris, 11 Nov. 1729; d. same place, 31 Aug. 1811. At first a lawyer, afterward a distinguished soldier, diplomatist, and scholar, he was always remarkable for his energy of character. He fought bravely in Canada under Montcalm, and it was principally owing to his exertions in 1758 that a body of 5,000 French withstood successfully a British army of 16,000 men. Toward the conclusion of the battle he received a shot in the head. The governor of Canada, finding himself unable to

defend the colony, sent Bougainville to France for reinforcements. He set off in November 1758, and returned January 1759, after the king had made him colonel and knight of St. Louis. After the battle of Quebec, 13 Sept. 1759, in which Montcalm was killed, and the fate of the colony decided, Bougainville returned to France and served with distinction under Choiseul Stainville, in the campaign of 1761, in Germany. After the peace he entered the navy and became one of the greatest naval officers in France. He persuaded the inhabitants of St. Malo to fit out an expedition for the purpose of establishing a colony in the Falkland Islands, and undertook the command of the expedition himself. The king appointed him captain, and Bougainville set sail with his little fleet in 1763. But as the Spaniards had a prior claim to the islands France was obliged to surrender them, and Bougainville, having returned to France, was commissioned to carry the surrender into execution on receiving from Spain a remuneration for his expenses. For this purpose he set sail with one frigate and a merchant ship from St. Malo, 15 Dec. 1766. After the immediate object of his voyage was accomplished he circumnavigated the world and returned to St. Malo 16 March 1769. He enriched the science of geography by a number of new discoveries. In the American war he commanded several ships of the line with great honor; was in 1779 chief of squadron and in the following year field-marshal in the land forces. After 1790 he devoted himself to science, and in 1796 was admitted to the Institute.

Bougainville Island, an island in the Pacific Ocean, belonging to the Solomon group and under German protection; area, 4,000 square miles. It is separated from Choiseul Island by Bougainville Strait.

Bougainvil'lea, a small genus of South American tropical shrubs of the natural order *Nyctaginaceæ,* largely used for ornament in warm climates and in greenhouses. Their chief beauties are their large, brilliantly colored bracts, which subtend the inconspicuous flowers. In the climbing species, which are the most popular, the bracts are so numerous as to conceal the foliage and stems as well as the walls upon which the plants are trained. They often remain thus attractive for months. Because of their ease of propagation and cultivation they are rapidly growing in popularity in the United States. For discussion of species, propagation, and cultivation, consult Bailey and Miller, 'Cyclopedia of American Horticulture' (New York 1900–2).

Bough, Samuel, English painter: b. Carlisle, 8 Jan. 1822; d. Edinburgh, 19 Nov. 1878. He never obtained any systematic art instruction. In 1845 he was a scene-painter in Manchester, and later in Glasgow, where Daniel Macnee encouraged him to become a landscape-painter; and he shortly produced 'Shipbuilding on the Clyde.' Among the more important of his oil pictures are: 'Edinburgh from the Canal' (1862); 'Holy Island' (1863); 'In the Trossachs' (1865); 'The Vale of Leith' (1866); 'Kirkwall Harbor' (1867); 'Borrowdale'; 'St. Monance'; 'London from Shooter's Hill' (1872). His 'Royal Volunteer Review' (1860) is in the National Gallery of Scotland. His best oil pictures are spirited and expressive in touch, and possess a fine sense of atmosphere; but he frequently painted carelessly and hurriedly, and produced much, especially during his later years, that was unworthy of his brush. His numerous water-colors are of more uniform excellence; they are strongly influenced by the example of David Cox, and are especially remarkable for the delicate gray tones of their skies. He settled in Edinburgh in 1855. A collection of over 200 of his works was brought together in the Glasgow Institute in 1880.

Bought and Sold Notes, written memoranda of a transaction, made by the broker in the case, and delivered by him to his principals. They state respectively that the broker has bought for the vendee, and sold for the vendor, the subject of the transaction. When the broker has not exceeded his authority, both parties are bound thereby (4 Esp. 114; 2 Camp. 337). No particular form is required, but there are four kinds: (1) "Where the broker professes to act for both parties, whose names are disclosed in the note. (2) Where the broker does not disclose in the bought note the name of the vendor, nor in the sold note the name of the buyer, but still shows that he is acting as broker and not as principal. (3) Where the broker, on the face of the note appears to be the principal. (4) Where he professes to sign as broker, but is really the principal" (4 Am. & Eng. Enc. Law, 751). The bought and sold notes, however, do not constitute the contract. They may, however, be accepted as evidence of the contract, and not the original contract, when so established by the usage of trade.

Boughton, bôr'tŏn, **George Henry,** English painter: b. near Norwich, England, 1833; d. London 19 Jan. 1905. His parents came to the United States in 1839, and settled in Albany. He studied art without a master, and in 1853 went to London and Paris to continue his studies. After 1861 he resided in London. His best pictures were 'The Idyl of the Birds'; 'Hay-Harvest in Brittany'; 'The Scarlet Letter'; 'Wayside Devotion'; 'Puritans Going to Church'; 'Snow in Spring'; and 'The Return of the Mayflower.' He became a member of the National Academy in 1871; associate of the Royal Academy, London, in 1879; and member of the Royal Academy in 1896.

Boughton, Willis, American educator: b. Victor, N. Y., 17 April 1854. He graduated at the University of Michigan, and since 1892 has been professor of rhetoric and English literature at Ohio University. He has won note in the work of university extension. His writings include 'Mythology in Art' and 'History of Ancient Peoples.'

Bougie, boo-zhē', Algeria, a port on the Bay of Bougie, 120 miles east of Algiers. Bougie was the Saldæ of the Romans, and in the 5th century was a chief seat of the Vandals. Under the Arabs it was raised to such importance that it was called Little Mecca, and was the entrepôt of the trade between Christendom and north Africa; but after various vicissitudes it had sunk to a small village in 1833, when the French captured the place. Their extensive works have since rendered it a strong fortress and a commercial centre of some value. Pop. (1892) 7,862.

Bougie (Fr. "taper"), in surgery, a smooth cylindrical rod, designed to widen the canals of the human body by its introduction therein, or to apply medicaments to a particular part of the interior of the body. It is distinguished from a catheter by being solid, while the latter are hollow and open at the ends for the purpose of affording a passage for fluids. Bougies are generally pointed at one end, and grow gradually thicker toward the other end, but in some cases they are of the same thickness throughout their whole length, the ends being only rounded off. They are made sometimes of linen dipped in wax and then rolled up, sometimes of a kind of plaster and linen, also of caoutchouc or gutta-percha, or of metal, such as lead, silver, or German silver.

Bouguer, Pierre, pē-ār boo-gā, French scientist: b. Croisic, Brittany, 16 Feb. 1698; d. 15 Aug. 1758. He studied the elements of mathematics under his father, who was an able hydrographer, and is well known as the author of an excellent 'Treatise on Navigation.' In 1727 he gained a prize at the French Academy for the best essay on the masting of vessels. He gained similar prizes in 1729 and 1731, and added still more to his fame by a work entitled 'Traité de la Gradation de la Lumière,' in which he endeavors to ascertain the quantity of light absorbed by transparent bodies, explains the construction of several ingenious instruments which he had invented for the purpose of facilitating such investigations; and maintains that the light of the sun is more intense at its centre than on the edges of its disk, while in the moon the reverse is the case. About this time the figure of the earth was the subject of frequent discussion in the Academy of Sciences; and for the purpose of ascertaining exactly how much it was elevated at the equator and flattened toward the Poles, it was proposed to measure the length of a degree at each of these positions, and at the same time make other observations and experiments of importance to astronomy and navigation. An expedition was accordingly fitted out, in which Bouguer was associated with Godin and La Condamine. The main burden of the task fell upon Bouguer, who published the results in a work entitled 'Théorie de la Figure de la Terre.' A quarrel with La Condamine concerning the honors of the work embittered the latter part of his life, and probably hastened his death.

Bouguereau, Guillaume Adolphe, gē-yōm-ē ăd-ŏlf boo-grō, French painter: b. La Rochelle, 30 Nov. 1825; d. there 20 Aug. 1905. After many hardships he succeeded in reaching Paris, where he was educated at the studio of Picot and at the Beaux Arts. In 1850 he gained the Prix de Rome and went to Italy to study. His first great success was 'The Body of St. Cecilia Borne to the Catacombs' in the Salon of 1854. Among his paintings are: 'The Meeting of Christ with His Mother'; an 'Annunciation'; 'The Holy Women at the Sepulchre'; 'The Triumph of Venus,' etc. He paints portraits occasionally, but his subjects are chiefly ideal, idyllic, and religious. He is a thorough draftsman, and is thought to excel in the painting of flesh. In 1885 he received the medal of honor at the Salon, was president of the Society of Artists, and received the medal of the Legion of Honor.

Bouilhet, Louis, loo-ē boo-ē-yā, French poet: b. Cany, 27 May 1822; d. Rouen, 19 July 1869. He first achieved fame with 'Melænis, a Story of Rome' in the time of the Cæsars, and 'The Fossils,' a series of delineations of antediluvians. His versified dramas, 'Mme. de Montarcy' (1856); 'Dolorès' (1862); and especially 'The Conspiracy of Amboise,' are elegant in style, rich in imagery, perfect in melody, but lack compactness of structure and are open to moral censure. The same faults are found in his comedies, 'Uncle Million' (1861); 'Faustine' (1864); and especially in his posthumous 'M'lle Aissé.

Bouillé, François Claude Amour, frän-swä clōd ä-moor boo-ē-yā (Marquis de), French soldier: b. Cluzel Castle, Auvergne, 19 Nov. 1739; d. London, 14 Nov. 1800. He distinguished himself in the Seven Years' war; was appointed governor of Guadaloupe in 1768; and conquered Dominica, St. Eustatia, Tobago, St. Christopher, Nevis, and Montserrat. After the Peace of 1783 he returned to Paris and was appointed lieutenant-general. He afterward traveled in England, through Holland and a great part of Germany, until he was made chief of the province Trois-Evêchés. In the Assembly of Notables (1787–88) he declared for the proposed reforms of Calonne, which, however, were defeated by Cardinal Brienne. He was opposed to the plan of Necker for the union of the provinces. At the breaking out of the Revolution he supported the existing government, both in his former province and in Lorraine, Alsace, and Franche-Comté. It was only at the urgent desire of the king that he swore allegiance to the constitution of 1791. He repressed in 1790 the rebellion of the garrisons of Metz and Nancy; and although the National Assembly decreed him a vote of thanks for the bravery and ability he had displayed on this occasion, still the revolutionists distrusted him. Shortly afterward he made preparations to assist Louis XVI. in his escape. Bouillé had made his arrangements well, and had not the king forbidden any bloodshed he certainly would have rescued him. Being thus compelled to leave the king at Varennes to his fate, he fled from the dangers to which he himself was exposed by the attacks of the revolutionists. From Luxembourg he wrote a threatening letter to the National Assembly, and then exerted himself to excite the foreign powers against the republic. He succeeded well at Vienna, gained over Gustavus III., and obtained the promise of 30,000 men from the Empress Catherine II., to be put under the command of the king of Sweden and the French general. But Gustavus was murdered, the empress forgot her promises, and Bouillé went over to England in 1796. Here he wrote his 'Memoirs of the Revolution,' which appeared in an English translation (Lond. 1797), and, after his death, in the original.

Bouillon, boo-ē-yŏń, the name of one of the most distinguished historical families of France. The last Duke of Bouillon of the first line had sold the duchy to the bishop of Liége, but a new line arose toward the end of the 15th century. It originated with a cadet of the house of Marck, which, at the commencement of the 15th century, possessed the principality of Sedan. In 1482 William de la Marck, well-known as "The Boar of Ardennes," seized the

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WILLIAM ADOLPHE BOUGUEREAU.

territory of Bouillon, belonging to the bishopric of Liége, and conferred it on his brother Robert. The bishop of Liége attempted by force to regain it, but this Robert, and a son of the same name who succeeded him, were successful in resisting; and at the end of the war, which was brought to a close in 1492 by the mediation of the king of France, Robert the younger remained virtually, if not formally, Lord of Bouillon. The third Robert succeeded his father last mentioned; and having, like his predecessors, entered the service of France, was made prisoner with Francis I. at the battle of Pavia. He afterward obtained a marshal's baton, and under the name of Marshal de Fleuranges, which was the title he assumed, is known as the author of very curious memoirs. Robert IV., son of Robert III., appears to have been temporarily dispossessed by the bishop of Liége, but recovered possession, and not only became marshal of France, but received the title of Duke, and thus became the first Duke of Bouillon of the new line. He was taken by the Spaniards at the siege of Hesdin in 1553; and three years after, when he had been liberated on parole for the purpose of procuring the 60,000 crowns at which his ransom had been fixed, died by poison. His wife was a daughter of the celebrated Diana of Poitiers. His son, Henry Robert, lost Bouillon, which, by the Treaty of Château-Cambray, returned to the bishop of Liége, but he still preserved the title, and transmitted it to his son William Robert, who died in 1588 without having married. The male line thus became extinct. He was survived by a sister, who married Henri de la Tour d'Auvergne, Viscount Turenne, but died without children in 1594. She had, however, bequeathed her possessions to her husband, and thus the two powerful houses of Turenne and Bouillon were merged into one. This new Duke of Bouillon was one of the most distinguished personages of his time. He was at first devotedly attached to Henry IV. while he was fighting his way to the throne, but afterward leagued with his enemies; and, being implicated in the conspiracy which cost Marshal Biron his life, was long obliged to live in exile. He was restored to favor in 1606, and figured much during the intrigues in the subsequent part of the following reign; and, having embraced the doctrines of the Reformed Church, became one of its most distinguished leaders. He died in 1623, leaving two sons, the younger of whom was the celebrated Marshal Turenne. The elder, named Frédéric Maurice, after serving with distinction in the Low Countries, returned to France, became a Roman Catholic, served Louis XIII., then joined the insurrection against him headed by the count of Soissons, and helped him to gain the battle of Murfée. During the Fronde he joined the princes and took a prominent part in the civil war, but was reconciled to the court in 1651, obtained the title of prince, and received large accessions of territory in exchange for the principality of Sedan. He died in 1652, leaving interesting memoirs of his life and times. He was succeeded by Godefroi Maurice, who figured much in the wars of the period and became great chamberlain to Louis XIV., and who died in 1721. One of his brothers was the celebrated Cardinal de Bouillon, who was born in 1644, obtained the cardinalate when only 26 years of age, was long the representative of the Gallican Church at Rome, made himself notorious by his vanity, ambition, and intriguing spirit, and died in 1715.

Bouillon, originally a German duchy, now a large district in Belgium, 9 miles wide and 18 long, on the borders of Luxembourg and Liége. This woody and mountainous tract consists of the town of Bouillon with 2,800 inhabitants, and 25 villages with 20,000 inhabitants. The town was once the capital of the duchy of the same name. This ancient place lies in the midst of hills, on the left bank of the Semois, which abounds with fish, 40 miles from Liége and 8 from Sedan. It has a strong castle upon a rock, which, however, is commanded by the neighboring mountains. Godfrey of Bouillon once possessed the dukedom of this name. He was Duke of Lower Lorraine, and Bouillon was bestowed upon him as belonging properly to the county of Ardenne. In order to supply himself with funds for his expedition to the Holy Land, Godfrey mortgaged his duchy of Bouillon in 1095 to the bishop of Liége. After the estate had been held for many years by the bishopric, the houses of La Marck and La Tour d'Auvergne laid claims to Bouillon, but in 1641 relinquished their pretensions to the bishop of Liége for 150,000 Brabant guilders. In the war of 1672 France conquered Bouillon, and Louis XIV. gave it in 1678 to the Chevalier La Tour d'Auvergne, his chamberlain. After this time it belonged to the house of La Tour until the Revolution, when it was taken from them in 1792. The last possessor, Godfrey Charles Henry de La Tour d'Auvergne, died December 1812. By the Peace of Paris, in 1814, the dukedom was included in that of Luxembourg, which had fallen to the king of the Netherlands. The title of prince of Bouillon was assumed in 1792 by Philip d'Auvergne, captain in the British navy, and he continued to bear it till his death in 1816. The congress which met at Vienna in 1815 appointed commissioners to investigate the comparative claims of this nobleman and Prince Charles of Rohan. They decided in favor of the latter. By him it was sold to the Netherlands in 1821, and on the division of the kingdom at the revolution of 1830 it fell to Belgium.

Bouilly, Jean Nicolas, zhŏń nē-kō-lär boo-ē-yē, French poet: b. Coudraye, 4 Jan. 1763; d. Paris, 14 April 1842. He made his début with the comic opera 'Peter the Great' in 1790. For a few years he was judge and prosecuting attorney at Tours, and then was called to Paris to assist in organizing the primary school system. He was a man of ancient Roman virtue, and his character is reflected in all his works. His comedies and comic operas (music by the first masters) were eminently successful as well in Germany as in France, particularly 'The Abbé de l'Epée,' 'The Two Days,' 'Mme. de Sévigné.' He also wrote 'Stories for French Children,' and 'Counsels to My Daughter.'

Boulainvilliers, Henri de, ŏń-rē dē boo-lăń-vē-yā, French historian: b. Saint Saire, Normandy, 11 Oct. 1658; d. 23 Jan. 1722. He studied at the College of Juilli, entered the army, but shortly after became devoted to historical and antiquarian pursuits. He wrote a number of works in connection with the history of France, but is perhaps best known by his 'History of Mohammed,' in which he writes in a very Oriental style, lauds the Prophet, and

seems almost disposed to become a believer in the Koran. He is said to have been much addicted to astrology.

Boulanger, Georges Ernest Jean Marie, zhôrzh ār-nĕst zhŏñ mä-rē boo-lŏñ-zhā, French soldier: b. Rennes, 29 April 1837; d. Brussels, 30 Sept. 1891. After a successful career in Algeria and in the East he became minister of war in 1886, and the fact that a new man was in possession of that portfolio was speedily felt. He introduced many needful reforms, insisted on the adoption of a repeating rifle, and caused important experiments to be made with high explosives. In the ministerial crisis of 1887 he lost his portfolio and was appointed to the command of the 13th Army Corps, but was retired, 28 March 1888. In January 1889 he was elected deputy to the National Assembly by 81,000 majority, in consequence of which the Floquet ministry resigned. In August 1889 he was charged with embezzlement, treason, and conspiracy, and found guilty by the Senate; the elections in the 12 cantons were annulled, and he was sentenced to deportation.

Boulanger, Gustave Rodolphe Clarence, goos-täv rō-dŏlf klä-rŏñs, French painter: b. Paris, 25 April 1824; d. Paris, 22 Sept. 1888. He had a wide reputation as a painter of classical subjects; received the Prize of Rome in 1849, and was decorated with the Legion of Honor in 1865.

Boulanger, Louis, loo-ē, French painter: b. Vercelli, Piedmont, 11 March 1806; d. Dijon, 7 March 1867. He studied under Guillon-Lethière and Devérias; became acquainted with Victor Hugo and illustrated many of his works; also taking subjects for many of his paintings from the poems of Hugo and Chateaubriand. Among his paintings are 'Mazeppa,' 'The Triumph of Petrarch,' and 'Macbeth.'

Boulay de la Meurthe, Antoine Jacques Claude Joseph, än-twän zhăk klōd zhō-zĕf boo-lä-ē dė lä mĕrt (Count), French lawyer and politician: b. Chamousey, Lorraine, 19 Feb. 1761; d. Paris, 2 Feb. 1840. During the Revolution he served as a volunteer in the army, and as a judge on the bench, until the Reign of Terror, when he was outlawed. After the 9th Thermidor he was appointed presiding judge of the civil court, and afterward held the office of attorney-general at Nancy. He sat in the Council of Five Hundred, was active in the *coup d'état* of the 18th Fructidor, and aided in the revolution of the 18th Brumaire. Being appointed chairman of the legislative section in the Council of State, he took an active part in digesting the *Code Civil.* On the first restoration he kept aloof from public affairs; during the Hundred Days he was again a minister of state; on the abdication of Napoleon I. he caused his son to be proclaimed as Napoleon II., and was appointed minister of justice by the commission of government. He was, of course, outlawed by the returning king, and for four and a half years was an exile. In 1819 he was permitted to return to France.

Boulay de la Meurthe, Henri George, ŏn-rē zhôrzh (Count), son of the preceding: French statesman: b. Nancy, 15 July 1797; d. 1858. He took an active part in the revolution of 1830. In 1837 he was elected to the chamber of deputies. In 1843 he voted for the repeal of the decree of banishment against the Bonaparte family. In February 1848 he sided with the moderate Republicans, was elected to the Constituent Assembly, and there again supported the motion for the return of the Bonaparte family. When Louis Napoleon was elected president the name of Boulay de la Meurthe was placed by him at the head of the list of candidates for the vice-presidency; and the assembly almost unanimously chose him. After the *coup d'état* of 1851 he was made a member of the Senate.

Boulder, Col., city and county-seat of Boulder County, situated on Boulder Creek and the Union Pac. and other railroads; 30 miles north of Denver, the State capital. It is in a noted gold, silver, coal-mining, agricultural, and stock-raising region, at the eastern base of the Rocky Mountains. It was settled in 1858 and received a city charter in 1880; is the seat of the State University; and has three national banks, daily and weekly periodicals, and a property valuation of over $1,000,000. The famous Boulder Cañon is an object of wide interest to the tourist. Pop. (1900) 6,150.

Boulder, a rounded water-worn stone of some size; in geology, applied to ice-worn and partially smoothed blocks of large size lying on the surface of the soil, or embedded in clays and gravels, generally differing in composition from the rocks in their vicinity, a fact which proves that they must have been transported from a distance, probably by ice. When lying on the surface they are known as "erratic blocks."

Boulder Clay, the name given to the mass of clay, sand, and boulders deposited by the ice-sheet which invaded the northern portions of North America and Europe during the Pleistocene period. It is also known as "till" and "ground moraine." The material is generally compact and tenacious and shows no stratification, the stones and boulders being irregularly distributed. It represents the detritus carried along beneath the ice and finally left in its present position covering the eroded rock-surfaces upon the retreat of the glacier. Its thickness varies from a few inches to 100 feet or more; the heaviest accumulations are gathered into rounded hills called drumlins (q.v.). The stones included in boulder clay are usually oblong with rounded edges and frequently with striated surfaces, the latter being produced by the friction of the moving mass. See Drift; Glacial Period.

Boulevard, bool-vär (O. Fr. *boulevart,* a word derived from the German *bollwerk,* the same as the English "bulwark"). The word was formerly applied to the ramparts of a fortified town, but when these were leveled, and the ditches belonging to them filled up, and the whole planted with trees and laid out as promenades, the name "boulevard" was still retained, and thus came to have its present signification. The most famous boulevards are those of Paris, especially those which, in the time of Louis XIV., took the place of the fortifications on the northern side of the city, and became first a promenade and then a street. Modern usage has applied the word to many streets which were not originally ramparts, but which have been cut through the older and denser parts of the town, or have been laid out in the new quarters. All that the more modern boulevards have in

common with the older ones is that they are broad and are planted with trees. The modern boulevards are for the most part situated at some distance from the bustle of the town, and are therefore less frequented than the older ones, which are in the very heart of the city, and in the neighborhood of the chief resorts of amusement and pleasure. In the United States the name is applied to wide avenues planted with shade-trees, and with more or less ornament in the way of statuary, flower-beds, lawns, etc. The Thames Embankment, in London, though not usually called a boulevard, is of this order. See PARIS.

Boulger, Demetrius Charles, English writer: b. 14 July 1853. He is an authority on military topics and with Sir Lepel Griffin founded the 'Asiatic Quarterly Review' in 1885 and edited it for nearly five years. He has published 'Life of Jakoob, Bey of Kashgir' (1878); 'England and Russia in Central Asia'; 'Central Asian Portraits'; 'The History of China'; 'General Gordon's Letters from the Crimea'; 'Armies of the Native States of India'; 'Central Asian Questions'; 'Lord William Bentinck'; 'Short History of China'; 'Life of Sir Stamford Raffles' (1897); 'The Congo State' (1898); 'The Belgians at Waterloo'; 'India in the 19th Century' (1901).

Boulger, Dorothy Henrietta (THEO. GIFT), English novelist: b. 30 May 1847. She is a daughter of Thomas Havers of Thelton Hall, Norfolk, and married George S. Boulger (q.v.), in 1879. She began to publish in 1871, and is the author of 'True to Her Trust,' 'Pretty Miss Bellew,' 'Maid Ellice,' 'A Matter-of-Fact Girl,' 'Visited on the Children,' 'Victims,' 'Lil Lorimer,' 'An Innocent Victim,' 'A Garden of Girls,' 'Not for the Night-time,' 'Dishonored,' 'Wrecked at the Outset,' 'An Island Princess,' 'Women Who Work,' 'Cape Town Dicky,' 'The Little Colonists,' 'Fairy Tales from the Far East,' 'The Case of a Man with His Wife.'

Boulger, George Simonds, English botanist: b. Blechingly, Surrey, 5 March 1853. He has been professor of botany and geology at City of London College from 1884 and has published 'Familiar Trees' (1886–9); 'The Uses of Plants' (1889); 'Biographical Index of British and Irish Botanists,' with Britten (1893); 'The Country, Month by Month,' with Owen (1894–5); 'Elementary Geology' (1896); 'Flowers of the Field' (1900); 'Wood' (1902).

Boulogne - sur - Mer, boo-lōñ sür mãr, France, a seaport of the department Pas de Calais, at the mouth and on the right bank of the River Liane, with the suburb of Capécure on the left. The town proper consists of an upper and lower town. The former is surrounded with old and well-planted ramparts; the latter, which is the business section, has straight and well-built streets and is semi-English in character, many of the signboards being in English, the shops having an English air, and much English being spoken. The Church of Nôtre Dame (begun in 1827, consecrated in 1866) has a magnificent high altar, and a crypt, part of which dates from the 12th century. Among the churches, some of which are handsome edifices, there are several for the English population. The castle, which dates from 1231, is a massive structure, communicating with the upper town by a bridge. It serves at present as a barrack and artillery depot. Here Louis Napoleon was imprisoned in 1840. Other noteworthy buildings are the Hotel de Ville, the Palais de Justice, the large and handsome bathing establishment, the library of 50,000 volumes, the museum of natural history and antiquities, the custom-house, the exchange, etc. Boulogne carries on various industries, is one of the chief French seaports, and is a great fishing centre, giving employment to about 5,000 hands. Extensive improvements in its accommodation for shipping are being carried out or projected. There is a large passenger traffic between Boulogne and Folkestone. Steamboats run daily between this place and England. Boulogne still exhibits some Roman remains. The Northmen took it in 882 and massacred the inhabitants. In 1544 the town was taken by Henry VIII. of England after a siege of six weeks. The English retained it till 1550, when Edward VI. sold it to France for 400,000 crowns. The Emperor Charles V. demolished it in 1553. During the first republic Boulogne received the name of Port de l'Union. With a favorable wind, vessels can reach the coast of England in two or three hours from this place. Bonaparte, therefore, ordered the harbor to be made deeper, and a number of vessels to be built in order to transport the army intended for the invasion of England, and some small forts and batteries to be erected in order to strengthen the harbor and the town. A large army remained here for many months in a camp, which almost resembled a town, waiting to embark; but upon the breaking out of hostilities with Austria in 1805 they were called to other places. Pop. (1896) 46,807.

Boulogne-sur-Seine, sãn, France, a town in the department of the Seine, southwest of Paris, of which it is a suburb. It is from this place that the celebrated Bois de Boulogne gets its name. Pop. (1896) 36,984.

Boulton, Charles Arkoll, Canadian soldier and statesman: b. Coburg, 1841; d. 1899. He entered the British army in 1858 and served for 10 years. During the first Manitoba insurrection he fought against the rebels and was captured in 1870 and condemned to death; when the rebellion broke out the second time he commanded a corps organized by himself and known as the Boulton Scouts. He became a member of the Canadian Senate in 1889. He wrote 'Reminiscences of the Northwest Rebellion.'

Boulton, Matthew, English engineer: b. Birmingham, 3 Sept. 1728; d. Soho, 17 Aug. 1809. After being educated at a grammar school he was instructed in drawing by Worlidge, and he also studied mathematics. He engaged in business as a manufacturer of hardware, and as early as 1745 he is said to have invented and brought to great perfection inlaid steel buckles, buttons, watch-chains, etc., of which large quantities were exported to France, whence they were repurchased with avidity by the British as "the offspring of French ingenuity." In 1762 Boulton, finding his manufactory at Birmingham too confined for his purposes, purchased a lease of the Soho, about two miles distant, in the county of Stafford. This spot, then a barren heath, was gradually converted into an exten-

sive manufactory and school of the mechanical arts, where ingenious men found ample employment for their talents from the liberal patronage of the proprietor. The introduction of that important machine, the steam-engine, at Soho, led to a connection between Boulton and James Watt, of Glasgow, who became partners in trade in 1769.

Bouncing Bet, or **Old Maid's Pink,** an old-time garden flower common as a weed. See SOAPWORT.

Bound Brook, N. J., a town of Somerset County, situated on the Raritan River and on the Baltimore & O., the Central N. J., the Lehigh Valley, and the Philadelphia & R. R.R.'s. It has a large lumber trade, and manufactures woolen goods, electric dynamos, paint, roofing-paper, etc. During the Revolutionary War it was the scene of a surprise of the American troops by Cornwallis. The Americans, being largely outnumbered, were forced to retreat after a short battle. Pop. (1900) 2,622.

Boundaries, American. English monarchs were very ignorant of American geography and were perpetually making grants irreconcilably and even grotesquely conflicting; as when the grants to New Hampshire and New York each included all of Vermont, and those «westward to the South Seas» included all the possible territory out of which later grants, often with the very same phraseology, were made. The Wyoming dispute between Connecticut and Pennsylvania, and the Western Reserve of the former in Ohio, are only samples of the endless wrangles occasioned by these royal gifts; and a considerable part of intercolonial history is the account of the struggles — by influence before the Privy Council, or by compromise or outright war among themselves — by which the present limits were gradually shaped. Short of this, much interesting history is involved in the surveys, from that of Mason and Dixon's Line down to that between Connecticut and Massachusetts, which rectified lines admitted in theory. After the Revolution, jurisdiction over boundaries was assumed by Congress, which, in 1781, under the Articles of Confederation, provided minutely for the selection of a court to determine such cases, modeled on the Grenville Act of 1770. The adoption of the Constitution in 1788 placed all such matters in the final determination of the supreme court. The boundaries between foreign powers and the United States as a whole present a different problem, or rather a series of problems; for which see also ALASKA; ANNEXATIONS; CANADA; FLORIDA; GADSDEN TREATY; LOUISIANA PURCHASE; MEXICAN WAR; NORTHEAST BOUNDARY; OREGON QUESTION; TREATY OF VERSAILLES.

Bounty, a grant or benefaction from the government to those whose services directly or indirectly benefit it, and to whom, therefore, it desires to accord some recompense, or at least recognition. In law and commerce, it is a premium paid by a government to the producers, exporters, or importers of certain articles, or to those who employ ships in certain trades. This is done either with the view of fostering a new trade during its infancy, or of protecting an old one which is supposed to be of special importance to the country. In 1890 Congress passed an act providing for a premium to be paid to the producers of cane, beet, and sorghum sugar by way of bounty. This bounty was in the nature of a contract (made with each and every person in the United States engaged in the cultivation of such varieties of sugar), providing that, in the event their produce attained a given standard of saccharine strength, they should receive the bounty provided therefor by the appropriation from the treasury. This act greatly stimulated the sugar-producing industry of the country, and large amounts of money have been invested, and a larger amount of sugar has been produced in the United States during the years that have followed the passage of the act than in any equal period in the history of the country. All bounties or premiums are not offered for the encouragement of domestic talent and industry to the exclusion of foreign competition. Many of those offered by the British and French governments, and by private associations, are held out to all competitors indiscriminately; and where the object is universal improvement, this is one of the appropriate modes of encouragement, though others concur with it, such as the monopolies of copyrights and patents, and the honors and distinctions conferred on those who make any important improvement. One other class of cases may, properly enough, be made the subjects of bounties or premiums; namely, the productions of extraordinary efforts of ingenuity and skill. A competition is in this way excited, by which none suffers, and all the effects of which are beneficial to a community.

Bounty Mutiny. See BLIGH, WILLIAM.

Bounty-jumper, a term used during the Civil War in the United States to denote one who enlisted in the United States military service to secure the bounty paid by the government for volunteers, and then deserted. Some of these enterprising individuals carried on a regular business of enlisting in one place under a certain name, hurrying to the front, receiving the bounty, deserting at once upon its receipt, and reappearing in some other place under a different name, only to re-enlist and repeat the process. The risks were great, but as the bounty was, in some cases, quite large, the practice found many votaries.

Bounty Lands. By royal proclamation of 7 Oct. 1763, American colonial governors were prohibited from making land grants west of the sources of the rivers flowing from the west or northwest into the Atlantic. This was to quiet the apprehensions of the Indians in the Ohio region that their lands were to be granted out. But Lord Dunmore of Virginia was empowered to offer bounties in land to all officers and soldiers who had served in the French and Indian war, and should personally apply to him for warrants,— 5,000 acres to each field officer, 3,000 to captains, 200 to subalterns or staff officers, and 50 to private soldiers,— up to 200,000 acres, from the king's domain either in Canada or Florida, or the «crown lands.» This was understood by Americans to mean precisely the above western lands, and those who had the ability and foresight selected choice tracts beyond the Alleghanies provisionally in hope of the government validating them later. Washington, for example, by himself and his land agent Crawford, had surveyed 70,000 acres, and secured patents in his own and other officers' names for 63,000, of which his own share was

32,000. Dunmore began giving these warrants on his own responsibility as early as July 1773, and on 21 Jan. 1774 notified all gentlemen, officers, and soldiers to have their surveyors assemble at the mouth of the Great Kanawha River and proceed to survey their claims. The land agents and surveyors who went down the river were stopped and in some cases attacked by the Indians; and this was one of the agencies in bringing about Dunmore's War (q.v.), although trouble had been gathering for a long period from white settlement and Indian murders. The name «bounty lands» has been defined as pertaining to the Northwest Territory lands belonging to the States, because on 16 Sept. 1776 Congress offered land bounties to volunteers in the Revolution (assessing the money to buy them on the several States, to which Maryland objected because the other States had lands and she had none, and so would be unfairly taxed); but it does not appear that the phrase was ever used of them at the time.

Bouquet, boo-kā, **Henry,** British officer in the French and Indian wars: b. Rolle, Switzerland, 1719; d. Pensacola, Fla., 23 Aug. 1765. He entered the army of the States-General of Holland, then served in the Sardinian army against France and Spain but returned to the Dutch service in 1748 as an officer of the Swiss Guards. When war broke out between France and England in 1755, Bouquet was made lieutenant-colonel of an English regiment known as the Royal Americans. He reached Philadelphia in 1756 and in 1757 was ordered to Charleston with a small detachment of his regiment; but in 1758 returned to Pennsylvania and was made second in command of an expedition against Fort Duquesne in which George Washington also took part. The French deserted and set fire to the fort before the expedition reached there. This gave the control of Pennsylvania to the English, but Bouquet remained in the province, mostly at outlying posts. In 1763 the Indians united in an attempt to expel the English; they massacred many settlers, coming within a few miles of Lancaster, and blockaded Fort Pitt. There was no time to raise provincial troops if the fort was to be saved, so Bouquet set out with a force of 500 regulars, made his way through the forest, taking every precaution against surprise, and defeated the Indians at Bushy Run, within 20 miles of Fort Pitt. The number of the Indians that attacked him was as great as his own force, and his soldiers had never seen Indian warfare, but by skilfully feigning a retreat Bouquet drew the Indians from their cover and completely routed them by a sudden charge. In the following year he led a force of regulars and provincial troops to the forks of the Muskingum River, 150 miles west of Pittsburg. The Indians, overawed by his former victory and by his boldness in penetrating so far into the wilderness, were ready to make peace and surrender their white prisoners. He was subsequently made brigadier-general and commandant of the Southern Colonies of British America and went to Pensacola, where he died.

Bouquet, Jean Claude, zhŏń klōd, French mathematician: b. 1819; d. 1885. In 1865 he became professor of mathematics in the Faculté des Sciences of Lyons. He was then called to Paris, where he taught special mathematics at the Bonaparte Lyceum, and subsequently at the Louis-le-Grand Lyceum. In 1873 he was appointed professor of mechanics at the Sorbonne, and was elected member of the Academy of Sciences in 1875 in the place of M. Bertrand. He also received the decoration of the Cross of the Legion of Honor.

Bouquet de la Grye, Jean Jacques Anatole, zhŏń zhäk ăn-ạ-tōl boo-kā-dĕ-la-gre′, French hydrographical engineer: b. Thiers, Puy-de-Dôme, 20 May 1827. He studied at the Polytechnic School, whence he was graduated in 1847 in the hydrographical engineers, and in 1866 he became their engineer-in-chief. He became a member of the Institute; commander of the Legion of Honor, and a member of the Academy, elected in 1884. He is also a member of the bureau of longitudes and vice-president of the committee on hydrography. A project which he has long urged is to make Paris a seaport by means of a ship-canal up the Seine. He is also known as an inventor and improver of astronomical instruments. He has written 'Paris as a Seaport'; 'Notes on Soundings of the Sea'; 'A Hydrographic Study on the Bay of Rochelle,'; etc.

Bouquet of Wine, a pleasant, non-spirituous aroma characteristic of good wines, and named on account of its real or fancied resemblance to the odor of flowers and fruits. The precise chemical nature of the substances that give rise to the «bouquet» is not known. They consist partly, without doubt, of a mixture of compound ethers, derived from fatty acids that are produced by the oxidation of albuminous substances and vegetable fats or oils. Essential oils of various kinds must also be included among them. According to some authorities, the kind of yeast that is used in the fermentation has much to do with the bouquet that is developed. Fruit blossoms are occasionally added to the must on account of the «ferment oil» that is developed by their fermentation, and which communicates a fruity smell to the wine. Elder flowers, when added to the must in this way, give rise to an aroma of Muscatel bouquet.

Bouquetin, boo-k'tăń′, a wild goat of the Alps and Pyrenees. See IBEX.

Bourbaki, Charles Denis Sauter, shärl dĕ-nē sō-tā boor-ba-ke, French general: b. Pau 22 April 1816; d. Bayonne 22 Sept. 1897. He entered the army in 1836, and fought in the Crimea and Italy. In 1870 he commanded the Imperial Guard at Metz, whence he was sent to England on a secret mission to the empress. Under Gambetta he organized the Army of the North, and commanded the Army of the Loire. His attempt to break the Prussian line at Belfort, though ably conceived, ended in disastrous failure; in a series of desultory attacks on a much inferior force, 15–17 Jan. 1871, he lost 10,000 men. In the wretched retreat to Switzerland that followed on the 27th, reduced to despair by the ill success of his plans, he attempted to commit suicide. From 1873 to 1879 he commanded the 14th Army Corps at Lyons, and in 1881 he retired from service.

Bourbon, Antoine de, än-twän dė, Duke of Vendôme, and afterward king of Navarre: b. 22 April 1518; d. 17 Nov. 1562. He married, in

1548, Jeanne d'Albret, only child of Henry II., king of Navarre, and assumed the title of king in her right. After the accession to the throne of France of the young king Francis II., he endeavored to obtain the control of the affairs of that country, but failed through his want of energy and perseverance. On the death of Francis II., in 1560, he was made lieutenant-general of the kingdom and adviser to the queen mother (Catherine de Medici) during the minority of her son. Upon the breaking out of the civil war, in 1562, he commanded the royal forces, and died of a wound received at the siege of Rouen. His son, Henry of Navarre, became king of France, as Henry IV. (1594).

Bourbon, Charles (CARDINAL), French prince and prelate; brother of Antoine de Bourbon; uncle to Henry IV., king of France: b. 22 Dec. 1520; d. Fontenay-le-Comte 9 May 1590. He was archbishop of Rouen, legate of Avignon, cardinal, peer of France, and member of the Council. In spite of family ties he ardently supported the Guises and the League, and was declared by that faction heir presumptive to the throne on the ground that his brother, Antoine, through heresy, had forfeited his claim. On the death of Henry III. he was declared king, as Charles X., and was recognized by a majority of the *parlements;* though he was all the while a prisoner at Fontenay-le-Comte.

Bourbon, Charles shärl (DUKE OF BOURBONNAIS), French general, known as CONSTABLE DE BOURBON; son of Gilbert, Count of Montpensier and Clara of Gonzaga: b. 17 Feb. 1489; d. 6 May 1527. He received from Francis I., in the 26th year of his age, the sword of Constable. By the coolness with which he faced death in posts of the greatest hazard he excited the admiration of his fellow-soldiers. When viceroy of Milan he won all hearts by his frankness and affability. His fame was not yet tarnished when the injustice of his king deprived him of his offices, banished him from France, and brought the family of Bourbon into disgrace, in which state it continued until the conclusion of the reign of Henry III. Whatever may be the true cause of her conduct, it is certain that the Duchess of Angoulême, mother of Francis I., strove to invalidate a formal donation of Louis XII. The constable, enraged at seeing himself deprived of his estates by the mother of the king whom he had served with so much fidelity and zeal, listened to proposals made him by Charles V. and the king of England. He experienced the usual fate of deserters; he was well received while his services were needed, but narrowly watched to secure his fidelity. Exposed as he was to the contempt of the Spanish nobility and the jealousy of the generals of Charles V., nothing remained to him but his courage and repentance. His ability, however, induced the emperor to bestow upon him the command of an army, and to treat him with honor. He was already beyond the confines of France, when Francis I. sent to demand the sword which he bore as constable, and the badge of his order. His answer displays the anguish of his heart:—"The king took from me my sword at Valenciennes, when he gave to D'Alençon the command of the vanguard, which belonged to me: the badge of my order I left under my pillow at Chantelles." His flight was a misfortune to France; the expedition of Francis into Italy was arrested. Having been appointed to the command of the imperial troops, he made an unsuccessful attack upon Marseilles, but contributed greatly to the victory of Pavia. When Francis was carried a prisoner to Madrid he went there in person, that he might not be forgotten in the treaties between the two monarchs; but Charles V. delayed concluding them, and Bourbon discovered that he could not trust the emperor, who had even promised him his sister in marriage. Compelled to smother his resentment he returned to Milan, maintained possession of Italy by the terror of his arms, and obtained so much authority as to become an object of suspicion to the emperor, who, in order to weaken him, refused to grant him the necessary supplies. In order to prevent the dispersion of his army he led the soldiers to the siege of Rome, the plunder of which city he promised them. He was the first to mount the breach, and was killed by a ball, shot, it is said, by Benvenuto Cellini. His body being conveyed to Gaeta, his soldiers erected over it a splendid monument, afterward destroyed. See Coignet, 'Francis the First and His Times' (1888).

Bourbon, Louis, loo-e, Spanish prelate: b. 1777; d. 19 March 1823. He was the son of the infant Louis, brother of King Charles III. of Spain, and the Duchess of Chinchon. The marriage was concluded with the royal assent: nevertheless, it was doubted, after the death of Charles III., whether the prince would be lawful heir to the throne, if a male descendant of the old line should be wanting. He therefore entered the Church, was appointed archbishop of Seville in 1799, and of Toledo in 1800. A cardinal's hat was also given to him in 1800. After the imprisonment of Ferdinand VII. at Valençay, he joined the party of the Cortes, and became very influential. He offered, in 1814 the constitution of the Cortes to Ferdinand VII. for his signature; and the king having altered his determination, Bourbon lost his favor and was deprived of the archbishopric of Seville. After the events which took place on the insurrection of the army at the island of Leon, he engaged in the revolution, and was president of the provisional junta before which the king swore, at Madrid, 9 March 1820, to abide by the constitution of the Cortes of 1812.

Bourbon, Louis Henri, loo-e ŏn-re (DUC DE), French courtier, Prince of Condé: b. Versailles, 1692; d. Chantilly, 27 Jan. 1740. As chief of the Council of Regency and superintendent of the king's education, he robbed the public treasury and extorted huge bribes. Made prime minister in 1723, he persecuted the Protestants, and granted exorbitant privileges to the India Company, in which he held shares. He was entirely controlled by his mistress, the Marquise de Prie.

Bourbon (boor-bôn) **Family.** The founder of this family, which has governed France, Spain, the two Sicilies, Lucca, and Parma, was Robert the Strong, who, in 861, became Duke of Neustria, and in 866 lost his life in a battle against the Normans. Some trace his descent from Pepin l'Heristal, others from a natural son of Charlemagne, and others from the kings of Lombardy. It is certain that the two sons of this Robert were kings of France. The elder,

named Eudes, ascended the throne in 888, and died in 898; the younger, Robert, in 922, and died in 923. The eldest son of this Robert was Hugh the Great, Duke of the Isle of France, and count of Paris and Orleans. Hugh Capet, son of Hugh the Great (great grandson of Robert the Strong), founded the third French dynasty in 987. One of his descendants, named Robert, was the root of the elder line of the dukes of Burgundy, which became extinct in 1361. A descendant of this Robert, Henry of Burgundy, was first regent of Portugal in 1095, where his legitimate descendants became extinct in 1383. Pierre de Courtenay, a descendant of Hugh Capet, in the fifth generation, was father and ancestor of many emperors of Constantinople. The house of Anjou descended from Hugh Capet, in the eighth generation, possessed the throne of Naples for two centuries, and for some time that of Hungary. Another descendant of Hugh Capet, in the 10th degree, founded the house of Navarre, which continued from 1328 to 1425. A second family of Anjou, descended from Hugh Capet, in the 13th degree, gave some distinguished princes to Provence. In the same degree, the younger line of the powerful dukes of Burgundy derived its origin from him. This line became extinct with the death of Charles the Bold, in 1477, whose successor, Maria, married Maximilian, archduke of Austria, and became grandmother of Charles V. Robert, Earl of Clermont, second son of St. Louis, married Beatrice, Duchess of Bourbon. In this way the city of Bourbon l'Archambault, or Bourbon les Bains, in the department of Allier (formerly Bourbonnais), became the birthplace of the house of Bourbon, and Louis I., Duke of Bourbon, son of Robert and Beatrice, its founder. Two branches took their origin from the two sons of this Louis, Duke of Bourbon, who died in 1341. The elder line was that of the dukes of Bourbon, which became extinct at the death of the Constable of Bourbon in 1527, in the assault of the city of Rome. The younger was that of the counts of La Marche, afterward counts and dukes of Vendôme. Of these, Charles, Duke of Vendôme, who died in 1537, and who had been the head of the house of Bourbon since the death of the Constable, had two sons, Anthony and Louis, founders respectively of the royal line of Bourbon, and of the line of Condé. Henry, the son of Anthony, obtained the throne of France as Henry IV., when the house of Valois became extinct in 1589 by the murder of Henry III. His father had obtained the kingdom of Navarre through his wife, who inherited it, and Henry now added it to the French dominions. Anthony's younger brother Louis, Prince of Condé, was the founder of the line of Condé. There were, therefore, two chief branches of the Bourbons — the royal, and that of Condé. The royal branch was divided by the two sons of Louis XIII., the elder of whom, Louis XIV., continued the chief branch, which, through his son, Louis (the dauphin), and grandson, Philip V., was separated into the elder or royal French branch, and the younger or royal Spanish branch; while Philip, younger son of Louis XIII., founded the house of Orleans, when he received the duchy of Orleans from Louis XIV. The kings of the elder or French line of the house of Bourbon are as follows: Henry IV., Louis XIII., XIV., XV., XVI., XVII., XVIII., and Charles X. The house of Bourbon consists of the following branches and members:

A. *The Elder French Royal Line of Bourbons as Distinguished from the Younger Branch or House of Orleans.* The last sovereigns of this line were three brothers, Louis XVI., Louis XVIII., and Charles X. (Louis XVII., son of Louis XVI., never obtained the crown), all of whom were grandsons of Louis XV. Louis XVIII. had no children, but Charles X. had two sons, namely: Louis Antoine de Bourbon, Duke of Angoulême, who was dauphin till the revolution of 1830, and died without issue in 1844, and Charles Ferdinand, Duke of Berry, who died 14 Feb. 1820, of a wound given him by a political fanatic. The Duke of Berry had two children, (1) Louise Marie Thérèse, called Mademoiselle d'Artois, and afterward by marriage Duchess of Parma, died at Venice, 1 Feb. 1864; and (2) Henri Charles Ferdinand Marie Dieudonné, born in 1820, and at first called Duke of Bordeaux, but afterward Count de Chambord. His mother was the Princess Caroline, daughter of Francis I., king of the two Sicilies. Charles X., having abdicated in favor of his grandson Henri above mentioned in 1830, and the dauphin having renounced his claims on the French throne also in favor of the latter, the Count de Chambord was until his death looked upon by his party as the legitimate heir to the crown of France, and was styled by them Henri V.

B. *The Branch of the Bourbons Known as the House of Orleans.*— This branch raised to the throne of France by the revolution of 1830, and deprived of it by that of 1848, derives its origin, as already mentioned, from Duke Philip I. of Orleans (d. 1701), second son of Louis XIII., and only brother of Louis XIV. By his second wife, Charlotte of the Palatinate, he left as his successor in the dukedom his son Philip, known as Duke of Chartres during his father's lifetime, and was regent of France during the minority of Louis XV. Philip, second Duke, was succeeded by his son, Louis Philip (b. 1703), who married a princess of Baden, and died in retirement in 1752, leaving a son of the same name. Louis Philip, Duke of Orleans, who was born in 1725, and died in 1785. The son of the last-mentioned Duke was Louis Joseph Philip, the Duke of Orleans whose name figures in the first French Revolution, who perished on the scaffold in 1793, after he had laid aside his princely name the year before and assumed that of «Citizen Egalité.» He left four children: (1) Louis Philip, before the Revolution Duke of Chartres, after his father's death Duke of Orleans, from 1830 to 1848 king of France, died 26 Aug. 1850, leaving a numerous family; (2) the Duke of Montpensier, who died in England in 1807; (3) the Count de Beaujolais, who died at Malta in 1808; and (4) a daughter, Adelaide, Mademoiselle d'Orleans, born in 1777, died 31 Dec. 1847. The eldest son of King Louis Philip was Ferdinand, Duke of Orleans (b. 1810, d. 1842), who married a daughter of Frederick Louis of Mecklenburg-Schwerin, and left two sons: (1) Louis Philip, Count de Paris, b. Paris, 24 Aug. 1838; and (2) Robert, Duke of Chartres, b. Paris, 1840. Louis Philip having abdicated in favor of the former in 1848, the Count de Paris till his death in 1894 was looked upon by the Orleanists as the true heir to the throne. He was married to his cousin, Isabella, a daughter of the Duke of Montpensier, and left issue.

C. *The Spanish-Bourbon Dynasty.*— In 1700 Louis XIV. placed his grandson Philip, Duke of Anjou, on the Spanish throne, who as Philip V. founded the Bourbon dynasty in Spain. Philip V. was succeeded in 1746 by his son, Ferdinand VI., who, dying in 1759 without heirs, was succeeded by his brother, Charles III. To him succeeded (1788) his son Charles IV., who, in 1808, resigned the throne in favor of a successor nominated by Napoleon, and died at Naples in 1819. His son Fernando, Prince of the Asturias, obtained the crown on the fall of Napoleon, and reigned as Ferdinand VII., dying 29 Sept. 1833, and leaving behind him two daughters by his third marriage, the elder of whom succeeded him as Isabella II. She was married, in 1846, to her cousin Francisco de Assis. In 1868 she had to leave Spain in consequence of the revolution, and in 1870 she renounced her claims to the throne in favor of her son Alphonso, who became Alphonso XII., and died in 1885, his son, Alphonso XIII., succeeding him.

D. *The Royal Line of the Two Sicilies.*— The Two Sicilies being then a possession of the Spanish monarchy, in 1735 Don Carlos, the younger son of Philip V. of Spain, obtained the crown and reigned over Sicily and Naples as Charles III. In 1759, however, he succeeded his brother Ferdinand VI. on the Spanish throne, when he transferred the Two Sicilies to his third son Fernando (Ferdinand IV.), on the express condition that this crown should not be again united with Spain. Ferdinand IV. had to leave Naples in 1806; but after the fall of Napoleon he again became king of both Sicilies under the title of Ferdinand I. He was succeeded by his son Francis I. in 1825; Francis was succeeded by his son Ferdinand II. in 1830; and the latter was succeeded by his son Francis II. in 1859, who was deprived of the kingdom in 1860.

E. *The Ducal Line of Parma.*— This line, like that of the Two Sicilies, was founded by a son of Philip V. of Spain, namely: Don Philip, his youngest son, who obtained the duchies of Parma and Piacenza in 1748. Louis, grandson of Don Philip, obtained Tuscany likewise (1802), with the title of king of Etruria. The family did not long retain this honor, however, being soon forced by the power of France to give up not only Etruria, but also Parma and Piacenza; and it was not till 1847 that there was again a Bourbon Duke of Parma. In 1859 the reigning Duke, Robert, had to leave his dominions, which were soon incorporated in the kingdom of Italy. See Coiffier Demoret, 'Histoire du Bourbonnais et des Bourbons' (1824); Achaintre, 'Histoire Chronologique et Généalogique de la Maison Royale de Bourbon' (1825); Coxe, 'Memoirs of the Kings of Spain of the House of Bourbon' (1815); Lehes, 'Généalogie des Bourbons de France, d'Espagne, de Naples, et de Parme' (1880); Bingham, 'The Marriages of the Bourbons' (1890).

Bourbon, Isle of. See RÉUNION, ISLE DE LA.

Bourbon-Lancy, läṅ-se, a French watering place, department Saône-et-Loire, famous for its thermal springs, containing chloride of sodium and iron. Its situation is notably fine, and by the Romans it was called Aquæ Nisineii or Nisienses. Remains of the Roman baths are still to be seen here, and the town contains a hospital, built by the Marquis d'Aligre, with 400 beds. Pop. (1896) 4,162.

Bourbon-Vendée, vŏṅ-dā, **Napoléon-Vendée,** or, since the dissolution of the Second Empire in 1870, **La Roche-sur-Yon,** a town in France, the capital of the department Vendée, 231 miles southwest from Paris, situated on a hill on the right bank of the Yon. The streets nearly all end in a spacious square, bordered with ranges of fine trees, and surrounded by public monuments and elegant mansions. The parish church, with a peristyle of six Doric columns, and the mairie or mansion-house, an elegant Italian building, are both in the square. Besides these there are an elegant market-house, theatre, and extensive public offices, large barracks, and a small public library. There is an active trade in woolen cloth, and hardware. It was founded by Napoleon I. on the site of the ancient castle of Roche-sur-Yon, destroyed at the Revolution, and received the name of Napoléon-Vendée, which was changed to Bourbon-Vendée at the Restoration. Pop. (1891) 12,215.

Bourbon Whisky, a term applied to Kentucky whisky, made from a mixture of corn, rye, and malt, of which the corn constitutes the larger part. In its distillation some of the oils and acids are allowed to remain. These, with age, undergo chemical action, and are converted into aromatic ethers.

Bourbonnais, a province and government of old France, with the title, first of a county, and afterward of a duchy, lying between the Nivernais, Berry, and Burgundy. It now forms the department of the Allier. It derived its name from the small town Bourbon l'Archambault, from which the Bourbon family received their title. Consult Montegut, 'En Bourbonnais et en Forez' (1880).

Bourbonnais, boor-bŏn-nā, Ill., a village in Kaskaskia County, 56 miles south of Chicago, the seat of two important Roman Catholic schools, Notre Dame Academy, and Saint Viateur's College, opened in 1865. Pop. 595.

Bourbonne-les-Bains, boor-bŭn-lā-bān, a town of France, department of Haute Marne, 21 miles east-northeast of Langres, with hot springs, which were resorted to by the Romans. They contain much chloride of sodium, with a temperature which varies from 140° to 150° F., and frequented by some 3,000 invalids annually. The town has a 12th century church, a large military hospital, and interesting ruins of an ancient château. Pop. (1896) 4,156.

Bourboule, boor-bool, **La,** France, a health resort in the department of Puy-le-Dome, 22 miles southwest of Clermont. It is picturesquely situated amid striking scenery and its mineral thermal springs are visited by over 7,000 persons yearly. Its waters when bottled are extensively exported for medicinal use. Pop. 1,947.

Bourchier, boor'chĭ-ėr, **Arthur,** English actor: b. Speen, Berkshire, 22 June 1864. He was educated at Oxford where he was prominent in amateur theatricals and in 1889 went upon the stage. He has played in leading theatres in England and the United States and took the Royalty Theatre in 1895 when he brought out one of his own adaptations, 'The Chili Widow,' which ran 300 nights, and the Garrick Theatre in 1900, where he produced Barrie's play, 'The Wedding Guest.'

Bourdaloue, Louis, loo-e̤ boor-da̤-loo, the founder of genuine pulpit eloquence in France: b. Bourges, 20 Aug. 1632; d. Paris, 13 May 1704. He was sixteen when he entered the society of Jesuits and his instructors successively entrusted to him the chairs of polite letters, rhetoric, philosophy, and moral theology. In 1669 he entered the pulpit, and extended his reputation by attacking, with a powerful and religious eloquence, free from the bad taste of the age, the passions, vices, and errors of mankind. The dignity of his delivery, and the fire of his language, made him distinguished, amidst the victories of Turenne and the feasts of Versailles, among the master-spirits of the arts and of literature in the time of Corneille and Racine. Louis XIV. invited him, in 1670, to preach before the court, and Bourdaloue acquitted himself with so much success that he afterward received invitations at 10 different times. After the repeal of the Edict of Nantes, he was sent to Languedoc, in order to explain to the Protestants the doctrines of the Roman Catholic faith, and he succeeded in this difficult business in reconciling the dignity of his office with the rights of mankind. In his latter days he devoted himself to the care of hospitals, prisons, and religious institutions. He well knew how to accommodate his manner to the capacity of those to whom he gave instruction, advice, or consolation. With the simple, he was simple; with the learned, he was a scholar; with free-thinkers, he was a logician; and came off successful in all those contests in which the love of his neighbor, religious zeal, and the duties of his office, involved him. Beloved alike by all, he exercised authority over the minds of all; and no consideration could make him give up his openness and integrity of character. His 'Sermons and Moral Discourses' appeared in English (3d ed. 1855); and 'Married Life: Its Obligations and Trials' (1897). See Fengère, 'Bourdaloue, sa prédication et son temps' (1874); Tousserat, 'Etude généalogique sur les Bourdaloue' (1900).

Bourdillon, Francis William, English poet: b. 22 March 1852. He has taught private pupils for many years and as a poet is widely known as the author of the lyric, 'The Night Has a Thousand Eyes.' His published works include 'Among the Flowers' (1878); 'Aucassin and Nicolette' edited and translated (1887); 'Ailes d'Alouette' (1890); 'A Lost God' (1891); 'Sursum Corda'; 'Nephele,' a much admired musical romance (1896); 'Minuscula' (1897).

Bourdon, Sébastien, sā-băs-te̤-ŏn̄ boor-dôn̄, celebrated French painter: b. Montpellier, 1616; d. 1671. Being poor and without occupation, he enlisted as a soldier. After receiving his dismission, he visited Italy, and studied under Poussin and Claude Lorraine. In 1652 he was driven from the French kingdom by the religious troubles, when he was appointed first painter to Queen Christina of Sweden. He afterward became distinguished in his own country by many great works, among which are the following: the 'Dead Christ,' the 'Old Kings of Burgundy in the Senate-house at Aix,' the 'Adulteress.' He had no peculiar manner, but he imitated others. He was a good engraver on copper. He died while engaged in painting the ceiling of the Tuileries.

Bourdon, named after the inventor, a barometer consisting of an elastic flattened tube of metal bent to a circular form and exhausted of air, so that the ends of the tube separate as the atmospheric pressure is diminished, and approach as it increases. The Bourdon is commonly known as the metallic barometer, although the aneroid is also metallic, and both holosteric.

Bourdon de L'Oise, François Louis, fran̤-swä loo-e boor-dôn̄-dė̤-lwäz, French revolutionist: b. Saint Remy, about 1750; d. Cayenne, Guiana, after 1797. He figured in the attack on the Tuileries, 10 Aug. 1792, and did much to bring to pass the execution of the king and the fall of the Girondists, but from July 1794, adopted the side of the nobles and clergy. After joining a Royalist club he was proscribed and transported to Cayenne in 1797, where he died not long after.

Bourg-en-Bresse, boorg-ăn̄-brĕs, a town of France, capital of the department of Ain, situated 232 miles southeast of Paris, on the Reyssouse and the Cône. It is well built, and ornamented with public fountains, one of which was erected to the memory of Gen. Joubert. On the Promenade du Bastion is a bronze statue of Bichat, the celebrated anatomist, who pursued his early medical studies in the hospital here. The parish church of Bourg-en-Bresse is a handsome edifice of the 16th century. Outside the town is a magnificent hospital, surrounded by gardens; and the beautiful Gothic church of Brou, built by the direction of Margaret of Austria, daughter of Maximilian I. In front of the portal stands a curious elliptical sun-dial, reconstructed by the celebrated astronomer Lalande, who was a native of this place. Bourg-en-Bresse has a library, a museum, a lyceum, seminary, two hospitals, a lunatic asylum, some manufactories of linen and hosiery, tanneries, a cotton-mill, grain market, etc. Its trade in grain, cattle, horses, and wine is considerable. Pop. (1896) 18,501.

Bourgelat, Claude, klōd boorzh'la̤, French lawyer, founder of the veterinary schools and creator of the art of veterinary surgery in France: b. Lyons, 1712; d. 3 Jan. 1779. He established the first veterinary school in his native town in 1762, and by his works on the veterinary art furnished the world with a complete course of instruction both in its theory and in its practice: they include 'Eléments d'Hippiatrique, ou Nouveaux Principes sur la Connaissance et sur la Médecine des Chevaux' (1750–3); and 'Traité de la Conformation Extérieure du Cheval' (1776).

Bourgeois, Charles Arthur, Baron, shärl är-tür boor-zhwä, French sculptor: b. 1838; d. 1886. He was a student of Duret and M. Guillaume. Among the more notable of his works are the 'Arab Washerwoman'; and the 'Greek Actor,' in bronze; 'St. Agatha'; 'The Slave'; and 'Hero and Leander,' in plaster; 'The Delphic Pythos' and several busts in marble, and 'St. Joachim' and 'Religion,' two stone figures for the church of St. Eustache and the Church of the Sorbonne, respectively.

Bourgeois, Leon Victor Auguste, lā-ŏn̄ vĕk-tōr â-goost, French politician: b. Paris, 1851. After holding several positions of importance he became director of the ministry of the

interior in 1886 and in 1887 prefect of police. He was minister of the interior in 1889; minister of public instruction 1892–3 and prime minister 1895–6. He was for a time in 1898 minister of public instruction for the second time, and in 1899 was at the head of the French delegation to the peace conference at The Hague. He has written 'Solidarité' (1897).

Bourgeois, Sir Peter Francis, English painter: b. London, 1756; d. 8 Jan. 1811. At first intended for a military career, he soon determined to become an artist. In 1776 he went on a tour through France, Holland, and Italy, and three years later he exhibited his first picture. Elected A.R.A. in 1787, he became R.A. in 1793, and landscape painter to George III. in 1794. King Stanislaus of Poland in 1791 appointed him his painter and conferred on him the honor of knighthood, and shortly afterward George III. also knighted him. He bequeathed many pictures and a considerable sum of money to Dulwich College.

Bourgeois, bŭr-jois', a size of printing type larger than brevier and smaller than long primer, used in books and newspapers.

Bourgeoisie, boor-zhwä-zę, a name applied in France to citizens of towns who do not belong to the nobility or clergy, and in a narrower sense to townspeople occupying an independent position — merchants, tradesmen, independent artisans, lawyers, etc. In the early period of the Middle Ages this class was much oppressed, and as a consequence of that it was poor and possessed little culture and refinement. In subsequent centuries it succeeded in raising itself in all these respects, and latterly attaining a position of political equality with the nobility and clergy, came to be spoken of as the "third estate" (*tiers état*). The word is now used in a somewhat vaguer sense than formerly, and may be taken to correspond with the equally vague English appellation the "middle classes."

Bourges, boorzh, France, capital of the department of Cher, 124 miles south of Paris, on the canal of Berry and the Central railroad, in an extensive plain, at the confluence of the Auron and the Yévrette. When the Romans invaded Gaul, it was known as Avaricum, the capital of Biturigescubi. It was taken by Cæsar, 52 B.C., and almost all its inhabitants slaughtered. Under the name of Bituriges, it was for 475 years the metropolis of Aquitania. During the Middle Ages, many councils were held here. The French clergy assembled here in 1438 to receive the famous charter known as the Pragmatic Sanction, by which the liberties of the Gallican church were secured. Jacques Cœur and Louis XI. were both born here. The former established here in 1463 a university, where Cujas taught during the 16th century. Bourdaloue, the famous preacher, was born here in 1632. Don Carlos resided here from 1839 to 1845, when he signed the abdication in favor of his son. The trial of Louis Blanc, Albert, and others, took place before the supreme court at Bourges, 7 March to 2 April 1849. The city is partly surrounded by a thick wall, flanked with lofty towers; its streets are irregularly laid out, while the houses are generally mean-looking, with their gables to the street. Among the old buildings which it contains are the magnificent cathedral, larger than Notre Dame de Paris, and one of the finest Gothic monuments of Europe; the city hall, built at great cost by Jacques Cœur as a dwelling-house, and now occupied as the Palais de Justice; and the palace of the archbishop. The establishments of public instruction, including the imperial college, the theological seminary, and the normal school, are well patronized. Bourges has manufactories of fine and coarse cloths, iron foundries, and tanyards. Pop. (1896) 43,587.

Bourget, Paul, pōl boor-zhā, French novelist: b. Amiens, 2 Sept. 1852. After a brilliant course at the Lyceum of Clermont-Ferrand, where his father was professor of mathematics, and the College of Sainte Barbe, he graduated with high honors in 1872. He began to write in 1873, but it was 10 years before he found his true work, though he contributed, the while, numerous articles to the magazines, and published three volumes of striking verse, 'La Vie Inquiète' (1875); 'Edel' (1878); and 'Les Aveux' (1881). His 'Essais' (1883) was the first indication of his strength. The second series, 'Nouveaux Essais de Psychologie Contemporaine' (1886), was a singularly subtle and exceedingly searching inquiry into the causes of the pessimism then widely prevalent in France. Bourget's first novel, 'L'Irréparable' (1884), was followed by 'Cruelle Énigme' (1885); 'Un Crime d'Amour' (1886); 'André Cornélis' (1887), and 'Mensonges' (1887). The keen insight into the hidden springs of human motive, and the marvelous subtlety of psychological analysis of these stories, together with their clearness and refinement of style, have lifted Bourget into the front rank of contemporary French novelists. His intimate knowledge of English and Italian life, and his travels in Spain and Morocco, gave him the material for 'Sensations d'Italie' (1891); and 'Cosmopolis' (1892); and he recorded his impressions (1894) of travel in the United States. Other novels are 'Le Disciple,' 'Notre Cœur,' 'La Terre Promise,' 'Un Saint,' 'Antigone,' 'Drame de famille' (1900); 'Un homme d'Affaires' (1901); 'La fantôme' (1901). Bourget was admitted to the Academy in 1894.

Bourgoin, Edmé Alfred, ĕd-mā ăl-frā boor-gwăn, French chemist: b. Saint Cyr-les-Colonne, 1836. In 1867 he became chief pharmacist of the Children's Hospital in Paris and has been director of the central pharmacy of the Paris hospitals from 1885. Among his writings are 'Electro-chimie' (1868); 'Chimie organique, Principes de la classification des substances' (1876); 'Traité de Pharmacie galénique' (1880).

Bourgoin, a French town, capital of a canton in the department Isere in southeastern France. It is situated on the River Bourbre and was called by the Romans Bergusium. It contains important paper, linen, and woolen industries. Pop. (1901) 7,279.

Bourgoing, Jean François, zhŏn fran-swā boor-gwan, French diplomatist: b. Nevers, 20 Nov. 1748; d. Carlsbad, 20 July 1811. While at a military school in Paris his talents were so marked that he was educated by the government at the University of Strassburg for the diplomatic service. After four years spent in Germany on diplomatic missions he went to Madrid in 1777 and was secretary of legation there

seven years, writing in that time his noted 'Nouveau voyage en Espagne, ou Tableau de l'état actuel de cette monarchie' (1789). In 1791 he was minister plenipotentiary to Spain, minister to Saxony in 1808, and was at various times employed on diplomatic missions to Germany and Holland. Besides the work above named he wrote 'Mémoires historiques et philosophiques sur Pie VI.' (1789).

Bourignon, Antoinette, än-twän-ĕt boo-rẹ-nyôn, Flemish visionary: b. Lille, 13 Jan. 1616; d. Franeker, 30 Oct. 1680. She was born so ugly that her parents held a consultation to determine whether it would not be better to destroy her as a monster. She was spared, but her infancy was spent in neglect and solitude. The first books she put her hands on were lives of early Christians and mystical tracts, which she read eagerly. She entered a convent and was subsequently in charge of a hospital at Lille, but was obliged to leave on account of her religious vagaries. She held that religion consists in internal emotion and is independent of knowledge or practice. Her views were adopted by large numbers of Protestants and Roman Catholics, and in the 17th and 18th centuries Scottish Presbyterian ministers were for a long time compelled to renounce Bourignianism at their ordination. Among her works are 'Treatise of Solid Virtue' (1699); 'The Light of the World' (1696, in English 1863); 'Restoration of the Gospel Spirit' (1707).

Bourinot, boo'rẹ-nŏt, **Sir John George,** Canadian publicist: b. Sydney, Nova Scotia, 24 Oct. 1838; d. 14 Oct. 1902. He was educated at Trinity College, Toronto; founded and edited the Halifax *Reporter,* became clerk of the Dominion parliament in 1880; was created a member of the Order of St. Michael and St. George in 1890; and in 1892 became president of the Royal Society of Canada. His publications include 'The Intellectual Development of the Canadian People' (1880); 'Manual of Constitutional History' (1888); 'Parliamentary Government in Canada' (1892); 'Parliamentary Procedure and Practice' (1884); 'How Canada is Governed' (1895); 'Canada's Intellectual Strength and Weakness' (1893); 'Canada Under British Rule' (1900); 'Cape Breton and Its Memorials of the French Régime' (1892).

Bourke, John Gregory, American military officer: b. Philadelphia, Pa., 23 June 1846; d. 8 June 1896. He was graduated at West Point in 1869, and saw much service against the Indians, rising through various grades to the rank of major. He became an expert in American ethnological lore; was a past president of the American Folk-lore Society, and wrote 'Snake Dance of the Moquis,' 'Medicine Men of the Apaches,' and other books. He distinquished himself on the Mexican border. He was an officer of great courage and ability.

Bourmont, Louis Auguste Victor, loo-ẹ â-goost vēk-tor boor-môn, (DE CHAISNES COMTE DE), marshal of France: b. 2 Sept. 1773, at the castle of Bourmont in Anjou; d. there 27 Oct. 1846. At an early age he took part in the campaign in La Vendée, at a later period entered the Republican army, and was advanced by Napoleon, under whom he had distinguished himself at Dresden and Nogent, to the rank of general of division. Although he had gone over to the Bourbons in March 1814, Napoleon, on his return from Elba, gave him a command, which, however, Bourmont resigned before the battle of Ligny, in order to go over to the side of the allies. Some years after, as commander of the army of intervention in Spain, he obtained some brilliant successes. His greatest victory was the conquest of Algiers, which procured him a marshal's staff in 1830. After the revolution of July 1830, he followed the banished dynasty into exile. In 1833 Dom Miguel, king of Portugal, placed him at the head of his troops which were to act against the adherents of Dom Pedro; but he was unsuccessful. He afterward sought to act in the interests of the Carlists in Spain, and when he at last returned to his native country found that he had almost entirely lost his popularity, and accordingly retired for the rest of his life to his estate in Anjou.

Bourne, Edward Gaylord, American educator: b. Strykersville, N. J., 24 June 1860. He was graduated at Yale in 1883, and has been professor of history there since 1895. He has written 'The History of Surplus Revenue'; is one of the editors of the 'Yale Review'; and published a collection of his writings on historical subjects under the title of 'Essays in Historical Criticism.'

Bourne, George, American clergyman and anti-slavery writer: b. Westbury, Wiltshire, England, 1780; d. New York, 14 Dec. 1845. In 1804 he settled at Harrisburg, Pa., where he set up a printing office. He was an earnest advocate of the total and immediate abolition of slavery, a position which aroused considerable opposition to him, and in 1815 he formed a church composed of non-slaveholders. His ultra-radical views at last obliged him to remove to Germantown. Afterward he resided for intervals at Sing Sing, N. Y., Quebec, and New York, where he founded a paper, *The Protestant Vindicator.* He wrote: 'The Book and Slavery Irreconcilable' (1815); 'Lectures on Ecclesiastical History' (1822); 'Pictures of Quebec' (1830); 'Slavery Illustrated in Its Effects upon Women' (1834).

Bourne, Hugh, founder of the sect of Primitive Methodists in England: b. Fordhays, Staffordshire, 3 April 1771; d. Bemersley, Staffordshire, 11 Oct. 1852. About 1810, some of the Wesleyan Methodists were desirous of renewing the primitive form of worship and constitution, and wished particularly to revive camp meetings. These practices were considered unadvisable, and accordingly Mr. Bourne and his friends were expelled from the body. They were 20 in number, and Hugh Bourne was acknowledged their elder. The name of Primitive Methodists was adopted in 1812, but by their opponents they were long styled «Ranters.» The sect is now a powerful body in England, numbering in 1901, 198,874 members and 1,100 ministers. In the United States it has 74 ministers, 90 churches and 6,549 members. In 1844 Bourne visited the United States, where his preaching excited much attention. He also visited Canada, Scotland, and Ireland, where he met with great success in his work. He published a 'History of the Primitive Methodists' (1823), and founded, in 1824, 'The Primitive Methodist Magazine.'